Community Power Works for Hospitals

Evaluation Results

Prepared by

Washington State University Energy Program

October 2012

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905 Plum Street SE, P.O. Box 43165, Olympia, Washington 98504-3165

WSU EEP12-075

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Background

Community Power Works (CPW) for Hospitals provided support to four Seattle area hospitals to improve the energy efficiency of their facilities. The four hospitals were Group Health Cooperative, Harborview Medical Center, Swedish Medical Center, and Virginia Mason Hospital and Medical Center. CPW for Hospitals consisted of two components: one-to-one matching grants (up to $75,000) to develop Strategic Energy Management Plans (SEMPs) and Carbon Reduction Incentive Funds (CRIFs) to assist with the cost of energy-efficiency improvement projects.

SEMP. To access the CRIF dollars, the hospitals had to complete a SEMP to establish a baseline of possible actions and projects that would reduce energy use from hospital operations. As described in the CPW for Hospitals request for proposals, "A SEMP is an actionable document that identifies the current energy baseline use at a facility, creates a goal for energy consumption reduction, and lays out a plan of how to achieve this reduction."

CRIF. The CRIF was intended to provide up to $2.1 million in incentive dollars to support and encourage energy efficiency retrofits. Incentive payments were based on the metric tons of carbon dioxide ($MtCO_2e$) equivalent reduced by the project. These carbon reductions occur as a result of energy savings. The CRIF dollars were to be awarded in two phases. In Phase 1, hospitals could apply for up to $250,000 each of incentive funds from November 22, 2010 to April 29, 2011 on a non-competitive basis. All remaining funds were to be awarded on a competitive basis in Phase 2. Applications for Phase 2 were due June 15, 2011. Projects were expected to realize 15 percent energy savings and CRIF funds were not to exceed 10 percent of total project cost.

Changes. The response from the hospitals to the CRIF was slower than expected, so CPW made some changes to increase the level of participation. The incentives were increased and application deadlines extended. The initial program incentives were $10/$MtCO_2e$ over an assumed project life of 10 years. The incentives were increased to $25 for electricity and natural gas savings and $35 for steam savings[1] for project applications received by February 15, 2012. The incentives dropped to $15 and $25, respectively, for applications received by April 15, 2012. However, the 10 percent match of total project costs cap and the 10 years assumed project life remained unchanged.

In addition, the 15 percent energy savings requirement was modified. This requirement was difficult for hospitals to achieve because they are such large facilities that even large energy efficiency projects would likely only address a small portion of a facility's energy systems and energy use. To achieve large percentage reductions would require multiple projects over several years. With these constraints in mind, the energy savings requirement was modified to a square footage equivalent basis, which allowed projects with less than 15 percent savings to participate in the program.

Roles. The City of Seattle Office of Sustainability and Environment (OSE) managed the delivery of CPW for Hospitals. They issued the Request for Proposals for the SEMP and the Call for Projects for the CRIF. OSE promoted the program, communicated with the hospitals, accepted the applications, dealt with the contracting and paperwork, collected project information for reporting purposes, and managed the interaction with the technical reviewer. The hospitals relied, to some extent, on two contractors – MacDonald-Miller Facility Solutions or McKinstry – to help manage their projects, including working with OSE and dealing with paperwork and reporting. SOLARC Architecture and Engineering, Inc. provided technical quality control support and review for the SEMPs and the CRIF

[1]Incentives for steam savings were valued higher because the steam utility, Seattle Steam, does not offer energy efficiency rebates to customers.

applications. The Washington State University (WSU) Energy Program conducted the evaluation work and provided support for project reporting.

Evaluation. In June and July 2012, the WSU Energy Program conducted interviews with staff from the four hospitals and with two contractors that worked with the hospitals. WSU also collected and reviewed tracking data and documents on the work completed at the hospitals. The results of our evaluation analysis are summarized below.

Key Findings

- The hospitals said the **support from CPW to develop the SEMPs was valuable**. It allowed them to bring together information from different places into one document; helped identify and prioritize energy projects; aligned energy projects with their capital plans and facility master plans; and provided a way for them to track their progress. They view the SEMP as a living document and hope to update it in the future.
- The hospitals **used CRIF support for energy efficiency projects that were already in their capital plans or being considered for implementation.** They expect to complete five energy efficiency projects.[2] While all these projects were already planned, in a few cases CRIF support allowed them to do more sooner.
- The hospitals **took advantage of a small portion of the CRIF** ($323,151 of the $2.1 million available).
- The hospitals cited several related factors for **why they did not pursue more** of the available funding:
  - The **timelines were too short** to develop projects.
  - Their **capital funds were already allocated** to other projects.
  - The **incentive was too small** to motivate them to identify other projects.

In summary, as one hospital staff person said, to use the $2.1 million CRIF, the hospitals would have needed to generate over $20 million in capital projects in a year or so. They did not have the capital funds to do this or the capacity to implement this volume of work in such a short period.

Overview of Projects

CPW for Hospitals provided a little over $500,000 for the SEMPs and CRIF energy efficiency projects at the four Seattle-area hospitals (Table 1). Total costs for the five projects exceeded $5.6 million. CPW incentives covered about 6 percent of this cost. Annual carbon savings was estimated at over 1,250 tons.

There was a wide range in project costs, from $2.6 million to $340,000. Four of the projects dealt with fans, air handlers and ventilation systems. One involved boiler and steam system improvements. Energy savings were split between electricity, natural gas and steam, with electricity accounting for the smallest share. One of the projects saved only electricity, one saved mostly natural gas, and the rest were split between electricity and steam savings, with steam being the largest share in two cases.[3]

[2] As of summer 2012, three of these projects were complete.
[3] This comparison of savings is based on common energy units (million Btu) for each fuel type.

Table1: Summary of CPW for Hospitals Projects					
Hospital	**SEMP CPW Match $**	**Project Description**	**Total Project $**	**CRIF $**	**Carbon Savings ($MtCO_2e$)**
Group Health	75,000	Boiler Optimization and Steam Trap Replacement	343,173	33,816	225
Harborview	61,000	Surgical Unit Fan Replacement	1,556,816	67,672	252
Swedish	28,203	Main Surgery Air Handler Upgrade	2,600,000	142,713	442
Virginia Mason	15,074	VAV System Controls and Boxes Upgrade and Replacement	640,000	50,397	202
		Main Hospital Fans	548,490	28,553	133
Total [4]	179,276		5,688,479	323,150	1,254

The SEMPs ranged in cost from $30,000 to a little over $150,000, reflecting a fairly wide range in the level of effort. CPW specified that a SEMP include the following five elements:[5]

- Detailed facility assessment (energy audit), including system energy modeling data where appropriate.
- Detailed utility data analysis, including system performance benchmarking.
- Five-year plan for energy conservation goals.
- Identification and engineering review of proposed facility improvement measures, including building envelope analysis.
- Year-over-year strategic implementation strategy of the identified facility improvement measures.

All of the SEMPs included these elements, but the level of detail and focus varied. There tended to be more emphasis on identifying and listing facility improvement measures. This reflects the need to identify projects for the CRIF. However, some of the hospitals used the SEMP to take a little broader look at their facilities and opportunities.

The level of effort for the SEMP also reflects how much previous work had been done. All of the hospitals had done previous energy studies, some more than others. One of the hospitals had already developed a SEMP.[6] So, each hospital tailored the SEMP to their needs and the requirements of CPW.

[4] Due to rounding, the totals may not exactly match the sum of the values in the columns.
[5] These elements draw on the work of the Northwest Energy Efficiency Alliance's BetterBricks Initiative to promote strategic energy management planning in hospitals.
[6] Through the BetterBricks Hospital's Initiative.

Feedback from the Interviews

The interviews asked for input in three areas: SEMPs, CPW's incentive program for Hospitals (CRIF) and the projects that were supported, and future plans for energy efficiency improvements and how the City of Seattle can support these efforts. The responses from hospital staff and contractors are summarized here by major topic area.

Value of the SEMP

The hospitals are using the SEMP to identify and prioritize energy projects and align them with their capital plans and their facility master plan. Hospital representatives said the following:

- "It **helped prioritize** things that were more aligned with our master plan"
- "A guiding document for **how to allocate capital dollars** for infrastructure projects with energy component"
- "Looking at pull out of SEMP and incorporate projects into our capital plan so we get the **best bang for whole global system**"

One hospital noted that the primary use for the SEMP was applying for the CRIF, but they would like to use it as a plan for capital funding requests.

One of the benefits that hospital staff and contractors mentioned for the SEMP is that it **brought together a lot of information** in one document. They had all done energy studies before, but the SEMP allowed them to put the information together **in an organized format**. Instead of looking at individual projects in a piecemeal fashion, they could look at the facility as a whole and look for synergies and prioritize projects that provide the greatest benefit.

The hospitals paid half the cost of developing the SEMP. **When asked if it was worth it, the responses were mixed.** Some said it was "fairly worth the effort" and "kind of marginal." Another noted that it was not worthwhile at the moment, but was confident they would get a return on their investment as they use the SEMP in the future. Another said that the SEMP grant got them to take action that they would not otherwise have done, and this comment was reinforced by one of the contractor responses. **In general, they would recommend the SEMP to other hospitals**, but felt it would be less valuable for hospitals that already have done a lot of energy study work and have a fairly good grasp of their needs (or where management does not support energy efficiency goals).

Most of the respondents viewed the **SEMP as a living, dynamic document** that should be updated. They noted that buildings and operations change and that they make improvements incrementally. However, they were a little less sure about whether they would update the SEMP. Some were more focused on doing the projects that were listed than updating the SEMP.

Improving the SEMP process

The respondents did not have a lot of suggestions for improving the SEMP process. One said the process was "all right" and a couple noted that they got involved in the process mid-stream. One person said they thought the core ideas for the SEMP process were good: the 50 percent match, some guidelines and the technical review. In general, there were few complaints about the SEMP process.

Two primary suggestions for improvement emerged from the comments:

- **Allow enough time to complete the SEMP:** It takes time to develop a thorough SEMP. As one person noted, it is not something that can be "slammed together." It is important to have time to identify, weed out and integrate opportunities.

- **Improve communication about requirements and expectations:** It was not clear how things worked at the start. It was not explained well. One representative comment was, "It kept being a moving target."

Why they did a CPW project

The hospitals identified two reasons for doing a CPW CRIF project: **they were asked** and **the financial incentives**. Just being asked to participate and the attention that was being given to CPW were among the main reasons the hospitals gave for doing a project. The incentives were the other reason. All of them mentioned that the incentives were important. One said that initially the incentives were not high enough, but when they were increased, it helped provide motivation. Another person noted that the incentives helped to sell a project to hospital management. Only two people mentioned energy savings; this did not seem to be an important motivator for doing a project.

To respond to CPW, **the hospitals found projects that were already being considered or planned that delivered enough energy savings to qualify**. In many cases these projects addressed reliability issues or other problems that needed to be addressed. For example a very old surgical fan that was a reliability risk was replaced. In another case, 25-year-old controls that were failing were replaced.

While the CPW incentives did not get the hospitals to do projects they were not already considering, they did have an influence. One hospital respondent said it took a project that was being considered and "pushed it over the edge" and got it approved. Another said it helped move a planned project along and "get it off the ground." Another hospital was able to do some extra measures on a project already in the queue.

Why they did not do more CPW projects

The main reason the hospitals did not do more CPW projects was **an issue of capital budgets and timing**. They have to live within the constraints of capital funding cycles. As explained by a hospital staff person, their capital funds were already allocated or they simply did not have the capital:

> "They are trying to spend our capital money. They have 2 million ($) in grant money; 10 percent payback. We hospitals would need to spend 20 million dollars to use 2 million ($). **Our capital cycles do not line up to what their deadlines were**. Even if we had the money, they were asking to recreate a capital cycle. The organizations are not going to do it. It did not line up with our capital funding timelines when they needed it done. It was off timing. They did not understand why we were not taking advantage of it. I already have my capital cycle written and I don't have you in it."

The hospitals did look for projects for CPW, but **they did not have more projects lined up that had a large enough energy component**. As one person said, "[there are] not a lot of projects that are going to give us deep energy savings. [We] have reliability issues [we] need to deal with. Need to do what is important."

One of the motivations for doing a project was the incentive dollars, but the feedback from the respondents was that **"the effort versus the reward did not make sense."** The incentive of up to 10 percent of the capital cost[7] was "not enough to move the needle." It was not worth it for them to go to any extra effort to come up with more projects. While the incentive amount per ton of carbon reduction was increased, the incentives still only covered a small portion of the project cost.

[7] In all cases the incentive turned out to be less than 10 percent.

How to improve the CRIF

The hospital staff and contractors had several suggestions for improving the CRIF process:

- **The program needs to consider and align with the hospital's capital funding cycles**. This requires developing a longer-term relationship and partnership with the hospitals and extending the timelines for the program. Hospitals need to know what kind of program support will be available in future years when they are developing their capital budgets.
- **Increase incentive levels.** While the hospitals appreciated the incentives they received, the incentives need to be higher if the program wants to get their attention. They were clear that incentives of up to 10 percent of the project cost were not sufficient.
- **Communicate program requirements at the beginning.** The process needs to be clearer and better organized up front. The hospitals found the process confusing and they found out about too many requirements at the last minute. One person suggested providing participants with a packet that described the steps and requirements at the beginning. Another suggested producing a frequently asked questions document.
- **Simplify the paperwork burden.** Some found the paperwork burden to be a little high, which may be due in part to the federal funding for this program. They mentioned the paperwork to close out the projects, long contracts, and terms and conditions language that required involvement from their legal departments. That some of this may not have been expected added to the sense of burden (see previous suggestion). The burdens a program imposes along with modest incentives can make the program not worthwhile.
- **Continue the simple application process.** There were positive comments about the application process and getting a project started. The hospital respondents indicated that this was fairly simple and straightforward. The issues seemed to be related to the end of the process and unexpected requirements that came up at project close out.

Future plans

All of the hospitals have future plans to implement projects that will provide energy savings. Many of these projects are aimed at addressing infrastructure needs, but they also result in energy savings. Potential future projects mentioned in the interviews included chilled water system upgrades (often addressing increased demand for chilled water), steam plant and boiler upgrades, steam trap work, variable speed drives on air handlers, and heat recovery systems.

When hospital respondents were asked how the City could help with completing these projects, several suggestions were made:

- **Assist the hospitals with identifying and developing energy efficiency projects.** Hospitals do not often have the in-house knowledge or resources to do this. The effort to do the analysis, design and development of a project can be significant. The utilities (e.g. Seattle City Light) require a significant amount of engineering work to justify their project incentive payments. This can be a barrier. Related to this, the City could help the hospitals keep their SEMPs up to date.
- **Incentives are important.** Capital dollars are scarce and there are competing needs for those dollars. Incentives can raise the profile of projects with significant energy components and make it easier for them to compete for capital funds. Incentives can help hospital

administrators recognize that these projects are good investments. Incentives also allow a hospital to do more (e.g., pursue greater energy savings) than they might otherwise have done.

- **Coordinate better with Seattle City Light.** In particular, combine incentives.

The hospital staff said it is hard to improve the energy efficiency of their facilities. Energy is pretty far down on the list of hospital expenditures. Capital dollars are limited, particularly in the current economic climate. There are competing demands for those dollars – medical equipment, infrastructure improvements, safety and reliability issues, etc. Health care reform adds another element of uncertainty. Yet, hospitals are big institutions with large energy demands and they offer the potential for significant energy savings.

Recommendations

The primary recommendation for supporting energy efficiency improvements in hospitals is to **develop long-term relationships and support** that help hospitals achieve significant energy reductions over time. Several elements in this long-term relationship include:

- **Provide support to the hospitals for keeping their SEMP up to date.** The SEMP is seen as a positive tool for identifying and prioritizing projects[8] in a comprehensive, rather than piecemeal, way. The hospitals can also use support to bring in experts to do the analysis and design work needed to develop and implement energy efficiency projects identified in the SEMP.
- **Provide higher incentives.** Project incentives help projects with high energy efficiency components compete for funding. Higher incentives provide greater motivation. Coordinating incentives with other energy utilities or funding sources is one way to provide higher incentive levels. Clear expectations and requirements provided up front can reduce the barriers to pursuing these incentives.
- **Align support with hospital capital budget cycles**. Projects identified and prioritized in the SEMP need to be incorporated into the hospital's capital planning process. This needs to be ongoing. Any incentive funding needs to have enough longevity or certainty to be included in the capital planning process. If these things do not occur, then the ability to influence the allocation of capital funds will be limited.

[8] A SEMP can be used for more than capital projects. It can be used for making energy efficiency improvements in facility operations and management. The SEMP was not used in this way in CPW for Hospitals and this did not come up in our evaluation, but operations and management need to be considered in any effort to improve hospital energy efficiency.