Engaging Employees in Conservation Leadership

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ABSTRACT

The merit of energy savings from behavioral based programs has often been debated and such initiatives have been downplayed in favour of more concrete, established technical measures. In this paper, the authors describe a unique behavioral-based employee engagement initiative for a commercial office building and include a discussion of results and lessons learned. The initiative discussed has since gone on to be a model for change in this jurisdiction.

The initiative is defined by its positive, action-based approach that pairs behavioral change with technical measures. The success is facilitated by strong management support and passionate employee participation and leadership. Initiative leaders and building occupants have done an excellent job in shifting the culture by establishing a link between electricity conservation and the broader environmental context. Everyone is empowered to take action.

Whole building consumption is tracked monthly using building meter data. In addition, baseline and year-end surveys provide comparisons for employee stated behaviors, environmental perceptions, and impacts of sub-initiatives. By the end of the first year, the initiative reduced electricity consumption by over 5%, resulted in measurable changes in behavior, and had engaged the majority of the buildings occupants. To date, the initiative has reduced electricity consumption by over 9%.

This paper argues that behavioral change is not only effective but also creates a culture that facilitates the adoption of technical measures. The discussion will stimulate thought about the nature of behavioral programs, the role of social marketing, and their value within a comprehensive suite of energy efficient initiatives in buildings.

Introduction

The merit of energy savings from behavioral based programs has often been debated and such initiatives have often been downplayed in favour of more concrete, established technical measures. Energy efficiency programs based on well-known technologies are easier to defend, since the link between installing a technology and the resulting energy savings is founded on well established scientific and engineering principles, and a variety of analytical methods are available to assess the program impacts associated with technology-based programs. In contrast, behavioral-based energy efficiency programs present a significant challenge for program implementers and evaluators, since in addition to some structural and regulatory barriers the link between behavior change and energy savings is much less tangible and appropriate methods to measure and attribute energy savings are limited or in the early developmental stages. Although a variety of challenges exist, the feasibility of saving energy with behavioral energy efficiency programs is gaining ground in the energy efficiency community with the advent of new results from early pilot programs and advances in the field of social marketing and behavioral psychology. Furthermore, significant potential for behavioral based employee conservation initiatives exists: BC Hydro's Conservation Potential Review 2007 estimates potential energy

savings from Behaviors and Operations and Maintenance to be 15% for Commercial Customers (BC Hydro 2007).

In this paper, the authors describe a unique behavioral-based employee engagement initiative for a commercial office building that has since gone on to be a model for other programs in the same jurisdiction. The initiative is defined by its positive, action-based approach that pairs behavioral change with technical measures. Program success is facilitated by strong management support and passionate employee participation and leadership. The paper demonstrates how the initiative leader applied methods and techniques for behavior change based on research in the field of social marketing, and documents how employee behavior and building consumption changed in the first year of this pilot program. The paper concludes with a discussion about how the program has facilitated the adoption of additional technical improvements in the building including a lighting upgrade, HVAC system optimization, and changes to lighting schedules and controls.

Literature Review

The limited ability of previous programs and campaigns to change environmental behavior has been linked to an incomplete and simplistic understanding of how human factors and social dimensions influence behaviors. In particular, the failures of the information/attitude model, which assumes that environmental knowledge and attitudes translate into desired behaviors, and the rational-economic model, which assumes that individuals will adopt actions and behaviors that are in their economic best interest, have been documented and analyzed in the literature (Costanzo et al. 1986; Stern 1992; McKenzie-Mohr and Smith 1999; Barr 2003).

In response to the limitations of traditional methods, social scientists have developed alternative theories and approaches for promoting behavior change which may be loosely categorized into psychological models (e.g. Stern 1992) and social marketing approaches (e.g. McKenzie-Mohr and Smith 1999).

- Psychological models – Focus on how key variables such as existing social and environmental values, situational factors, and psychological variables influence environmental behaviors (Barr 2003).[1]
- Social marketing – A pragmatic approach which focuses on understanding the key barriers and benefits to environmental behaviors and developing strategies that encompass key social factors such as commitment, norms, and personal contact (McKenzie-Mohr and Smith 1999).

Although there has been considerable progress towards developing new theories and techniques to better promote and sustain changes in environmental behaviors, there are limited published examples of programs that describe how theories were put into action and also report

[1] Examples of the influence of environmental values include altruism, conservative attitudes, and eco-centrism (Stern et al. 1995; Corraliza and Berenguer 2000; and O'Riordan 1985). Situation factors include convenience or access to services (Derksen and Gartell 1993), sociodemographics such as ownership (Hines et al. 1987), and previous experience with the desired behavior (Costanzo et al. 1986). Psychological variables include personality and perceptual factors, satisfaction, well-being, self-worth (De Young 1996), subjective norms (Tucker 1999), social identity (Siero et al. 1996), information transfer and imitation (Costanzo et al. 1986), and self-efficacy - the feeling that personal actions will make a difference (Eden 1993; Hinchcliffe 1993; Woods and Skumatz 2004).

on actual changes in behavior and resource use (as opposed to changes in attitudes or intentions, Woods and Skumatz 2004). Some exemptions relevant for this paper are summarized below.

Siero et. al. (1996) that looked at how energy consumption feedback and comparison between business units at a metallurgy company resulted in changes in energy consumption that were maintained over time. Woods and Skumatz (2004) examined how self-efficacy factors (beliefs that personal actions can make a difference) impacted the adoptions of energy efficiency actions. Staats et al. (2000) conducted a study that investigated how specific informational intervention, feedback and reinforcement resulted in the adoption and persistence of behavior changes in office thermostat regulation and radiator use. McMakin et al. (2002) report how a tailored program that focused on group identity, ease of participation and supporting resources attempts was used to engage residents in military housing (who do not pay the utility bills) in low or no-cost ways to conserve electricity. Smith et. al. (2002) describe promoting energy awareness through the use of a number of positive behavior reinforcing initiatives including outreach, visual communications, profiling energy champions, energy audits, training, and hardware change outs. Bender et. al. (2004) wrote about the behavioral economics associated with California's 2000-2001 energy crisis. They discussed the importance of framing the message as well as fairness and rational thought.

Principles of Social Marketing for Energy Efficiency Programs

The social marketing principles developed by McKenzie Mohr and Associates formed a solid frame for Conservation Action!. McKenzie Mohr and Associates suggest that there are six tools to effective community social marketing campaigns: 1) commitment, 2) prompts, 3) norms, 4) communication, 5) incentives, and 6) convenience (McKenzie Mohr and Associates, 2008). Subsequent sections document how these principles were applied to the initiative.

1. Commitment - A small initial commitment leads to greater actions for two reasons: it changes the way people view themselves and it plays off a need to be seen as consistent (the psychological principle of cognitive dissonance, see Yates and Aronson 1983). Written, public, or group commitments are more likely to be effective and it is important that the person is interested in the commitment and is not coerced.
2. Prompts - Prompts are visual cues or reminders and can be visual or auditory, however, they should be noticeable, self-explanatory, and close in proximity to the desired action.
3. Norms - Community norms provide strong social pressure to conform to certain behaviors. Visible norms that are reinforced using personal contact increase awareness and adoption are the most effective.
4. Communication - A carefully considered and memorable message can be powerful. It is important that messages come from a credible source, are captivating, and are tailored to the audience. Feedback also has a positive effect on the adoption and maintenance of behaviors.
5. Incentives - Non-monetary incentives, such as social approval, can have a profound effect on influencing behavior. Visible incentives that reward positive behavior should be given at a time as close to the action as possible. Finally, the incentive should be appropriate in the context of the action and the community.

6. Convenience - Convenience is achieved by removing barriers and increasing benefits to the desired action or increasing barriers and decreasing benefits to the alternative action. Barriers and benefits are different for every desired behavior.

Conservation Action! at BC Hydro

Over the last two years, BC Hydro has developed an internal workplace energy efficiency initiative called Conservation Action! The purpose of the initiative is to engage BC Hydro employees in energy conservation at work, to pilot methods and approaches for affecting behavioral change with respect to energy efficiency, and to demonstrate BC Hydro's commitment to 'walking the talk' when it comes to promoting energy efficiency in its buildings. Conservation Action! was initiated as a pilot program in 2006 at the main building occupied by its Power Smart department in Burnaby, BC, Canada. Since that time, the pilot has been expanded to a company-wide initiative with similar Conservation Action! programs implemented at other BC Hydro buildings. Although the general discussion is relevant to the company wide initiative, the results focus on the pilot program at the Power Smart building in Burnaby.

Guiding Principles and Elements of Success

There are three essential elements to the success of the Conservation Action! initiative: 1) Positive, Action Oriented Approach, 2) Management Support, and 3) Engaging and Empowering Employees and Volunteers. Each of these elements will be discussed in the following sections.

A positive, action oriented approach. Early brainstorming and roundtable discussions with the original program concept team and employees involved in other green initiatives, suggested that many environmental programs fail to promote wide scale change because they rely on overwhelming negative messages that promote guilt and fear, without providing simple, actionable suggestions for how individuals can make a difference today. In effect, people become paralyzed by the problem and eventually start ignoring the messages altogether (or even worse, disassociating themselves entirely from environmental issues since the perceived solutions seem so extreme and unrealistic for the average person). To counter the typical approaches used by many past environmental initiatives, Conservation Action! focused on taking a positive approach that is simple and action oriented.

- Positive: 1. Focus on what people can do now and in the future to make a difference and not on spreading guilt and blame people for past negative decisions or actions. 2. Avoid tactics that punish people for negative behavior (e.g. writing 'tickets'). 3. Focus on having fun and working together to make positive change (inclusion and not exclusion).
- Action Oriented: 1. Pair education and messaging with specific actions that can implemented right away. 2. Focus on doing and not dwelling on negativity or despair.
- Simplicity/Ease of Participation: 1. Keep messages simple and focused on one or two key ideas. 2. Facilitate participation by making actions simple and easy to implement.

The initiative recognizes that small changes and decisions become the foundation for larger and more complex personal changes on the path to a more sustainable lifestyle. The ultimate goal is to make energy conservation relevant, meaningful, and accessible.

Management support and commitment. The initiative was fully embedded into the structure of the organization at multiple levels. First, high level management support was provided by assigning a steering committee to the project composed of two senior managers in Power Smart who reported to the Director of Power Smart. Second, management approval was given to allow two program coordinators to allocate one day per week each to the initiative. These coordinators were given permission by their managers to divert one day per week from their regular job to the program. Finally, the importance of the initiative was formalized by including it in the annual performance management structure. In the first year, Power Smart management set a target of reducing the energy consumption in the building by at least 5%. At year end, the performance on this metric was then used (in addition to other metrics) to determine the size of each employees annual bonus (both staff and management).

In addition to embedding the initiative in the structure of the organization through the steering committee, project coordinators, and performance management, management support was also sought on an ongoing basis by seeking the participation of high profile managers at events and initiatives (e.g. attending lunch and learns, making a public pledge), including Conservation Action! updates at team meetings, and by asking managers to encourage their employees to volunteer for the initiative.

Engaging and empowering volunteers and employees. If a positive action oriented approach is the spirit of the Conservation Action! initiative, then volunteers are its heart and soul. Even with two coordinators dedicated to one day a week, the scope and success of the initiative depends on the energy and commitment of a team of dedicated employee volunteers. Volunteers were recruited at the beginning of each year to serve specific roles or work on defined initiatives. For each volunteer role, job descriptions and expected commitment are clearly defined. In total, including both ongoing volunteers and those who have worked on one-time events, more than forty individuals volunteered for the initiative, which represents about 15% of the BC Hydro staff working at the building. Key volunteer roles include Conservation Floor Captains (local leaders/floor reps), data managers/collectors, initiative or event coordinators (e.g. lunch and learns, contests and challenges), special teams (e.g. green tips, secret conservation operations, peer recognition), and technical support (lighting, common area load).

Summary of Key Initiatives

Conservation Action! incorporates a wide variety of initiatives that are constantly evolving and refreshing. Some of the more successful initiatives have included the Cubicle Tune-ups, Green Tips, Conservation Champion Cards, Floor Captains / Floor Challenge, posters and stickers, Lunch and Learns, lighting schedule updates, and HVAC DDC system adjustments. In addition, general waste reduction and environmental initiatives were completed in collaboration with the CPP Employee Environment Team to round out the delivery message.

Conservation floor captains. The conservation floor captains were volunteer representatives who reinforced the desire action through personal contact. They provided credible, local leadership, were an information resource for employees, and provided a mechanism for informal feedback to initiative coordinators. They were important to establishing norms on their floor.

Floor challenge. The floor challenge was a friendly competition between the floors in the building. The floor challenge leveraged the public commitment of the floor. Points were awarded in three categories: electricity consumption, waste reduction, and participation.[2] Performance in each of the three categories was tracked monthly and cumulative points were publicly displayed on a Celebration Board. Monthly updates on the floor challenge were distributed electronically to all employees and also communicated in person by the floor captains. At the end of the year, the winner of the challenge was declared and rewarded with a grand prize consisting of a VIP afternoon at a Vancouver Canadians baseball game and BBQ.

In addition to displaying the floor challenge results on the Celebration Board, monthly progress towards the total building target was provided to employees through poster on each floor. The poster also served as a reminder for the coming month's activities, opportunities for participation, and also included some new conservation tips.

Cubicle tune ups. During Cubicle Tune-ups, Power Smart representatives visited employees at their workstations to promote energy conservation and waste reduction. The primary objectives of the cubicle tune-up initiative were to educate staff about ways to conserve energy in their office spaces, identify opportunities to reduce electricity in employee office areas, and promote energy saving changes in the set-up/configuration of employee office spaces. The cubicle tune-ups were highly effective because they were voluntary, visible, custom developed, and personally delivered by a credible source.

Turn It Off initiative. The 'Turn if Off' initiative was a simple poster and sticker campaign targeting manual switch locations and equipment. The posters and stickers provided visual reminders and prompts to reinforce targeted actions.

Conservation Champion recognition program. A Conservation Champion recognition program allowed employees to recognize each other for exemplary actions to save energy and reduce waste, spread the word about conservation actions, and helped inspire people to adopt new habits. Recognition card have two parts: one card is posted on a white board in a common area on their floor and other card is given to the employee being recognized. At the end of each month, the cards are collected and a random draw is held for a $25 gift card. Participation in the Conservation Champion program also counts towards the floor challenge.

The Conservation Champion recognition program was successful because it gained commitment by leveraging the need for consistency, provided visual prompts, established norms, communicated positive behavior, and provided appropriate incentives.

Green Tips. Green Tips were e-mailed to all employees on a weekly basis and generally served as prompts. The content of the tips was developed by volunteers from a variety of external sources and focused on environmentally themed suggestions and credible information of general interest and value to employees.

[2] Floor Challenge Measurement: Energy Consumption was measured through sub-meters that were installed on each floor. Gross consumption data was downloaded monthly by a student and compared to baseline data. Printing stats were used to measure the waste reduction category with data downloaded from the printers on each floor (images printed). Participation was measured by tracking the number of people from each floor who participated in Conservation Action! events and initiatives during a given time period.

Lunch and Learns. Each month a Lunch and Learn session was held to bring employees together and provide some useful, reliable information or stimulate discussion on a conservation/waste reduction theme. The Lunch and Learns were important in establishing social norms. Occasionally food incentives were provided, but for the most part employees benefited from the knowledge gained and the social approval of their colleagues.

Program Results

The success of the program was assessed in a variety of ways including employee surveys, changes in building energy consumption, and program influence on other initiatives.

Baseline and Year End Employee Surveys

In addition to tracking the energy consumption of the building in comparison to a historical baseline, the success of the initiative was also tracked by means of a baseline and year-end employee survey. The results of this survey are very helpful for tracking how behaviors and environmental attitudes have changed during period of the initiative.

Overall effectiveness of the program. The survey asked BC Hydro employees about the effectiveness of various elements of the Conservation Action! initiative and the overall initiative. Overall, almost 50% of employees rated the initiative as very effective, while another 40% rated the initiative as somewhat effective. Employees thought that the most effective sub-initiatives were the floor challenge (49% very effective), cubicle tune-ups (37% very effective), and posters and stickers (35% very effective).

Conservation behaviors at work. Respondents reported the frequency of exhibiting various conservation behaviors in both the baseline and year end surveys on a four point scale (always, most of the time, sometimes, never). A summary of BC Hydro employee responses for the 'always' and 'most of the time' categories is shown in

Exhibit 1.

Exhibit 1 – Baseline and Year-end Frequency of Conservation Behaviors

Reported frequency of participating in Conservation Behaviors (excluded 'Not applicable' responses	Baseline (N = 184)		Year End (N = 160)	
	%	#	%	#
When I am in my workstation, I only have the minimum number of lights turned on for the task.	100%	120	100%	131
Always	63%	75	73%	95
Most of the time	28%	33	25%	33
Total (always/most of time)	91%	108	98%	128
I turn off workstation lights when I leave my workstation at the end of the day	100%	94	100%	121
Always	72%	68	79%	96
Most of the time	3%	3	7%	8
Total (always/most of time)	75%	71	86%	104
I turn off lights in common area rooms when I am the last person to leave	100%	132	100%	137
Always	34%	45	74%	102
Most of the time	36%	47	23%	31
Total (always/most of time)	70%	92	97%	133
I turn off the TVs if I am the last person to leave the gym	100%	64	100%	67
Always	52%	33	78%	52
Most of the time	19%	12	9%	6
Total (always/most of time)	71%	45	87%	58
I avoid printing hardcopy versions of e-mails, reports, and other electronic items	100%	146	100%	143
Always	18%	27	24%	34
Most of the time	32%	46	47%	67
Total (always/most of time)	50%	73	71%	101
I take the stairs instead of the elevator for short trips between floors (if able).	100%	141	100%	140
Always	70%	99	79%	111
Most of the time	15%	21	15%	21
Total (always/most of time)	85%	120	94%	132
I turn my computer and monitor off at the end of the workday and on weekends.	100%	143	100%	140
Always	81%	116	86%	121
Most of the time	8%	12	9%	13
Total (always/most of time)	89%	128	95%	134
I unplug chargers and other small electronic devices in my workspace when not in use.	100%	95	100%	104
Always	37%	35	62%	64
Most of the time	15%	14	15%	16
Total (always/most of time)	52%	49	77%	80
I print documents double-sided and in black and white whenever possible.	100%	146	100%	141
Always	48%	70	69%	97
Most of the time	34%	49	25%	35
Total (always/most of time)	82%	119	94%	132
I turn off or unplug unnecessary office and other equipment in my work area at the end of the day	100%	115	100%	121
Always	38%	44	53%	64
Most of the time	24%	28	23%	28
Total (always/most of time)	62%	72	76%	92

As shown in Exhibit 1, reported adoption of specific conservation behaviors among the employee population increased for almost all tracked indicators. Of particular interest, is the fact that the particular actions and behaviors that received the most focus during the initiative were associated with the greatest improvement (e.g. turning off lights in common areas, reducing plug load, and printing only when necessary).

Influence of the Conservation Action! initiative. Conservation Action was particularly active in encouraging employees to make changes to how they used lights and managed plug load in their personal workspaces. To understand more about how the initiative may have influenced

employee decisions to make changes to plug load management or lighting settings, the year end survey asked respondents to report the influence of the Conservation Action! initiative on their decisions to make changes to lighting setting or plug load management on a five point scale where 1 is 'not at all important' and 5 is 'very important'. As shown in Exhibit 2, a strong majority of respondents felt that the initiative was important in their decision to make changes to lighting or plug load settings.

Exhibit 2 – Influence of Conservation Action! on lighting and plug load decisions

Changes to the electrically powered equipment or devices	%	#
Didn't make any changes	27%	37
Very important	41%	56
Somewhat important	20%	27
Neutral	10%	14
Unimportant	3%	4
Grand Total	100%	138
Changes to lighting settings	**%**	**#**
Didn't make any changes	21%	25
Very important	37%	43
Somewhat important	22%	26
Neutral	13%	15
Unimportant	4%	5
Not at all important	3%	3
Grand Total	100%	117

Changes in Whole Building Electricity Consumption

Program success was also measured by tracking changes in whole building consumption relative to a historical baseline using a simple billing meter analysis.[3] The building metric was used to communicate monthly progress to building occupants and also used as a proxy for actual program energy savings for the purposes of program tracking and management. In addition, Power Smart management used the building metric as the basis for an annual program consumption target, which was incorporated into the employee performance management system. Using the simplified approach as proxy for actual program impact, it was observed that total building consumption declined by 5% in first year of program activities and by an additional 4% in the second year. Exhibits 3 and 4 present the simple billing meter analysis.

[3] A baseline of annual electricity consumption was developed using three years of historical building meter data. The meter data was used to calculate changes in monthly and year-to-date consumption relative to the baseline.

Exhibit 3 – Central Park Place Consumption Data by Fiscal Year

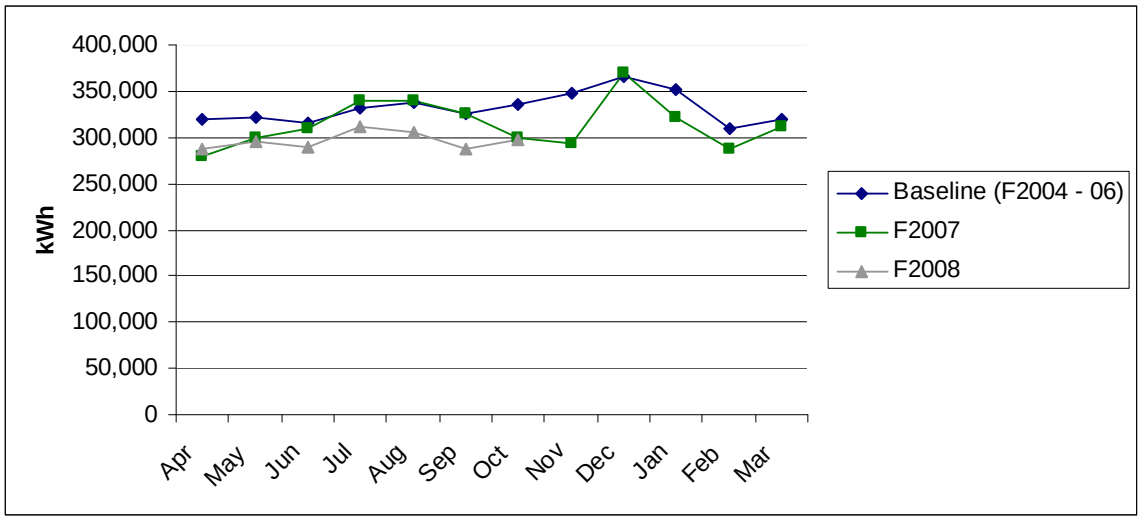
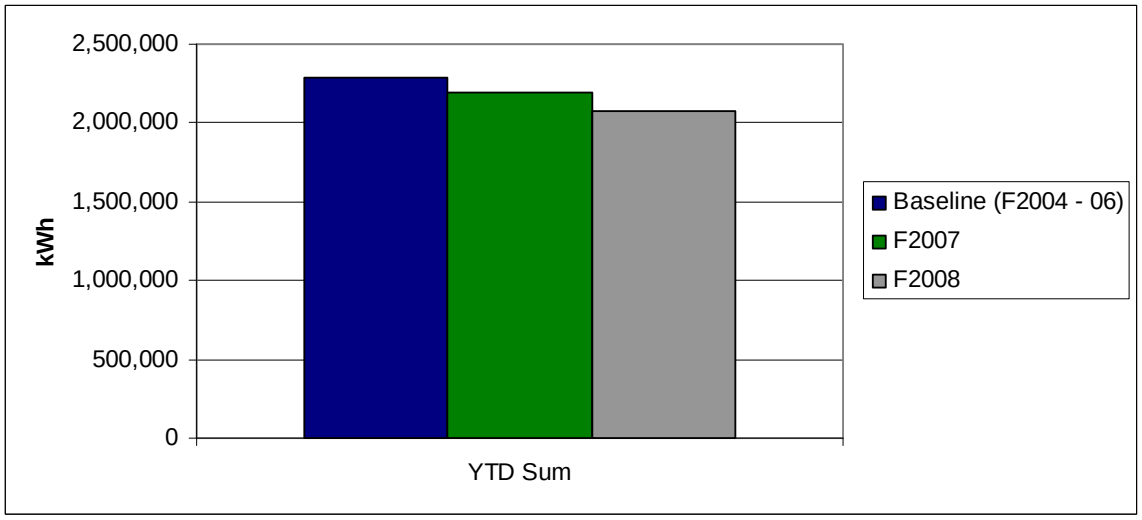


Exhibit 4 – Year to Date Summary of Central Park Place Consumption (Oct 31, 2007)



Although useful for monthly tracking and program target setting, the simple building metric approach is not suitable for assessing and attributing actual energy savings to the initiative, since the method does not control for factors such as weather and natural change. In addition, billing analysis approaches are typically not recommended for assessing program impacts when the anticipated energy savings are less than 10% of the total building consumption, since the effect cannot be statistically distinguished from background variability in the data. Although not a perfect approach for measuring program success, the simplified approach was acceptable for the purposes of the pilot program for a number of reasons: the three year baseline consumption was relatively stable; the results were simply being used as an indicator of performance; the metric provided a motivating tool for employees; the results were not reported as Power Smart program energy savings; and finally, alternative approaches were nonexistent.

Planting a Seed and Watching It Grow – Conservation Action! as a Model

The success of the initiative has encouraged others to employ the Conservation Action! model for other employee engagement initiatives and programs both internally and externally.

Internal programs. The Conservation Action! pilot initiative was used as a basis to launch a company wide program (also called Conservation Action!), which seeks to foster and support volunteer Conservation Action! teams at BC Hydro's other major locations. BC Hydro has now established Conservation Action! programs at four major buildings including its two corporate locations in Vancouver and Burnaby, British Columbia, an operations facility in Surrey, and the Power Smart building in Burnaby. In addition, for more remote areas and smaller locations, BC Hydro has launched a program called 'Conservation Champions' to encourage smaller individual and group efforts to engage employees in energy conservation.

External programs and initiatives. The Conservation Action! program was also used as a model for the development of a variety of external employee conservation engagement programs including a pilot employee workplace engagement program for commercial customers, an energy conservation challenge for local governments in the summer of 2007, and a green employee program for the BC provincial government.

Discussion

BC Hydro's Conservation Action! initiative is defined by its positive, action-based approach that pairs behavioral change with technical measures. The success of the program is facilitated by strong management support and passionate employee participation and leadership. Employees are motivated to take action through a variety of programs and initiatives and are recognized and rewarded for their efforts on an individual and company wide basis. Conservation Action! used Community Based Social Marketing to persuade, influence, motivate, and create a lasting change to the social norm at our office. Commitment, prompts, norms, communication, incentives, and convenience were leveraged to get participation and results.

The program's success in changing employee behaviors is supported by the results of annual employee surveys, which show significant positive changes in targeted conservation behaviors. In addition, although not a definitive measure of program impact, the changes in building energy consumption observed during the program period, also suggest that the initiative is providing measurable energy savings. The future challenge for the Conservation Action! program is to maintain employee interest and engagement in the program and to work with program evaluators and M&V specialists to develop more sophisticated methods for tracking and evaluating program related energy savings.

By creating an environment conducive to behavioral changes, Conservation Action! also helped set the stage for technical changes such as Direct Digital Control (DDC) system optimization, lighting redesign and HVAC control system recommissioning. It naturally follows that an energy conscious employee base will examine the technical systems in their space. Conservation Action! provided a venue for employees to have their suggestions be heard and acted upon.

Conclusion

With the demand growing to deliver energy savings we must look beyond the technical solutions. We must engage our communities and businesses so that conservation and energy efficiency are a way of life and a way of doing business. With increasing environmental savvy it is ever more important for messages to be integrated and therefore resilient. Behavioral-based energy efficiency program not only have potential, but also have stickiness; an ability to change social norms for the long term. By employing the principles of community based social marketing and creating an action based positive environment for change the employees at Central Park Place saw tangible results; not only through a reduction in consumption, but also in a invaluable cultural change.

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