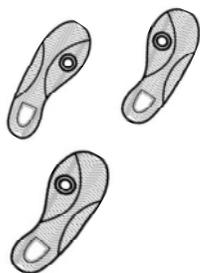
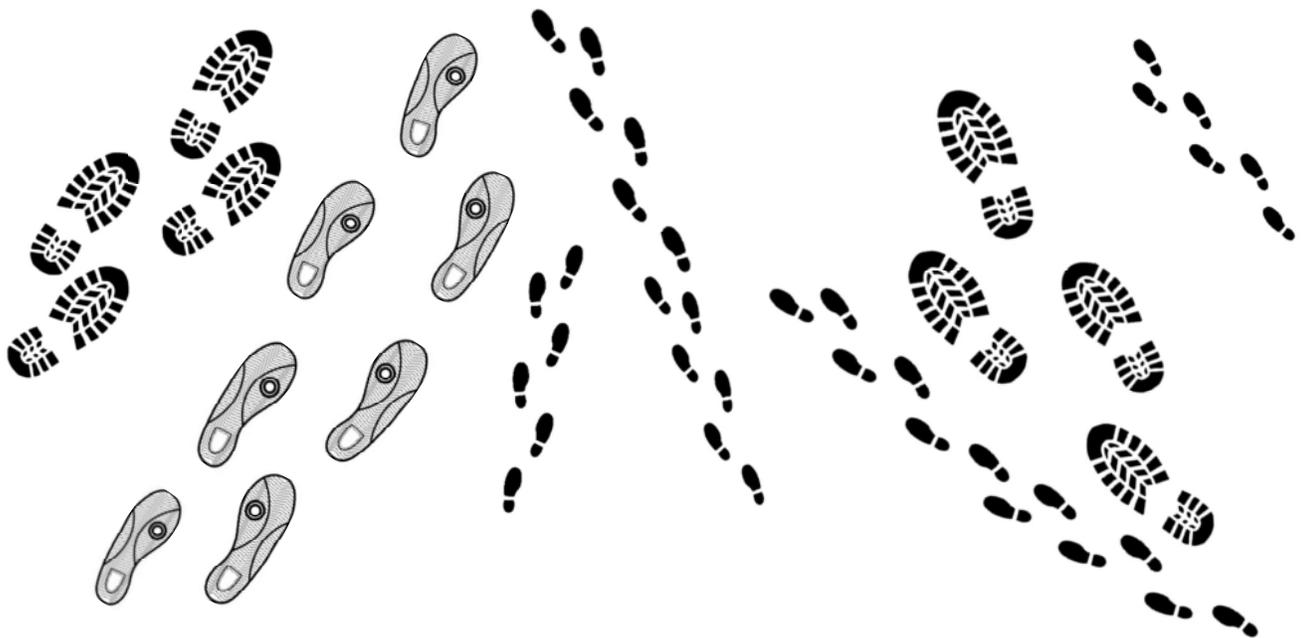




Sustainability How-To Guide Series

Engaging Occupants in Your Sustainability Program: Strategies for Success



Cynthia Putnam

CSBA, CEM
Principal
Putnam Price Group, Inc.

Melanie L. Danuser

M.P.A., LEED Green Associate
Project Manager
Putnam Price Group, Inc.

Lynn M. Clark

CFM, FMP, LEED AP BD+C
Green Operations Consulting

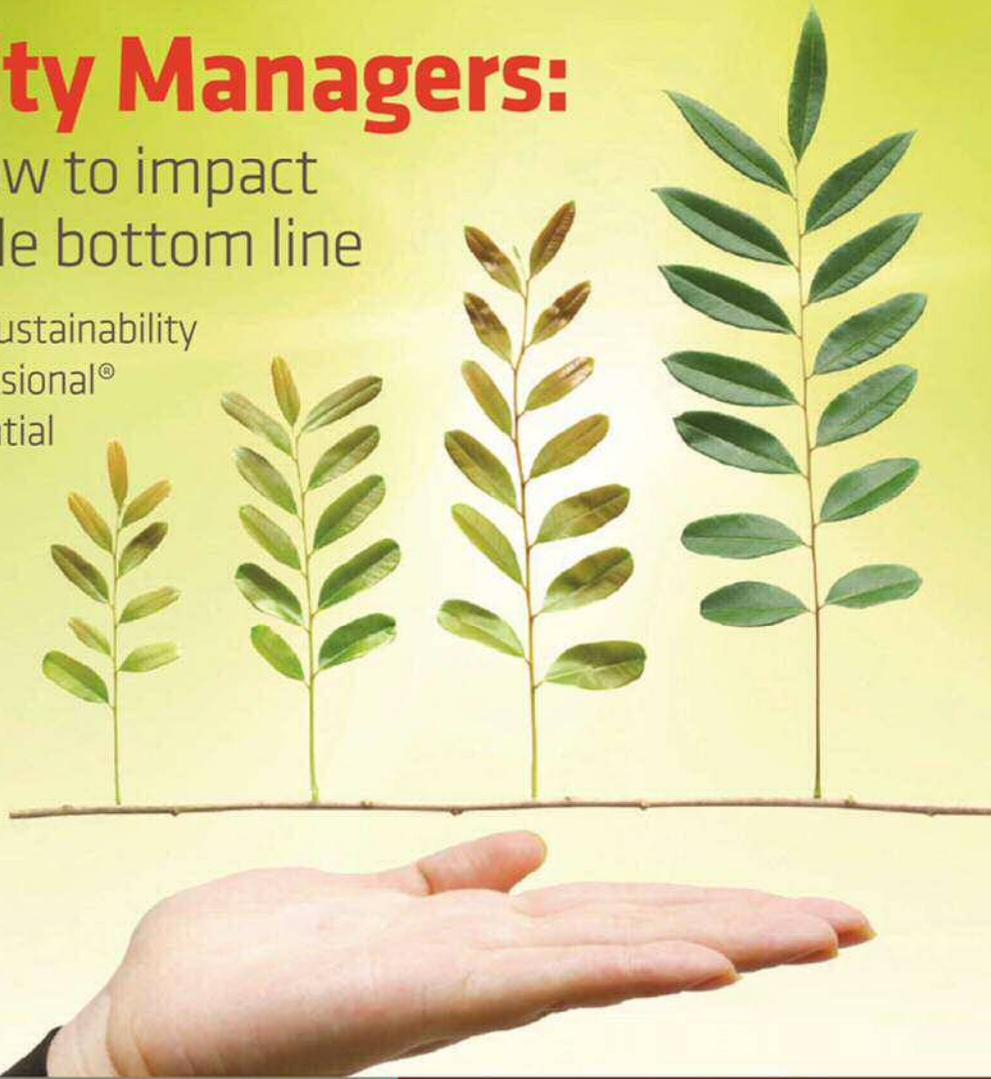
Stephanie Randall Cooper

LEED Associate
BAS, South Seattle College
Sustainable Building Science
Technology

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– Cynthia Putnam, Melanie Danuser, Lynn Clark and Stephanie Randall Cooper

External Reviewers

Joseph Ashurst, CFM, BOC, Facility Manager, University of Utah

Chris E Taylor, Installation Energy Manager, CEM, MSEE, Naval Air Station Whidbey Island, WA

Editorial Board

Advisors

Eric Teicholz, IFMA Fellow

Bill Conley, IFMA Fellow, CFM, SFP, FMP, LEED AP

Editor

Liv Hadden, Trybal Performance

About the Authors

Cynthia Putnam

CSBA, CEM, Principal, Putnam Price Group

Cynthia Putnam is a principal with Putnam Price Group, a firm providing consulting services in energy and resource management. She serves as project director for the Northwest Energy Efficiency Council and oversees the national Building Operator Certification (BOC®) program which provides skill building in energy efficiency through operator training and certification. She is a member of the Greater Seattle chapter of IFMA and co-chairs the chapter's sustainability liaison committee.

Melanie Danuser

LEED Green Associate, Senior Project Manager, Northwest Energy Efficiency Council

Melanie Danuser is a Senior Project Manager with the Northwest Energy Efficiency Council. She oversees the national Certification division of the Building Operator Certification (BOC®) program. She also works on various other projects contributing to the promotion of energy efficiency with a focus on optimizing building operations.

Lynn Clark

CFM, FMP, LEED AP BD+C, Owner, Green Operations Consulting

Lynn Clark is the owner of Green Operations Consulting and an active member of the Greater Seattle chapter of IFMA. She worked on LEED CI Gold certification projects and several Environmental Management Systems (EMS) initiatives with the U.S. EPA Region 10 Seattle office, including the Central Waste Stream roll-out based on "Kick the Can."

Stephanie Randall Cooper

LEED Green Associate, BAS degree candidate, South Seattle College, Sustainable Building Science Technology

Stephanie Randall Cooper holds a BAS degree from South Seattle College in Sustainable Building Science Technology. She was project manager of the "Big 'Green' Greenhouse Design Competition" following the Living Building Challenge, and wrote an Occupant Engagement module for the Northwest Energy Efficiency Council's Building Operator Certification. Stephanie is a member and scholarship recipient of International Facility Management Association.

Foreword

It is no secret that a focused, well-defined sustainability strategy is beneficial to an organization's bottom line, whether it is a federal, private-sector, military or nonprofit entity. Sustainable practices are not only the right thing to do for the environment; they also benefit the communities in which they are implemented. Sustainability is the business implementation of environmental responsibility.

Sustainability is all around us. Federal, state and local governments are increasingly applying regulatory constraints on design, construction and facility operations standards. Employees expect their employers to act responsibly, and vice versa. Going green is no longer a fad or a trend, but a course of action for individuals and businesses alike - benefiting the triple bottom line of people, planet and profit.

Today's facility manager needs to be able to clearly communicate the benefits and positive economic impact of sustainability and energy-efficient practices, not only to the public, but also to the C-suite. While there is a dramatic need for each of us - and our organizations - to care for the environment, it is just as important that we convey to executives and stakeholders how these initiatives can benefit our company's financial success.

The document in your hands is the result of a partnership between the IFMA Foundation and IFMA, through its Environmental Stewardship, Utilities & Sustainability Strategic Advisory Group, each working to fulfill the shared goal of furthering sustainability knowledge. Conducting research like this provides both IFMA and the foundation with great insight into what each can do as an organization to assist the facility management community at large.

It is my hope that you, as a facility professional, will join us in our mission of furthering sustainable practices. This resource is a good place to start.

Tony Keane, CAE

President and CEO

International Facility Management Association

IFMA Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group

I. Purpose

The Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group (ESS ESUS) serves as an advisory resource for the integration of the ESS core competency into the practice of facility management. The ESUS SAG is responsible for the production of IFMA's Sustainability How-to Guide series.

II. Direction and Authority

The IFMA Board of Directors authorizes the ESUS SAG, within the parameters of its role and responsibilities, to act in an advisory role to the board and the ESUS community in the integration of ESUS into the core competencies of the association.

III. Role and Responsibilities

Environmental stewardship and sustainability is a strategic theme and core competency of facility management that touches every aspect of the association. The primary responsibility of the ESUS SAG is to further the development of the ESUS competency area by acting in an advisory capacity with respect to the policies and strategies that pertain to IFMA's performance as a sustainable organization, development of the ESUS topical area within IFMA's Online Community and input on the development of ESUS as a core competency.

IV. Membership

SAG members include:* Bill Conley, IFMA Fellow, CFM, SFP, FMP, LEED AP; Laurie Gilmer, P.E., CFM, SFP, LEED AP; Christopher Laughman, CFM, SFP, LEED AP O+M; Sheila Sheridan, IFMA Fellow, RCFM, LEED AP; Eric Teicholz, IFMA Fellow (ESUS SAG chair); Jenny M. Yeung, CFM, CEnv.

*as of April 2016

The general objectives of the How-to Guides series are:

1. To provide data associated with a wide range of subjects related to sustainability, energy savings and the built environment;
2. To provide practical information associated with how to implement the steps being recommended;
3. To present a business case and return-on-investment analysis wherever possible, justifying each green initiative being discussed;
4. To provide information on how to sell management on the implementation of the sustainability technology under discussion;
5. To provide case studies of successful examples of implementing each green initiative;
6. To provide references and additional resources (e.g., websites, articles, glossary) where readers can go for additional information; and
7. To work with other associations for the purpose of sharing and promoting sustainability content.

The guides are reviewed by an editorial board, an advisory board and, in most cases, by invited external reviewers. Once the guides are completed, they are distributed for free online by IFMA and the IFMA Foundation.



IFMA Foundation
1 E. Greenway Plaza, Suite 1100
Houston, TX 77046-0194
Phone: 713-623-4362
<http://foundation.ifma.org>

The IFMA Foundation originated the Sustainability How-to Guide series. The ESUS SAG took over production of the guides in 2014.

The mission of the IFMA Foundation is to promote and support scholarships, educational and research opportunities for the advancement of facility management worldwide. Established in 1990 as a nonprofit, 501(c)(3) corporation, the IFMA Foundation is supported by the generosity of a community of individuals- IFMA members, chapters, councils, corporate sponsors and private contributors- and is proud to be an instrument of information and opportunities for the profession and its representatives.

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Part 1 – Executive Summary

More often than not, organizations emphasize investments in physical upgrades and technology to improve sustainability, yet the full potential of these investments often cannot be realized without occupant and institutional engagement and change. For example, technology upgrades such as occupancy sensors can reduce reliance on occupants to turn off lights, however if buildings are older and budgets don't allow for upgrades, occupants may be the only means for energy saving. Furthermore, designing out the human element can have unforeseen consequences. Occupants can find creative ways to defeat functionality such as “tricking” thermostats and occupancy sensors.

This guide introduces facility professionals and sustainability managers to the opportunities and benefits of engaging occupants and tenants in their initiatives, and provides a step by step approach for designing, implementing and measuring the impact of an occupant engagement program to achieve positive behavior changes. Readers are introduced to the benefits of engaging occupants, behaviors that make an impact, and proven frameworks for designing effective engagement programs. We then move to a discussion of program design and implementation which prepares readers to research the opportunities in their organization and to prepare a high-level proposal to management for a pilot engagement program.

Nine case studies of “real world” occupant engagement programs illustrate examples of challenges and best practices documented by experienced practitioners. The case examples are intended to stimulate readers’ own thinking about the possibilities for engaging occupants in their sustainability program. A final component of the guide are two checklists – one focused on the research questions to ask as you embark on an engagement program, and the other to develop the value proposition and game plan to present to management for their approval.

Readers of this guide will be able to:

- Discuss the benefits of occupant engagement and the steps involved
- Use the “research” checklist to identify target behaviors that afford opportunity and are measurable
- Use the “plan a project” checklist to develop a high level plan and resource commitment to propose to management
- Apply lessons learned from 9 case studies to address challenges and best practices in occupant engagement.

Part 2 – Introduction

Ask facilities managers if occupant engagement brings value to their operation and you'll get a range of responses from "absolutely, yes!" to "don't bother; it's out of your control." If you have doubts, you're not alone. As one colleague recently quipped, "our buildings would work a lot better if there were no people in them." If there's anything certain about facilities management, we know buildings and their occupants come as a package. Whether a skeptic or believer, occupant engagement is an area of opportunity for facility and sustainability managers.

Let's take a look at the benefits of occupant engagement. Are you familiar with the term WIIFM - What's in it for me? WIIFM is our value proposition. When effectively involved, occupants can deepen the impact of your sustainability program and help you reach your goals through engaging occupants in daily practices that reduce waste and improve recycling rates, save energy in the workspace and on the road, and use water wisely indoors and outdoors. Beyond daily savings, engaged and motivated occupants also provide the facility and sustainability managers with an internal "sales force" to champion new initiatives and ensure persistence of behavior change over time.

Take the example of BAE Systems in Greenlawn, New York. The sustainability team at BAE quadrupled the staffing of their sustainability program by transforming it from a facilities department-driven effort to one that engaged thirteen volunteers from a cross section of departments in the organization including Information Technology, Operations, Program Management, Human Resources, Communications and more.

JSH Properties Reduced Electricity Waste by 13 Percent

JSH Properties in Seattle, WA recently completed a tenant engagement demonstration project to shut off workstation electrical devices. A 13 percent reduction in electricity use was achieved after the first 3 months, and an even deeper 20 percent reduction thereafter, according to Emma Karlsson, Director of Sustainability. The project engaged tenants in workstation actions to reduce plug load energy use in combination with Friday night sweeps by the JSH team to remind and reinforce workstation actions. Operational changes focusing on copiers and vending machines were also implemented. The project generated an annual savings of \$6,000 in electricity costs for a single floor participating in the demonstration. Extending the campaign to additional floors bore promise for even greater savings.

Consider these examples of how occupant engagement programs provide tangible benefits to the sustainability program:

- JSH Properties in Seattle, WA saved over \$6,000 in electricity costs for a single floor participating in a tenant engagement project to shut off workstation electrical devices.

Sustainability How-to Guide – Occupant Engagement

- EPA Region 9 in San Francisco, CA successfully diverted 90 percent of their landfill-destined office waste into recycling and composting through a “Kick the Can” campaign engaging occupants in centralized waste management and accurate sorting of waste stream materials.
- BAE Systems optimized printer efficiency by removing 32 individual department printers and centralizing print functions, for an annual savings of \$32,000 in operating costs.

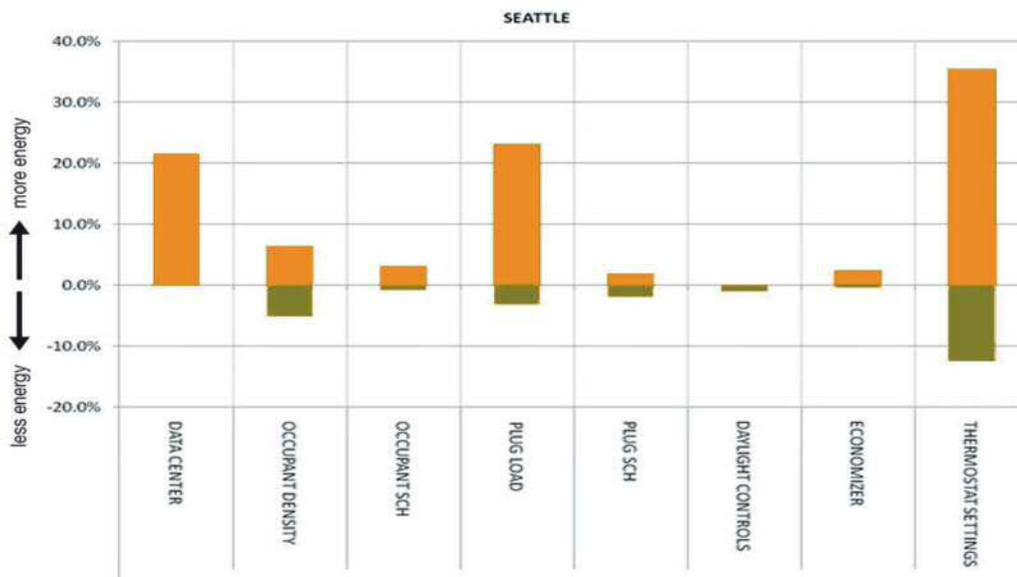
Part 3 – Detailed Findings

3.1 Occupant Behaviors that Make an Impact

What behaviors make a difference? Occupants influence some aspects of energy, waste and water, but not all. For example, office workers may have control over task lighting and computer shut down in their workspace, but not HVAC settings and operation. Likewise, they may influence how recyclables are sorted, but not what’s acceptable material for the recycling bin. Knowing what occupants influence helps you target the right behaviors to engage.

In a 2011 study on building energy performance, the New Buildings Institute found that behaviors directly controlled by the tenants such as schedules, plug loads, management of night plug loads and lighting controls have a significant impact on overall building energy use. Figure 1 below shows the impact. Thermostat settings have the largest impact of any measure for heating-dominated climates, with poor control resulting in a 35% increase in energy use as denoted by the yellow bar for “thermostat settings” in Figure 1. The green bar for “thermostat settings” denotes a 12% savings over baseline with the use of optimal HVAC temperature controls. “Tenants are seldom in a position to recognize the direct impact they have on total building energy use,” according to Mark Frankel, technical director of New Buildings Institute. He recommends occupant education and controls design for thermostat settings and schedules as a fruitful area of focus for energy savings. Establishing a setback policy and procedure for occupants to follow, as well as installation of sub-metering and energy-use dashboards are effective strategies to help tenants understand and reduce their energy use.

Figure 1 Occupant Behaviors Impact Building Energy Use (Seattle, WA example)



Source: New Buildings Institute, 2011

Beyond energy use, there are many other behaviors that lend themselves well to occupant engagement programs. In a recent query the authors made to the IFMA **Environmental Stewardship and Sustainability Community (ESS COMM)** for “ideas for getting occupants to save energy and resources in the workplace”, we found a majority of respondents targeted waste management behaviors to improve sorting of recyclables, compostables and garbage. Others focused on procurement practices to improve supply chain support for sustainable meetings and conferences, equipment purchases, custodial services and more. As we examine the case studies which accompany this Guide, we find an even wider range of behaviors – no less than 11 - targeted in the engagement programs. Table 1 below provides examples of occupant behaviors frequently targeted by sustainability programs, and several are featured in the case studies in this Guide.

Table 1 Examples of Occupant Behaviors Frequently Targeted by Engagement Programs

Occupant Behavior	Case Study	Name of Campaign
Waste Management		
Cross functional team building	BAE Systems	NA
Meetings & conferences	US EPA Region 9	Green Meetings Policy
Sorting waste	US EPA Region 9	Kick the Can
HVAC		
Temperature set points	Whidbey Island Naval Air Station	NA
After hours scheduling	Whidbey Island Naval Air Station	
Closing fume hoods in Labs	University of Utah	It's Good to Shut the Hood
Comfort-appropriate dress	NA	
Use of space heaters	NA	
Lighting		
Operation of task lighting	Mecklenburg County	Crab, You're It
Operation of common area lighting	Mecklenburg County	Crab, You're It
Use of daylight	Mecklenburg County	Crab, You're It
Computers		
Low energy settings	NA	
Single/dual monitors	NA	
Monitor shut off after-hours	Fort Carson Army Base	Achieving Net Zero Energy
Night time shut down - manual or automated	Fort Carson Army Base	Achieving Net Zero Energy
Plug load equipment		
Printers, copiers, fax - central system v. individually distributed	BAE Systems	NA
Chargers	NA	
Personal appliances - coffee makers, refrigerators	NA	

With so many behaviors that show promise, how do you narrow the spectrum to pick the best one or few for your program? “Rather than assume, do your research,” advises JHS Properties’ Karlsson. She conducted field observations, interviews and surveys of tenants to identify the most promising target behaviors for her tenant engagement campaign. The research findings showed that 50 percent of tenants left their computer monitors on after leaving work. As a result, the JSH team decided to include it on a key list of tenant workstation actions. In like fashion, during their research phase, the Fort Carson team discovered that some buildings had central HVAC while others offered individual, zone-level control. As a result, they provided workstation shut down procedures for occupants in those buildings where they had control. The importance of early and thorough research is a common theme across the case studies. We will address this further below by describing approaches facility and sustainability managers are using to assess opportunities in their organization. We also provide a simple “research questions” checklist to help readers get started on that path.

3.2 A Framework for Your Occupant Engagement Program

As facilities managers gain more experience with occupant engagement and share their approaches, we see a common practice of using a proven framework to organize occupant engagement programs. A framework provides a structured, step by step approach for designing and implementing the key elements of an effective program – an action plan for achieving your sustainability goals. Like a recipe, it gives you the essential ingredients for success while offering flexibility for adaptation to the unique needs of your occupants. A quick literature search uncovers a host of frameworks from simple to more complex such as ENERGY STAR®’s occupant engagement tips, Doug McKenzie-Mohr’s community-based social marketing, and Pacific Northwest National Lab’s (PNNL) rules, roles and tools (RR&T).¹ Most have four elements in common - Engaging the right players (management, occupants, operators, etc.); Guiding their actions (behaviors, actions); Providing the necessary tools (communication tools and channels, education, rewards); and, Measuring and sharing results. Of the case studies featured in this Guide, the latter two frameworks are most frequently used. For example, the project team for the Mecklenburg County pilot program used the Community Based Social Marketing (CBSM) framework for their “Crab – You’re It” campaign to reduce daytime and after-hours lighting use. The CBSM framework involves identifying barriers and benefits which enable the desired behavior, creating a plan that engages the essential tools, choosing a size-effective sample for the pilot, and reviewing the accomplishment upon completion. As a first step, the county devoted eight months of research, working with two employee focus groups, to select the target behaviors and design effective communication materials.

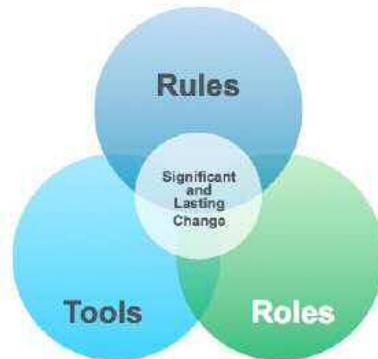
A framework provides a structured, step by step approach for designing and implementing the key elements of an effective program – an action plan for achieving your sustainability goals.

In contrast, the project team at Fort Carson Army Base opted for the Rules, Roles and Tools

¹ For more information about frameworks for occupant engagement programs, see the References section at the end of the Guide.

(RR&T) framework to address HVAC scheduling and night time shut down of computers. This framework is structured around achieving a combination of institutional and individual behavior changes by understanding and modifying rules (procedures and methods for doing things), roles (who is responsible for what), and tools (specific sustainability mechanisms such as occupancy sensors for workplace lighting and use of recycling and composting bins) to support sustainability behaviors. See Figure 2 below for an explanation of the RR&T framework.

Figure 2 Rules, Roles and Tools



- **Rules** are comprised of both the formal policies and procedures related to sustainability, and the informal rules that affect how the policy is perceived and implemented by occupants. A formal policy might establish temperature set points for occupied and unoccupied hours. Questions to address: What are the policies, procedures, and norms that support the present behaviors and the principles that apply to changing those rules?
- **Roles:** What/whose behavior matters with regard to that problem? What needs to change?
- **Tools:** What technologies, processes, and systems are in place or needed to support desired behavior changes and outcomes?

Using the RR&T approach to achieve night time shut down of computers, the Fort Carson project team first had to address the installation's existing Information Technology (IT) policy which prevented night time shut down. Once a new policy was adopted, allowing for shut down to meet net zero energy goals, the team was able to work with occupants to provide instructions on proper shut down at the end of the work day. The result was a more than doubling of compliance from a baseline of 24% to a high of 64% over the 3-month period.

Table 3 Applying the RR&T Framework to Engage Occupants at Fort Carson Army Base

Behavior Change	Night time shutdown of desktop computers in 5 buildings
Rules	Old IT policy: Prohibition on nighttime shutdown New policy: Exemption from prohibition to meet net zero energy goal
Roles	Occupants, building energy monitors (BEMs), Ft. Carson senior leadership, computer network personnel
Tools communication, tracking & feedback	BEM is social facilitator – weekly visits and biweekly emails - reminders, compliments, troubleshoots. Feedback – graph of compliance comparison of buildings
Results	Compliance increased by 36% Increase in percent of occupants saying: Have the skills to implement energy savings (from 65% to 90%) Feel personally responsible for energy use (from 64% to 89%) Believe it is important (from 76% to 92%)
Most Effective Approaches	Instruction from an immediate supervisor Information on specific actions to take Feedback on performance A letter from leadership

When selecting a framework, keep in mind that no one size fits all. Pick one that offers the structure and flexibility that best suits the resources you have.

3.3 Getting Started with Your Occupant Engagement Program

We have discussed the benefits of engaging occupants in your sustainability program, the importance of selecting the right behaviors to target in your program, and the value of using a framework to organize your research focus and program design. With that context, we are now ready to turn our attention to designing and implementing a program. In this section, we will address two critical steps for getting started - Researching the Behaviors that afford opportunity, and Creating a Project Plan for management approval.

Phase 1 – Researching the Target Behaviors

It's not uncommon for the research phase of an occupant engagement program to consume 40 to 50% of the overall resources and timeframe. While it may seem excessive, it's an investment well spent. Findings from the research phase often result in valuable learnings that contribute to fundamental alterations to the original plan. For example, Chris Taylor, Energy Manager at Naval Air Station Whidbey Island in Washington State, found that HVAC night time setback

“offered the greatest reward” for his occupant communication initiative despite early assumptions that HVAC was 24/7 operation. His program focused on matching the actual needs of the tenant to HVAC scheduling. During interviews, “tenants tended to overstate their needs,” said Taylor. “Many said they were 24-hour operations when in actuality they were 24-hour capable.” Night time building walks confirmed this to be true and, in turn, gave Taylor the wiggle room he needed to adjust HVAC schedules from 24/7 operation.

The research phase of an occupant engagement program should focus on, at a minimum, three key questions:

It's not uncommon for the research phase of an occupant engagement program to consume 40 to 50% of the overall resources and timeframe.

1. Which behaviors have the greatest potential to improve sustainability (e.g., reduce waste, save energy)?
2. Are they measurable?
3. What approaches can motivate and maintain these behaviors?

One place to start is with a behavioral audit. When Karen Cochran, Sustainability Lead for Pacific Gas & Electric, looked at opportunities with their San Francisco operations, “we felt that because we have so many building systems automated, employees have more impact on waste diversion rather than energy use.” One way they have leveraged employee involvement and tapped into their competitive spirit is with an annual waste diversion contest in their headquarters building. Their waste program is set up for everyone to choose one of three bins when they have an item to dispose of: compost, recycle, or waste to landfill. Although the system has been in place for many years, it may be different from how an employee sorts waste at home. The waste contest focuses on *accurate* waste sorting behavior. “This behavior ensures we can effectively measure the results,” notes Cochran. Each night for a month the bags of waste of each type were counted to develop a percent diverted from landfill (compost + recycle / landfill = percent diverted). This provided the team with a baseline for measuring change resulting from the campaign. Their efforts were rewarded with an increase in diversion rates of nearly 40%, from a baseline of 55% diversion to a high of 90%. The floor with the best diversion rate won bragging rights, a lunch, and the perpetual trophy.

Beyond the behavioral audit and after-hours field observation noted above, facility and sustainability managers can employ many other strategies such as interviews, focus groups, surveys, historical utility consumption data, and more to address the research questions. JHS Properties’ Emma Karlsson conducted observations, interviews and surveys of tenants to identify the target behaviors. She also measured historical energy use to establish a consumption baseline for weekdays and weekends. The research findings showed that 50 percent of tenants left their computer monitors on after leaving work. As a result, the JSH team decided to include it on a key list of tenant workstation actions. Other actions include shutting off and unplugging electrical devices such as phone chargers, turning off lights for 2 hours during the day and at night, changing computer settings, and trading in dual monitors for a larger single monitor.

Table 3 below provides a summary of common data collection tools and references used in the research phase of many occupant engagement programs. We encourage readers to explore the tools in the table and to also review the research approaches used in the case studies at Fort Carson, JSH Properties, Mecklenburg County, and Whidbey Island Naval Air Station.

Finally, for readers who are ready to roll up their sleeves, we have provided a simple checklist to help you organize the steps for the research phase of your project (see Appendix A). Titled “Research and Select a Target Behavior,” the list organizes the research questions into a Rules, Roles and Tools framework for assessing institutional and individual behavior opportunities. We encourage you to review the list and practice working with it on early stage ideas for occupant engagement.

Table 3 Data Collection Tools for the Research Phase of your Occupant Behavior Program

Observation

Space layout, available technologies, how the space is used, what people wear, temperature settings using an infra-red temperature sensor for objective measurements, light levels using a good light meter, record temperature settings and light level measurements on a building floor plan, individual practices (turning off lights, computers, monitors etc.), after-hours activities and operation, sub-metering.

Building Energy Monitor Floor Checklist Form:

<http://www.gsa.gov/portal/content/195803#occupantbehavior> (Appendix I)

Interviews

Attitudes, values, practices of decision makers and influencers.

Surveys

Attitudes and awareness, personal responsibility, individual work patterns, technology use patterns, values, knowledge, concerns.

Occupant survey template: <http://www.cbe.berkeley.edu/research/survey.htm>

Focus Groups

Office dynamics, organizational culture and values, key stakeholders, organizational structure, potentially contentious issues and concerns, etc.

Focus group question list:

<https://www.surveymonkey.com/r/?sm=%2F%2BgGBiwMPQshM0XrUwOO0Q%3D%3D>

Historical, Interval-level Energy Data

Baseline energy consumption, historical patterns, weekday vs weekend use.

ENERGY STAR Portfolio Manager: <https://portfoliomanager.energystar.gov/pm/login.html>

Phase 2 – Creating a Project Plan for Management Approval

In Phase 1 above, we discussed key research questions and a set of data collection tools for assessing occupant engagement opportunities. We concluded the section with a checklist for organizing the research steps into a Rules, Roles & Tools framework to prepare for the project plan phase. In this section, we will review four critical steps for developing an occupant engagement project plan. An early and essential step involves earning management support for your initiative. Consider this scenario.

“If our goal was to save energy, then we’d shut down all of our schools and send the teachers and students home.” This was the response from the school superintendent of a large district in Ohio when her sustainability manager presented a proposal to save utility costs with a teacher engagement campaign to remove space heaters and refrigerators in classrooms. A fast learner, the sustainability manager reworked the proposal to show how the campaign would support the district goals of providing a safe and effective classroom learning environment while freeing up dollars from utility bill savings to invest in community initiatives important to management. He successfully won the superintendent’s support on the second attempt, providing him with a critical team member for his campaign. The campaign involved regular communication from the Superintendent’s office to school principals about the benefits of the new space heater and refrigerator policy and how to address teacher concerns.

So how do you develop a plan that will garner the support of management? The following are steps that should help you be successful in proposing and executing your occupant engagement program.

Step 1 – Engage management.

Management plays an essential role in any occupant engagement program. Not only as an influential messenger to occupants but as champion for what may come later – extending your program from a pilot to a broader employee base or expanding it to target a new behavior change. Upper management also shapes the organizational culture, be it one of continuous improvement v. business as usual or collaboration v. operating in silos.

Getting buy-in from his commanding officer was a critical first step in Taylor’s HVAC set back program. One portion of his campaign targeted the Fleet Readiness Center (FRC), a 187,000 square foot building that consumed 10 percent of the Navy base’s overall energy consumption. “Command level support made our initiative a priority for the managers and tenants in the building,” Taylor noted. With this backing, he held face-to-face meetings with building managers and occupants to gain agreement on HVAC schedules, then did frequent check-ins with occupants following schedule adjustments to address concerns. Commander support gave him the backing he needed while also providing the added bonus of engaging Command participation in recognition events to celebrate occupant success.

Figure 3 EPA's ENERGY STAR Bring Your Green to Work Campaign



What steps can everyone take to save energy at work? Find out by touring this fun, interactive cubicle! Click on the blue stars to see energy saving tips. Download and share it with co-workers to promote energy efficiency in your office. This virtual office is a part of EPA's ENERGY STAR Bring Your Green to Work campaign, which offers tools and interactive resources that can help you and your coworkers reduce energy use in the office.
<http://www.energystar.gov/buildings/tools-and-resources/bring-your-green-work-interactive-cubicle>

Source: U.S. EPA, ENERGY STAR

Step 2 - Focus on two or fewer behaviors, and measure them.

While there may be dozens of ways to save energy in the workplace, behavior change is hard enough without the burden of trying to do everything at once. Focusing on one or two behaviors is more achievable for occupants and ensures the potential for early success with your program. In their lights off campaign, the project team at Mecklenburg County in North Carolina targeted two lighting behaviors - task lighting and common-area lighting - to save energy and reduce utility costs. Lighting was targeted because 'on and off' was measurable. Audits were conducted prior to the campaign to determine the baseline behavior as well as after to see subsequent or modified lighting use behavior. The co-worker game 'Crab, You're It' encouraged turning off lights by engaging 350 employees in a game-like atmosphere for six weeks. An employee caught leaving their light on while not at their workspace for more than 15 minutes would find a plastic Fiddler crab (a light-attracting crustacean found locally) on their desk. "Crab, You're It." To release the crab, the employee would find an unattended workspace with the light on. Not possible? Return the crab to a centrally placed bucket. One month after the program, the final audit showed an 80% increase in lights turned off when not in use. A second 'Adopt-a-Light' campaign encouraged responsibility for lights off in common areas.

Figure 4 Crab, You're It Campaign



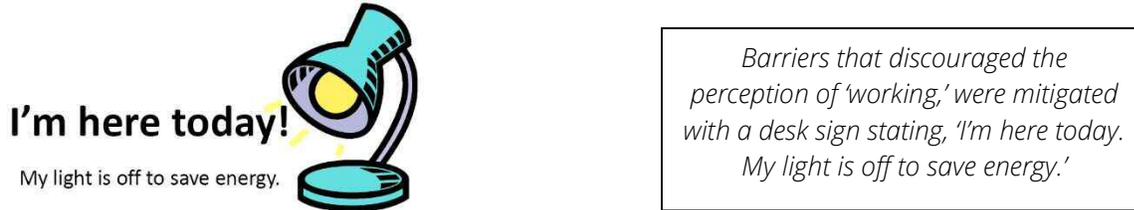
An employee caught leaving their light on while not at their workspace for more than 15 minutes would find a plastic Fiddler crab (a light-attracting crustacean found locally) on their desk. "Crab, You're It." To release the crab, the employee would find an unattended workspace with the light on.

Source: Mecklenburg County, North Carolina

Step 3 - Address employee motivation and ability.

Are your occupants familiar with the company's sustainability program? What matters to or interests them about sustainability? How much impact can they have in their role? Getting answers to these questions can help you identify the right set of communication tools that will educate and motivate them. The project team for Mecklenburg County's lights off campaign found that occupants were more likely to leave common-area lights on when unclear about responsibility for shut off. Likewise, employees who were not in the habit of turning off their workspace lights believed the practice was no longer an organizational priority. Assigning responsibility and communicating "lights off" priorities emerged as simple and obvious first steps to include in their campaign. To address motivation, the project team invited employees to preview the campaign's message and visual presentation. Several expressed concern about an unlit office being perceived as an employee "isn't working." The campaign addressed this by providing desk signs stating "I'm here today...saving energy."

Figure 5 Crab, You're It Campaign Cont.



Source: Mecklenburg County, North Carolina

Others advise that if you create a reward system, consider asking the occupants what would be meaningful. Maybe one month it's a pizza party, another it's a picnic, or a third it's coupons to the movies. Taylor issues feedback to occupants monthly in the form of tenant energy reports as well as quarterly awards for improved efficiency and participation with command parties, time off, and/or dedicated funding for building-specific maintenance projects. He also found that terminology makes a difference when communicating benefits. Using "Efficiency" versus "Conservation" and "Works Better" versus "Use Less" were effective with his occupants. Occupants were asked to do self-audits using a checklist provided by the Energy Department. "This helped building managers to get a better feel for where the energy was going in order to identify possible improvements," said Taylor. "It also helped building managers feel proud their facility was working better, that they had improved it."

How do you maintain motivation over time? A common challenge for those experienced with occupant engagement is maintaining motivation and engagement over time. Occupants forget, lose interest, move to other locations, and are replaced with new occupants. Improving the link between behavior change and the results and the recognition that compels occupants is essential.

In their "Shut the Hood" campaign, the facility management team at the University of Utah found that the key to lasting effectiveness was to keep the topic fresh in the minds of all the laboratory

staff. They used real-time LED displays located in elevator lobbies showing the air exhausted through each lab’s fume hoods with signage to re-inform and engage employees.

The Fort Carson project team found the four most influential communication messages to be instruction from an immediate supervisor, information on specific actions to take, feedback on performance, and a letter from leadership.

The Fort Carson project team conducted post-campaign interviews with occupants to identify the communication

messages that were most influential. They found the four most effective to be instruction from an immediate supervisor, information on specific actions to take, feedback on performance, and a letter from leadership.

Reissuing surveys to solicit feedback is also useful. Listen to what the occupants tell you and match the rewards accordingly - whether it is a food event, an outing, or leaving early on a Friday. Keeping the reward the same will result in loss of interest and increasing energy consumption. Keeping occupants motivated is a continuous process. Prepare your program for the long term.

Step 4 - Evaluate and share results.

Results tell all! Campaigns that adhere to the guidance in step 2 - picking measurable behaviors and establishing a consumption baseline – are guaranteed results for their efforts. Even if they aren't what you expected – for example, no noticeable change, or even poorer performance than pre-campaign. Results still provide valuable information for making improvements to your future strategy and outcomes.

After the first three months of the HVAC scheduling campaign, Taylor was able to compare baseline consumption to the campaign period consumption to show results. “The campaign was achieving an overall improvement of 5.5 percent in energy performance at the FRC, saving \$15,000 each month,” said Taylor, with no change in operations or production levels. These were notable results to share in his quarterly report to the Commander and to use as the basis for a celebration party with the winning facility occupants and building managers.

For readers who are ready to tackle phase 2, we have provided in an Occupant Engagement Plan checklist covering the value proposition to management, your communication strategy with

Listen to what the occupants tell you and match the rewards accordingly. Keeping the reward the same will result in loss of interest. Keeping your occupants motivated is a continuous process.

occupants, and the progress tracking and reporting (see Appendices 6.0). The checklist will help you organize at a high level the conceptual framework for your project. We encourage you to review the list and practice working with it on early stage ideas for occupant engagement.

3.4 Simpler Strategies for Getting Started with Occupant Engagement

If you like these ideas but don't have the time and resources to take the plunge, consider these simpler strategies for dipping your toe in the water.

- **White Boards – “A Note from Facilities”.** White boards offer two-way communication that provides accurate, timely information to occupants, and allows feedback. Teresa Rogers, Facility Manager with Hines, used this approach when her client put the brakes on email notices from facilities. She installed white boards adjacent to kitchenettes on each floor, with pen holders and lots of colorful pens. On the corner of each board was written ‘A Note From Facilities.’ She identified herself, her email address, phone number, and office space location. “Please date all questions and answers,” she writes and for timely response she checks the boards on each floor 2-3 times per day. A recent occasion to use the white board was to give notice to building occupants of a fuel spill that was to be cleaned up and would impact their above and below ground parking situation for several days. When the spill was mitigated, a notice was written, on all floors, that parking could resume. Another occasion was when elevators would be down on a Saturday.

- **Lunch ‘n Learns.** Richard Laws, Physical Plant Manager at United Radio in New York, used a lunch and learn program to educate some 400 employees about the company's energy management program and how they could help. The events were held weekly over a six-month period and catered. The Lunch and Learn Program is an annual event running from October through March. “I received a lot of buy in from everyone on the importance of the initiative and their desire to help save energy,” said Laws. It was a great way to open eyes to the nuts and bolts of running large buildings with heavy energy consumption.

- **Building Rounds.** Tours and walk-arounds don't take a lot of time and provide an effective way to showcase new projects and educate occupants about the work of the FM department. During his term as Director of Facilities Engineering for a hospital in Portland, OR, John Junk invited his CFO on rounds to highlight progress on capital projects and to provide a look-ahead to future needs. The rounds offered him a leg up on securing support for his master plan requests.

We've only touched the tip of the iceberg with occupant engagement but we hope it has provided a glimpse of the tremendous potential it offers FM professionals for achieving more with sustainability programs. As you look ahead, consider the wise perspective of a member of the IFMA EES Community. “Change in machines is easy but changing human behavior is harder than we can imagine. If you want to take my advice - “lead by example and be patient. It has always worked for me and I believe it will work for you and your managers too.”

Part 4 – Making the Business Case

A business case provides the justification for the company or organization to make an investment in a project proposal. Chances are, if you’re leading your company’s sustainability program, you’ve already made the business case to management for pursuing the initiative and won their support. Stepping back and reviewing the drivers behind the company’s interest in sustainability is a good place to start in making the business case for an occupant engagement program. What are the organizational drivers behind sustainability and how will the occupant engagement program address those? For example, if a driver is cost control, selecting occupant behaviors that reduce waste and improve recycling rates, could generate results that achieve measurable savings in utility costs.

Common business drivers for sustainability include one or more of the following:

- Saving money
- Decreasing environmental impact
- Supporting a new corporate priority such as worker productivity or wellness
- Demonstrating community stewardship
- Increasing tenant satisfaction and retention

Occupant engagement programs have the potential to support all of these drivers in a meaningful and measurable way. Picking the ones that resonate with your management provides you with the platform for aligning the outcomes of your occupant engagement program. An effective approach to ensure outcomes align with the organizational goals is to use a balanced scorecard. Table 4 is an example that illustrates how energy saving goals align with the company’s cost reduction driver.

Table 4 *Balanced Scorecard*

Organizational Goal	Sustainability Goal	Initiative	Outcome	Target	Status
Reduce operating costs	Use less energy	Lights off during unoccupied hours	Decrease electricity use	10%	5%
Tenant satisfaction	Improve thermal comfort	HVAC set points and scheduling	Fewer comfort calls	15%	5%

Measuring Outcomes and Sharing Results – Cost v. Benefit. We have emphasized the importance of selecting occupant behaviors that are measurable pre- and post-campaign. Measurability allows you to establish a baseline then track progress to determine if the campaign had an impact. Positive impacts can be used to reward and recognize participants and report to management. The case studies presented in this Guide provide many examples of how measurable behaviors were selected and documented by the project teams. Of note is that most of the campaigns weren’t tasked by management to develop a formal cost-benefit analysis. Of

the small subset that did, most noted that their programs were of very low-cost nature because they relied primarily on communication tools, rewards, and some labor costs associated with meetings and events rather than investments in purchases of equipment and service contracts. For example, the waste management campaigns typically involved new waste containers and signage which were purchased under remodeling budgets, table tents and workspace labels provided by waste contractors, and volunteer efforts for the program roll-outs, floor coordinators & waste stream audit. Payback periods were very short, generally under 1 year, and ROIs were high. Consider the examples below.

Shut the Hood Campaign - University of Utah

Investment: \$5,000

Annual Savings: \$24,000

Simple Payback: 5 months

Return on Investment (ROI): 380%

The metric for success of this campaign was simple: more closed fume hoods, less wasted exhaust air. Prior to the campaign, 40% of unattended fume hoods were left open, that rate dropped to 21%. The CFM (cubic feet per minute) of fume hood exhaust air dropped by 6% over the test period. An estimated reduction of \$2,000 per month in heating/cooling expense was also experienced by the University. But what was the investment? The Facilities Department asked for a budget of \$5,000 to cover the following:

- Refreshments during the public areas kickoff event for students
- Design and purchase of the stickers to be placed on lab entrances and on the hoods themselves
- Purchase and installation of the 6 LED real-time data displays

“Crab, You’re It” Campaign - Mecklenburg County, NC

Investment: \$200

Annual Savings: NA

Simple Payback: NA

Return on Investment (ROI): NA

The expenses were purchasing the plastic crabs (<\$100) and the ice cream for the ice cream social following the campaign (also <\$100). The County's goal was to test the Community-Based Social Marketing (CBSM) methodology. They tracked behavior change, not energy use.

Occupancy Matching – Naval Air Station Whidbey Island

Investment: NA

Annual Savings: \$120,000

Simple Payback: NA

Return on Investment (ROI): NA

For the Occupancy Matching, we tracked electricity saved and converted it to dollars. We only made changes in the buildings where we were able to reduce the operating hours, so it always made money. For the Tenant Energy Efficiency Competition, we did do a study after the first year and found a net savings of about 1,300 MWh and \$120,000 (using constant dollars, savings due to energy not rate changes.)

I Will If You Will Campaign - Shorenstein Realty

<http://greenshorenstein.info/pdf/IWillIfYouWill.pdf>

Investment: \$670

Annual Savings: \$100 for 3 months/\$400 for 1 year

Simple Payback: 1.5 years

Return on Investment (ROI): -40 in year 1

I Will if You Will is part of Shorenstein's Flip the Switch campaign, which seeks to empower our tenants to reduce plug loads, shrink their environmental footprint, and save money. Absolute savings for the entire program over a 3-month period was 602 kWh. While modest, this figure does not account for future savings nor does it account for other tenants who may have participated in the program informally. With a Modlet (plug load measurement device) starter kit costing \$370 and program rewards adding about \$300 more, this program is not directly cost-effective (although the Modlets can be used again for subsequent campaigns). Rather, the primary benefit of the program from a financial perspective is advancing the energy efficiency conversation, building capacity for Flip the Switch, and creating a framework for saving energy. In other words, this program makes salient the potential energy savings that we hope will lead to broader action on the part of tenants.

Cross Functional Teams and Printer Reduction - BAE Systems

In lieu of a business case for the cross functional team approach, BAE created a charter for structuring the volunteer sustainability committees which was presented that to their site executive in Greenlawn, NY for approval. Once approved, the structure was piloted, and the successes were shared with the Director of Facilities as a best practice for sites throughout our sector. He adopted the idea, and the project team subsequently applied it to five additional sites. The team's proposals consisted of team structure, how and when we meet, and benefits both financial and non-financial to BAE Systems and its employees as well as ROI.

Example project budgets for BAE:

- Printer reduction project – labor hours to research and audit existing printer layout and operation. Four hours to remove and collocate printers for optimal usage.
- Energy Day/Earth Day Events – A job responsibility for the sustainability manager with volunteer support from the Sustainability Committee members to staff events. Annual budget for giveaways at events is \$10K for 11 sites in the sector and supplies giveaways for 80% of the population.

- Recycling Standardization and Enhancement – Labor expenses for a facility walk through; New interior container expenses is budgeted at \$10K per site, although all new containers are very seldom needed. More often the site is just lacking proper signage and employee recycling guidance information. Containers are not well labeled to display what materials are permitted in that stream and what materials are not. Exterior containers should also be properly labeled to insure proper use by the facilities staff and external contractors. The cost of labeling the containers is minimal as design work was provided by the recycling container manufacturer and is deployed in the same style, with some minimal site specific changes, throughout the sector. Waste audits of compactors were provided by the local waste hauler. Periodic billing review yielded inefficiencies such as correcting container pickup frequencies, proper container sizing and proper container location. All of these actions have resulted in diversion rate increases at many locations as well as annual cost savings.

Part 5 – Case Studies

This section features real world experiences where FM's have engaged occupants in energy savings, resource conservation, and/or sustainability practices in the work place.

5.1 BAE Systems, Sustainability Department, Greenlawn, New York

Sustainability Committees & Cross Functional Engagement

Morgan Rooney, SFP, Communications Specialist, BAE Systems

Overview:

Sustainability Committees embrace responsible behavior by driving improved efficiency in the areas of Cost, Energy, Waste, Water, and Carbon. The Sustainability Department at BAE Systems was looking to expand the scope of sustainability to engage all functions. Piloted the concept at one site with an overwhelming response of volunteers. This has now become a global best practice shared at 4 US sites and 1 site in the UK, with 2 additional sites currently in process. Teams have achieved significant cost savings; aimed at driving growth & returning value to shareholders. BAE Systems felt this initiative was a great way to engage employees, share diverse backgrounds; makes them more efficient, cost effective, & responsible. Sustainability is a key capability in today's competitive business environment.

Background:

The challenge was finding a way to engage more employees that wanted to change the way BAE Systems functions and set goals they could achieve to make them more efficient and competitive. Historically, Environmental Sustainability (ES) at BAE Systems has been a Facilities driven effort. As this initiative has matured, the ES Facilities' Sustainability Department looked for ways to broaden the scope of their program to reach beyond Facilities into all functions and aspects at BAE Systems.

Process:

This Sustainability Committee was piloted at the Greenlawn, NY (GNY) Site in September of 2013. BAE asked for volunteers and to their surprise received an overwhelming response from interested employees. The selected team was comprised of 13 volunteers with cross-functional representation spanning all facets of BAE Systems including:

- Site Leadership
- Engineering
- Operations/Manufacturing
- Program Management
- Communications
- Safety, Health & Environment
- Facilities
- Program Engineering Management
- Sustainability

- Graphic Arts
- Information Technology
- Human Resources

Teams meet monthly to share ideas and discuss implementation. Additionally, for each project the team reaches out to subject matter experts to empower them to make positive change and share ideas that previously went unresolved.

The open sharing and execution of concepts/ideas by a highly diversified group of engaged and empowered volunteers is a textbook best practice; lowering operating expenses while increasing competitive advantage and value to shareholders.

Below are examples of implemented projects demonstrating the dedication of each Sustainability Committee to responsible behavior, and the positive impact on the environment within the company and the enterprise as a whole.

Projects Implemented:

- Employee Community Gardens/Composting
- Recycling Standardization and Enhancement
- Printer Reduction
- Material & Resource Management
- Supply Chain Efficiencies
- Employee Engagement/Communication
- Team Building
- Carbon Reductions
- Energy Day/Earth Day events
- Empowerment of Employees

Solution:

Initially, we hoped to identify opportunities for improvement in Sustainability at the site level. What the team achieved far exceeded their initial goal and brought together a diverse group of individuals that expanded the scope for additional and non-traditional sustainability opportunities. The keys to enabling the success of these teams have been:

- Strong leadership support
- Recruitment of volunteers who have a personal interest in sustainability
- Breaking the teams into sub-committees for each project
- Empowering diversified team leadership for each project
- Bringing in outside subject matter expertise where applicable
- Open sharing at team meetings
- Consistency of monthly meetings

Results:

We are empowering, engaging and educating a wide spectrum of our work force in the field of Sustainability. This engagement has empowered our employees to execute conservation ideas that result in environmental, economic and social benefits to our enterprise.

Conclusion:

Based on the successes achieved thus far, BAE Systems plans to use continuous improvement strategies within existing Sustainability Committees and to transfer best practice to other sites and business units with the goal of engaging all employees in Sustainability efforts.

Printer Reduction Project

Teams were formed at the BAE Systems Greenlawn site to analyze processes and develop ways to eliminate waste and make operations more efficient. Most recently through the Sustainability Committee, a team was formed with the task of optimizing printer efficiency. Based on the team's findings, it was identified that the GNY site is at a 4:1 printer to person network printer ratio, industry standards recommend a 10:1 ratio.

With this goal in mind, the team identified 32 printers that could be taken out of service based on proximity to other multi-function copiers. Printers set to be removed were labelled and alternative equipment was identified to employees. estimated savings totaled \$32K per year (\$1K per printer) in material and energy savings.

Maintaining individual department network printers is costly and inefficient. The Greenlawn site recognized that they must continuously monitor their processes to ensure that they remain competitive in today's competitive marketplace.

5.2 U.S. Environmental Protection Agency (EPA) Region 9

“Kick the Can” Campaign

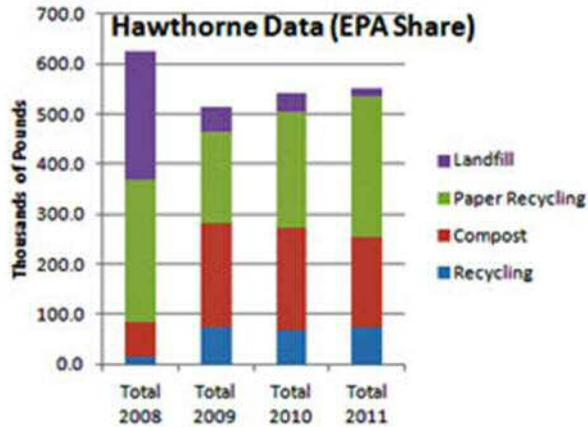
Lynn Clark, CFM, FMP, LEED AP BD+C, Green Operations Consulting

The Environmental Protection Agency Region 9 (EPA R9) has an ISO 14001 Certified Environmental Management System that helps them systematically reduce their ecological footprint. Reduction areas include: waste; paper use; water use; energy use; and air emissions.

The EPA R9 sustainability leaders include a Sustainable Region 9 Team (staff) and Advisory Committee (managers) that together advise and help implement EMS (Environmental Management System) initiatives. One EMS program with a lengthy history of engagement results is Kick the Can (no desk-side collection).

Goal Setting - In 2011, the R9 San Francisco office set a (practical) zero waste goal date of January 1, 2012. Practical zero waste means they divert 90% or more of their waste stream (measured in pounds) from landfill to compost or recycling. They achieved their goal through the implementation of behavioral, educational, and infrastructure-related initiatives. The following

chart depicts data from this initiative (Hawthorne is the R9 San Francisco office located at 75 Hawthorne affected by the program).



Landfill waste (purple) at the EPA Hawthorne Building declined to 2.6% by 2011. Paper recycling (green) increased 2009-2011 due to "clear the clutter" campaign.

Choice Architecture & Audits – Choice architecture refers to the design of different ways in which **choices** can be presented to consumers, and the impact of that presentation on consumer decision-making. For many Region 9ers, the journey began more than two decades ago when they started using blue bins to recycle paper, drink cans, and bottles. The first effort to go beyond this began in the mid-1990s with a dumpster dive by R9 leaders to identify materials headed for the landfill. Since then, R9 has invested in incremental changes to improve composting and recycling efforts.

Motivated by a mid-2000 dumpster survey that found hundreds of nearly-empty wastebasket plastic bags inside larger plastic bags, the Sustainable Region 9 Team in 2007 initiated the "Kick the Can" campaign. Staff and managers "kicked" using their desk-side trashcans. Individuals instead took their items to sorting stations with dedicated containers for recycle, compost, and landfill located on each floor.



Compost creates a soil amendment which is used locally for California vineyards.

Employee Involvement – Over the span of 2012-2014, the Sustainable Region 9 Team expanded the Zero Waste network by recruiting "Floor Champions" to advocate sustainability initiatives in their immediate work areas. These Champions assembled "3-D Boards" to illustrate correct sorting procedures, and hung them over each sorting station. Since the R9 San Francisco office

succeeded in reducing the entire waste stream sufficiently to reach their aggressive Zero Waste Goal, the incorrect sorting decision of a single individual can impact the score for the entire floor during an audit.



"3-D Boards" at stations on all floors simplify waste stream sorting.

Sharing Lessons Learned - The EPA Region 9 Environmental Management System (EMS) achieved ISO (International Standards Organization) certification by third party auditors. "Our Zero Waste approach was noted by the auditors and is being shared," says Zac Appleton, R9 Zero Waste Coordinator. "Already, corporate offices seeking ISO certification have been using our ['40 Things You Can Do To Save the Planet'](#) guide."

Management Support- Zac says "There's top-to-bottom support" for Zero Waste at Region 9, from the Regional Administrator's office to the staff in every division. "Floor Champions and managers have rolled up their sleeves and donned rubber gloves to perform container audits that have painted a rich picture of Region 9's waste data. Audits identify trends, common sorting errors, and share lessons for the floors working to improve their diversion." Achievement is sustained through an annual (practical) zero waste audit (per floor), results publication (by floor), signage, and on-going communications.

"Zero Waste is more than recycling and composting. It is also about reducing the source of waste at the very beginning. For example, Region 9 has cut new paper purchases by almost 50% since the 2003 baseline. We are on our way to transforming Region 9 into a truly paperless environment," according to EPA R9's Zac Appleton.

Contributors: Zac Appleton, former EPA R9 Zero Waste Coordinator; Elyssa Bairstow, EPA R9 Sustainability Coordinator; and Lynn Clark, Green Operations Consulting

5.3 U.S. Environmental Protection Agency (EPA) Region 9

Greening of Meetings and Conferences

Lynn Clark, CFM, FMP, LEED AP BD+C, Green Operations Consulting

<http://www.epa.gov/region9/ems/pdf/EPA-R9-Grn-Mtgs-Policy.pdf>

The Greening of Meetings and Conferences

The US Environmental Protection Agency (EPA) Region 9 strives to make a difference, not only in what they do, but in how they do it. The Green Meetings and Conferences Policy (GMP) is a prime example. First launched in December 2009, updated in 2011, and expanded in 2015, it provides guidance on how to reduce the carbon footprint of meetings and conferences. This supports the Agency's and Region 9's goals of preventing pollution, minimizing use of resources and reducing greenhouse gas emissions.

It applies to:

- All Region 9 hosted and co-hosted events, including conferences, training, or other meetings that involve ten (10) or more people and are held in the EPA Region 9 offices. Applicable practices are encouraged for meetings of any size.
- To the extent feasible, the policy also applies to Region 9 events held at non-EPA buildings, such as hotels, government buildings, conference centers, or any other space that is not procured through an EPA contract.

The five-page policy also provides checklists, templates, pre- and post-event surveys, sample contract language, how-to factsheets, plus lists of sustainable supplies and food sources. Based on lessons learned, in March 2015 a new set of questions for staff of potential meeting venues was added. Infrastructure includes a dedicated email for GMP questions and feedback, and an intranet site of tools and resources.

The policy's 14 environmentally preferable goals and measures include:

- Handouts are to be minimized or avoided by providing electronic copies of meeting materials. Handouts, if used, shall be printed double-sided, on 100% post-consumer recycled paper, processed chlorine free. This shall include documents printed outside of EPA as well. Sample statement of work language is provided in the policy for goods and services.
- Others are: Binders/Folders, Lighting, Light Refreshments, Composting & Recycling, Name tags, Location, Lodging, Publicity, Travel & Transportation, Awards, Promotional items, Decorations, and Signs & Banners.

While the goals are clear, it is also understood that 100% "green" might not yet be possible. At a minimum:

- Use 100% post-consumer content paper
- Recycle and compost at all meetings held in R9 spaces
- Double-sided printing
- Lights and equipment off when vacating a room
- No disposable water bottles

Policy challenges include tracking and developing metrics. The EPA R9 uses spot checks of meetings to assure compliance. Labeled waste stream sorting bins and some sustainable

supplies, including bulk tap water dispensers and compostable cups, are proactively provided onsite.

The demonstration of planned adherence to the policy is a requirement of an onsite space reservation. A new feature is that upon completion of reservations an email is automatically generated that provides a post-event survey.

By 2015, about half of the US EPA's other regional offices have adopted similar policies to Region 9's Green Meetings initiative which was a first of its kind in the Agency. The US EPA R9 policy motivates behavior change by setting clear expectations and providing onsite sustainable amenities. Easy to use tools include questionnaires that track both the results and concerns, providing reflection on lessons learned and guidance on best practices.

Contributors: *Elyssa Bairstow, EPA R9 Sustainability Coordinator, Lynn Clark, CFM, FMP, LEED AP BD+C, Green Operations Consulting, and Wendi Shafir, Pollution Prevention & Sustainable Materials Management Coordinator*

5.4 Fort Carson Army Base, Colorado Springs, Colorado

Fort Carson Demonstration Project

Kathleen Judd, LEED AP O&M, Project Manager, PNNL

http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22824.pdf

http://energy.gov/sites/prod/files/2014/06/f16/change_performance.pdf page 7.1

Overview:

Fort Carson Army base in Colorado Springs, Colorado continued their pledge for sustainability with a twelve week supportive demonstration project in the Spring of 2013. The project's goal was to recognize which changes in occupant behavior offered the greatest measurable potential for ongoing resource savings. The pilot project targeted energy conservation strategies such as nighttime/weekend computer shut down, lighting shut-off, thermostats setback and other energy measures. Five 'green' buildings were selected. Nearly 700 civilian and military occupants participated. Following the project, occupants reported a greater understanding of the base's mission and action strategies due to recurring communications with trained Building Energy Monitors (BEM).

Background:

Four of the five buildings selected for the project were LEED certified. The fifth building was recently remodeled with "green features." All the buildings consisted primarily of administrative space; two military buildings had some high-bay storage areas. Two civilian-occupied buildings had decentralized heating with individual controls and operable windows, and manual-control office lighting with occupancy-sensors in common areas and conference rooms. This group was directed to turn-down heat by 5-10 degrees evenings and weekends, and manually turn off lighting that was not needed, especially after hours.

Three military personnel buildings had centralized heating & cooling without occupant controls, occupancy-sensor lighting and no operable windows. All occupants were directed to turn monitors off when not in use, and turn computers off evenings and weekends. All occupants were requested to take advantage of daylighting, adjust shades, use task lighting when available and appropriate, and dress for interior comfort. All occupants were requested to reduce plug loads by limiting personal appliances and consider other energy savings measures. Success was recorded on a checklist with walk-through observations.

Process:

Eighteen months before, a research team organized a group to help create the pre-project baseline survey. The survey explored occupant knowledge of base sustainability efforts; perceptions of workspace, comfort and lighting conditions; and the level of awareness in the variety and use of office-related equipment. The team established data collection methods, such as ‘floor-checks’ to record twice weekly walk-through observations, and an evaluation plan to compile and compare measurable outcomes using building data. The team determined the most successful behaviors and actions to focus on, and identified formal and informal policies and procedures that might hinder the project goals. The team discovered a current base policy was to leave computers on; opposite the project goals. The Network Enterprise Center (NEC) group would monitor computer shutdowns.

Each of the five BEM’s were assigned to a building and received a handbook. They were trained to identify energy saving opportunities (i.e., private appliances), conduct periodic walk-throughs (day and night), and convey (report?) problems that required attention (i.e., lighting sensor malfunction). Training included how to share information in bi-weekly emails, praise occupant achievements, prompt appropriate behavior, and accept valuable feedback. Occupants received personalized communication, supervisor instructions, specific actions, monitoring information and continual encouragement.

Solution:

Pacific Northwest National Laboratory (PNNL) conducted the occupant post-interviews. According to the 102 post-interview responses, four strategies appeared to have the most success. Eighty-eight to forty-six percent believed they turned off monitors and computers; turned off lights when leaving rooms; used blinds to control temperature; and dressed in layers for comfort, respectively. ‘Extremely influencing’ and ‘very influencing’ factors were considered, in order, to be:

- Energy saving action instructions from supervisor;
- Commanders’ letter requesting occupants take the project seriously; and
- BEM email messages suggesting actions and comparing building energy savings actions taken.

Least influencing factors were considered to be:

- Recognition by BEM and supervisors for actions taken

- Posted signs

The largest group of respondents, 37%, believed they were well informed, whereas 15% believed they were very well informed and 8% not at all. “Limited, specific and locally relevant information” enabled greater understanding of their actions and impacts in achieving conservation, according to occupants.

Results:

The project goal was to determine occupant behaviors that have the greatest potential to save energy. According to BEM observations the first week of the project, four buildings had 8% of nighttime computers shut-down, while one civilian building began with 51%. The project’s highest compliance was 64% by the civilian buildings.

Conclusion:

PNNL’s recommendations included the importance of identifying committed, qualified Building Energy Monitors with practiced communication skills, energy conservation knowledge, and an understanding of base operations and needs. The value of time consuming BEM training offers a greater understanding of occupant motivations to change behavior, and a simple set of tools to empowerment. The variety of buildings, energy systems and established occupants made comparative analysis difficult. Direct comparison of specific building data was not possible due to low occupant responses. The inability to determine the level of initial communication to the military building personnel may indicate the reason for lower occupant success.

5.5 Mecklenburg County’s Land Use and Environmental Services Agency (LUESA)

“Crab, You’re It” – A Lighting Behavior Modification Game

Megan Green, Program Manager, Mecklenburg County, NC

<http://charmeck.org/mecklenburg/county/LUESA/AirQuality/Documents/CBSM%20Final%20Report.pdf>

Overview:

For six weeks, over three hundred employees were introduced to a lighting reduction program called “Crab, You’re It,” in a game-like atmosphere. Launched April 2012 as a pilot program to discover a targeted campaign’s influence, two lighting campaigns were initiated. Research and planning for the program began eight months earlier. Some of the guidelines the campaign followed were: keep it simple for greater chance of success, verify results through observation, and follow the community-based social marketing process. A building-wide ‘roll out’ announcement, with management support, encouraged participation.

The Mecklenburg County’s Land Use and Environmental Services Agency (LUESA) conducted the pilot program to determine the value of behavior modification strategies. The goal of lighting

reduction was selected because 'on and off' are measurable actions, the cost of installing controls are expensive, and as one of the most visible forms of energy use, lighting is often seen as an indicator of waste. The program objective was to "increase the number of lights being turned 'off' in unoccupied workspaces" and "increase the number of common area lights being turned 'off' at the end of the day." The challenge was how to engage occupants to turn 'off' task lights, and take responsibility for specific common-area lights.

A 'Green Guardian' team, made up of seven volunteers from five departments, researched and organized the pilot campaign. They identified the 'targeted behavior,' the audience and the test period. Community Based Social Marketing (CBSM) was chosen as the tool for the program. It involves identifying barriers and benefits which enable the desired behavior, creating a plan that engages the essential tools, choosing a size-effective sample for the pilot and reviewing the accomplishments upon completion.

Two randomly selected employee focus groups previewed the campaign's communication content and the visual presentation. Their feedback compelled revisions. A building-wide electronic survey sent to employees indicated they perceived a low percent of current compliance and responsibility, yet most lights were 'off' at the end of the day. Responses indicated behavior would not be altered by conservation, safety or accessibility. Initial audits performed during and after work hours established the baseline.

Phase one's lighting objective targeted an unattended workspace with the lighting on. After 15 minutes unattended, any employee could release a plastic fiddler crab on the desk. The occupant of the desk was then "it" and had to be on the lookout for another workspace to "tag" as "Crab, You're It." In phase two, "Adopt-A-Light," encouraged responsibility for common-area lights, which were more likely to remain 'on' when responsibility was unclear.

Barriers that discouraged the perception of 'working,' were mitigated with a desk sign stating, 'I'm here today... saving energy.' Social norm conformity, personal norms & identity, and managerial expectation compliance appeared to beneficially influence behavior to reduce unnecessary lighting.

Audits conducted immediately following the campaign showed an average of 90% compliance for workspace lighting reduction, and 90% for common area lighting. One month after the program, the final audit showed a decrease to 80% and 90% respectively.

Lessons Learned:

The results of this project suggest the importance of: support from management; understanding the organization's personal and social norms of behavior; focus groups to distill valuable insight into more effective campaign strategies; and, celebration of documented successes. The personal touch of "Crab, You're It," encouraged a familiar game-like atmosphere that went beyond education-based programs or a simple explanation of the goals and expectations.

5.6 University of Utah, Salt Lake City, UT

“It’s Good to Shut the Hood” Campaign

Joseph Ashurst, CFM, BOC, Facility Manager, University of Utah

<http://attheu.utah.edu/facultystaff/its-good-to-shut-the-hood/>.

Overview:

A university research building has many specialized semi-enclosed cabinets (“hoods”) where researchers can safely work with dangerous chemicals. The hoods contain toxic fumes and exhaust them out of the building. To prevent fumes in the hood from escaping into the room, the hoods are designed with variable air volume to maintain a constant air velocity at the hood opening, drawing air from the room into the hood then exhausting it safely outdoors. While a best practice for managing toxic fumes, the hoods do come with an energy penalty because outside make up air needs to be conditioned to replace air exhausted through the hood to the outdoors. The simple practice of closing the hood when not in use can minimize the quantity of exhausted air. Some estimates indicate if researchers keep the hoods closed when not in use, savings of up to \$3,400 per hood per year (equating to significant emissions reductions and improved environmental stewardship) can be achieved. With many hoods in a single research building (75 in this case study), the Facility Manager must rely on the researchers to “self-police” their own labs. Challenges included high turnover of research students and a lack of knowledge among laboratory staff of the implications of leaving unused hoods open. Further, as the hoods are used throughout the day by numerous researchers, engagement must be widespread to achieve meaningful change.

Getting buy-in within the facilities department was simple – implementation cost was minimal and potential savings were high. Buy-in from hands-on researchers, however, was required to bring about change. Capitalizing on the University’s hierarchical structure, the facilities department started at the top, first obtaining buy-in for their efforts with the VP for Research, and only then with the Principal Investigators (the executives running each lab). Once the top level executives were completely committed to the process, the “It’s Good to Shut the Hood” campaign rolled out to all staff/students consisting of:

- A kickoff event (with free food) in the main atrium of the building, staffed by volunteers eager to inform researchers about the way the hoods work and how they can make a difference through their behavior
- Signage at the point of change (the hood) informing/reminding users of the impact their efforts make
- LED readout displays in public spaces showing the real-time total quantity of air exhausted through the lab’s hoods, with signage to re-inform and continually engage

Because the simple act of closing a hood is the major goal of this effort, education was the primary factor that influenced the change. The key to lasting effectiveness of the campaign was to keep the topic fresh in the minds of all lab staff – this was achieved with the real-time LED

displays (located in elevator lobbies). Static signage gets “lost” in the landscape, but people notice the continually changing LEDs.



Signage at the point of the desired behavioral change used to remind employees to “Shut the Hood”

The metric for success of this campaign was simple: more closed hoods – equating directly to less wasted exhaust air. Prior to the campaign, 40% of unattended fume hoods were left open - that rate dropped to 21%. The total quantity of exhausted air measured in CFM (cubic feet per minute) dropped by 6% over the test period. An estimated reduction of \$2,000 per month in heating/cooling expense was also experienced by the University.

In terms of the financial investment, the Facilities Department asked for a budget of \$5,000 to cover the following:

- Refreshments during the public areas kickoff event for students
- Design and purchase of the stickers to be placed on lab entrances and on the hoods themselves
- Purchase and installation of the 6 LED real-time data displays

That’s an impressive payback period of less than three months, because the desired behavior change was communicated through the correct channels to the target audience effectively.

The Facilities Department of the University of Utah plans to expand the program to other campus laboratories. They will use some of the same tactics discussed here; emphasizing that getting buy-in removes roadblocks or the potential for rebellion against the change. Investment in the LED signage brought longevity and better engagement to the campaign. People will choose green if their “investment” in that choice is minimal, and if they are informed of the impact their efforts can have. Facilities staff can influence green decision-making via education.



A real-time LED display continually engages lab employees by reminding them of the impact shutting hoods can have.

For more information, contact Joseph Ashurst, Facility Manager with University of Utah joseph.ashurst@fm.utah.edu.

5.7 Whidbey Island Naval Air Station, Whidbey Island, Washington

Matching HVAC with Occupant Schedules

Chris Taylor, CEM, Energy Manager

<http://www.aeecenter.org/files/newsletters/ESMS/OccupancyMatching.pdf>

Naval Air Station Whidbey Island (NASWI) requires readiness as a 24/7 response operation base while fulfilling continued energy reductions mandated by government budget sequestration. Chris Taylor, CEM and Installation Energy Manager found being 24/7 'capable' met the expected military and base requirements. By working with the occupants to match building schedules to actual energy load needs, their joint efforts earned the base 10.5% in energy savings. Commander support was instrumental, and with this backing Taylor held face-to-face meetings with building managers and occupants to gain agreement on HVAC schedules.

Nearly five hundred Advanced Metering Infrastructure (AMI) smart meters, installed in 2012 throughout NASWI, a utility energy billing program and a geospatial energy 'mapping' application were tools used to locate the largest energy users among the 3.9 million square foot campus. Ten facilities consumed 45% of the total electricity used on the 280 building air base. Taylor focused on the top 8 energy consumers. There were 2 hangers and 2 simulators, a hospital, a processing and a training facility, and the industrial Fleet Readiness Center (FRC). FRC is an aircraft maintenance depot, with industrial processes such as welding, paint booths, calibration labs, ovens, and engine repairs. 10% of the base's total electrical consumption was used by this 187,000 sq. ft. FRC building.

Combining information gained from the analysis tools, daytime, nighttime and weekend audits, Taylor and his facility managers pulled together building baselines, focusing on tenant HVAC scheduling. They worked with tenants to construct actual operating schedules, control system schedules and occupant-described work schedules. Not surprising, unnecessary energy use in unoccupied buildings was discovered 'on' evenings and weekends; high fan and cooling loads in flight simulators and avionics, especially. Taylor worked with building facility managers with walk-throughs, and subsequent reprogramming. Changes were slowly introduced over weeks. Loads were monitored using the smart meters.

During interviews, "tenants tended to overstate their needs," said Taylor. There was a tendency for occupants to leave the heat on. Fearful of their inability to ensure equipment reliability and meet production levels, tenants questioned the flexibility to change temperature and operation times when needed. They held a "just in case" attitude toward temperature and lighting believing that once controls were set, they could not be changed. Occupants discovered their buildings could be operationally ready within two hours of necessary changes in schedule and temperature. This met their operational constraints.

Occupant follow-ups found unsuspecting pleased customers. Even after weeks of HVAC schedule changes, one tenant said, "Hey, when will you start making changes to the cooling system?" Occupant engagement encouraged greater compliance and significant savings in 8 energy intensive buildings. Frequent check-ins with occupants following schedule adjustments addressed tenant concerns and ensured change had no adverse effects.

By engaging the occupants and assuaging fears, the needs of NASWI's 'small city' were met, with no change in operation or production levels. In the six months, April –September 2013, NASWI realized savings over \$500,000, with 10.5% energy reduction.

The Tenant Energy Efficiency Competition, a follow-on program endorsed by Installation Commanding Officer, carries this concept further. A scoring metric records compliance based on each building's performance. The two-part metric is one-third based on energy consumption reduction, and two-thirds based on culture change compliance. Occupancy schedules with measurably lower energy use is one metric, the other is based on the achievements in culture change for each building, which is the ultimate goal. Scoring employs a range of achievements from 'Do you have a Building Manager?', 'Does your building have a Green Team?', and 'Are there others who assist in this goal, i.e., a night watchman or custodian?' The more achievements scored, the greater success and greater rewards for each building and all the occupants.

A Building Manager (BM) is assigned a building; not their sole duty. Successful occupant engagement and cultural change depends on their participation, including the Commander. Innovative training provides BM's with fresh approaches to efficiency strategies, effective collaborative approaches, attracting and retaining effective Green Team members, and shareable monthly water and utility bills. The BM's mission is to achieve the greatest energy efficiency with the greatest building occupant participation, resulting in the greatest culture

change. The competition’s quarterly and annual awards include Liberty passes, gaming events and other awards.

A scoring metric records compliance based on each building’s performance. The metric is one-third based on energy consumption reduction, and two-thirds on culture change compliance. Scoring employs a range of achievements from ‘Do you have a Building Manager?’ ‘Does your building have a Green Team?’ and ‘Are there others who assist, i.e., a night watchman or custodian?’ More achievements indicate more occupant involvement. More occupant involvement indicates culture change compliance. Greater occupant involvement and culture change compliance result in rewards for all the building occupants. Quarterly competitions and annual awards include Liberty passes, gaming events and other awards.

Part 6 - Appendices

6.1 Checklists

Research & Select a Target Behavior

RESEARCH CHECKLIST for Occupant Engagement Campaign

Name of Building: _____

Space Types (e.g., office, retail, classroom, etc.): _____

Number of Occupants: _____

Type of Occupant (e.g., tenant, employee, contractor): _____

Organizational Culture (describe): _____

Hours of Operation: _____

Building EUI: _____

Example Findings from Research

EXAMPLE #1: Our program focused on matching the actual needs of the tenant to HVAC scheduling. During interviews, tenants tended to overstate their needs, saying they were 24-hour operations when in actuality they were 24-hour capable. Night time building walks confirmed this to be true Accordingly, we adjusted HVAC schedules from 24/7 operation.

EXAMPLE #2: Our research findings showed that 50 percent of tenants left their computer monitors on after leaving work. We decided to include it on a key list of tenant workstation actions along with other actions.

EXAMPLE #3: Our program focused on turning lights off when absent from the workspace and after hours. Our research began eight months prior to kick off. Two randomly selected employee focus groups previewed the campaign’s communication content and the visual presentation. Their feedback compelled revisions. We also sent a building-wide electronic survey to employees. Responses indicated a low percent of current compliance and responsibility. Also the perception that unlit spaces suggested absenteeism posed a barrier to compliance. We addressed this with a desk sign stating, ‘I’m here today... saving energy.’ We conducted initial audits during and after work hours to establish the baseline.

Research & Select a Target Behavior

BEHAVIORS	Selecting the Behavior	Current Practice	New Practice	Occupants Influence (Y/N)	Measurable (Y/N)	Metric to track
	<i>EXAMPLE: Operation of task lighting</i>	<i>Lights left on during absence and after hours</i>	<i>Lights off during absence and after hours</i>	Y	Y	<i>Percent of lights off during unoccupied hours</i>
	Your proposed target behavior:					
	Your proposed target behavior:					
RULES	Research the Rules	Describe				
	Existing policy & procedure					
	Proposed new policy & procedure					
	Who oversees policy & procedure?					
	Organizational culture (describe)					
ROLES	Research the Roles	Describe - data to collect from this individual				
	Management					
	Department directors					
	Office managers					
	Green Team					
	Building operators					
	Occupants					
	Research Questions You Will Address	Yes/No	Describe Research Tool You Will Use (e.g., observation, interview, focus group, survey, historical energy consumption, other)			
	Number of occupants your program will target					
	Current practice for targeted behavior (e.g., leave light on after-hours)					
	Occupant ability to implement new behavior					
	Occupant perceptions of barriers to new behavior					
	Occupant motivation - what influences to change?					
	How would occupants like to be rewarded?					
	Dress norms					
	Myths/Beliefs (e.g., turning off lights uses more energy)					
	Other: _____					

Occupant Engagement Plan

Occupant Engagement Plan Checklist

Name of Building: _____
Behavior Change: _____
Test Period: _____
Sample Size: _____

PROPOSAL TO MANAGEMENT

Value Proposition Example: *Our teacher engagement campaign will focus on removing space heaters and refrigerators in classrooms which will support the district goals of providing a safe and effective classroom learning environment. The energy saved will free up dollars to invest in community initiatives important to the District.*

Your Value Proposition:

The Ask Example: *Your support is instrumental to our campaign's success with occupants in our test buildings. Will you communicate your support during our launch and periodically throughout the campaign? Will you participate in our recognition and celebration events?*

Your Ask:

COMMUNICATION TO OCCUPANTS

Communication at Launch Example: *Our campaign - "It's Good to Shut the Hood" - rolled out to all lab staff/students with a kickoff event (with free food) in the main atrium of the building, staffed by volunteers eager to inform researchers about the way the hoods work and how they can make a difference through their behavior.*

Your Communication at Launch:

Education Tools Example: *We installed signage at the point of change (the fume hood) informing/reminding users of the impact their efforts make.*

Your Education Tools:

Feedback Example: *We installed real-time LED readout displays in public spaces showing the quantity of air exhausted through each lab’s hoods with signage to re-inform and continually engage.*

Your Feedback Plan (tools and frequency of communication):

Employee turnover/New employees Example: *We relied on the researchers to “self-police” their own labs. There was high turnover of research students and a lack of knowledge among new laboratory staff of the implications of leaving unused hoods open.*

Your Employee Turnover/Newbies Plan:

Recognition & Rewards Example: *We listen to what tenants tell us and reward frequently, at least monthly. Rewards include team trophies, pizza at a staff meeting, coupons for coffee, movie tickets, time off, and dedicated funding for building-specific maintenance projects.*

Your R&R Plan:

TRACK PROGRESS

Tracking Plan Example: *After the first three months of the HVAC scheduling campaign, we were able to compare baseline consumption to the campaign period consumption. “The campaign was achieving an overall improvement of 5.5 percent in energy performance in the building with no change in operations or production levels.”*

Your Tracking Plan - the metric and methodology (e.g., observation, consumption data, etc.):

REPORT

Reporting Example: *We report results to the Installation Commander each quarter. We use notable successes as the basis for a celebration party with the winning facility occupants and building managers.*

Your Reporting Plan - type of report, to whom, frequency:

Building Overview

Area Specific Check List

INSTRUCTIONS:

- a. Check Yes or No and note any corrective action to be taken for check list items.
- b. A copy of the completed check list shall be forwarded to <<NAME>>.
- c. Complete all tabs at the bottom of this workbook.

Date:

Building #:

Energy Monitor's Name:

Code/Shop:

Responsible for what percentage of building:

Floor Section: (NW, etc.)

Indicate use function within building:

Building Population:

Building Operating Schedule:

PURPOSE: The intent of this checklist is to assist Building Managers or Building Energy Monitors with their required semi-annual facility energy inspection.

Comments Below:

Lighting

Lighting Checklist

DATE

	Checklist Item	Yes	No	Corrective Action
1	Are any exterior lights on during daylight hours?			
2	Are electrical lights inside the building shut off when natural daylight is sufficient?			
3	Are lights shut off in storage areas and other low use spaces when the spaces are unoccupied?			
4	Are restroom and break room lights off during unoccupied or low use hours?			
5	Are there areas where light switches, timers or motion sensors should be considered to control lighting when the spaces are unoccupied?			
6	Are lights shut off in hallways during unoccupied times?			
7	Are work area lights turned off during lunch breaks where possible?			
8	If motion or day lighting sensors have been installed for any of the lighting, are they in working condition?			
9	Do any areas appear to be brighter than necessary? If so, contact <<Name, Title>> for help in determining if fixtures can be delamped or de-energized.			
10	Are there opportunities to install supplemental lighting for specific tasks and reduce overall space lighting?			

Heating-Cooling

Heating/Cooling Checklist

DATE

	Checklist Item	Yes	No	Corrective Action
1	Is the heating schedule control accomplished from a central computer?			
2	What is the occupancy schedule for your building? (Normal work hours: days of the week and hours of the day per zone)			
3	Does the computer schedule match your occupancy schedule? If not, has the building operator been contacted?			
4	Are thermostats tamper-proof so set points are not easily changed? If not, has the building operator been contacted?			
5	Verify that heat to the building is shut off from (example: May through approximately Nov. 1).			
6	Are heating thermostat set points set to maintain no warmer than 66°F in the heating season? If not, has the building operator been contacted?			
7	Is the air conditioning (A/C) system set no lower than 78°F and shut down or setback during unoccupied hours? If not, has the PWD been contacted?			
8	Are there window air conditioners in the building? If yes, how many?			
9	Are window air conditioners turned off when the space is unoccupied?			
10	Have portable electric space heaters been authorized in writing by <<Name, Title>> and approved by the Fire Department? If not, contact <<Name, Title>>.			
11	Where approved, are portable heaters only used when required?			
12	Are the exhaust ventilation systems only run when needed, e.g., connected to room lighting, motion sensors or manually controlled?			
13	Do all radiators have working thermostatic controls that shut off steam or hot water to the radiator when appropriate temperatures are met?			
14	In air conditioned spaces, are the doors and windows closed when the heating or A/C is on?			

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15	Are doors between air conditioned spaces and non-conditioned spaces within the building kept closed?			
16	If doors have interlock switches to shut off heat or air conditioning when the door is open, are they working correctly? Are there doors that should be interlocked?			
17	Are air filter replacement and cooling coil cleaning on a preventive maintenance schedule.			
18	Are any exposed steam or hot water pipes missing insulation?			
19	Are there steam leaks in or around your facility?			
20	Is weather-stripping around doors and windows adequate?			
21	Are there any broken windows or holes in the building envelope?			
22	Are air intakes and exhausts free of obstructions?			
23	Have you submitted service tickets for all maintenance-related deficiencies noted on this checklist?			

Plug Loads

Miscellaneous Checklist

0-Jan-00

	Checklist Item	Yes	No	Corrective Action
1	Are computers shut off at the end of each workday?			
2	Are copy machines and printers shut off at the end of each workday?			
3	Are there any leaking water faucets or other plumbing fixtures?			
4	If showers are available, do they use low-flow showerheads?			
5	Are there any personal appliances (refrigerators, heaters, etc.) in use outside of common coffee mess or break room areas?			
6	Are soda and juice vending machines delamped, or using working occupancy controls (machine and occupancy sensor are plugged into controller and occupancy sensor is sensing motion when you walk by). List discrepancies and attach to this checklist.			
7	Does hot water at sinks feel overly hot?			
8	Is any process equipment left running when not in use? If yes, please explain why.			
9	If compressed air is used, have you verified there are no leaks, local compressors are shut off when not in use and are not cycling frequently, and compressed air is being used appropriately?			
10	Is there equipment in the building using a once-through flow of water for cooling?			
11	Have you submitted service tickets for all maintenance-related deficiencies?			
12	Have you instructed personnel in your building on energy best practices outlined in <<Policy, Procedure>>?			
13	Do you regularly post energy tips provided by the energy manager in your facility?			
14	Does your check list accurately summarize all energy use within your facility? Are there any reportable outstanding energy uses?			

6.2 References

Behavioral Change and Building Performance: Strategies for Significant, Persistent, and Measurable Institutional Change, 2014. AK Wolfe, et al. Pacific Northwest National Laboratory (Department of Energy)

http://energy.gov/sites/prod/files/2014/06/f16/change_performance.pdf page 7.1

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<http://www.energystar.gov/buildings/tools-and-resources/bring-your-green-work-interactive-cubicle>

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<http://newbuildings.org/sites/default/files/SensitivityAnalysisReport.pdf>

Sustainable Region 9 Green Meetings and Conference Policy link provided courtesy of US EPA Region 9:

<http://www.epa.gov/region9/ems/pdf/EPA-R9-Grn-Mtgs-Policy.pdf>

6.3 Resources

6.3.1 Four Example Frameworks for Occupant Engagement Programs

ENERGY STAR's Engage Occupants Toolkit

<http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/engage-occupants>

Community-based social marketing (Doug McKenzie-Mohr)

<http://www.cbsm.com/pages/guide/preface/>

Rules-Roles-and-Tools (Department of Energy)

<http://energy.gov/eere/femp/identify-institutional-change-rules-roles-and-tools-constituting-context-sustainability>

Rules: The formal and informal rules that affect workplace behavior

Roles: The people within an organization who are important to achieving and maintaining sustainability goals

Tools: Workplace technologies, systems, and processes used to meet particular needs.

Four Quadrants of Engagement (Renee Lertzman)

<http://daily.sightline.org/2014/03/12/breaking-the-climate-fear-taboo/>

Influencer: The New Science of Leading Change (Joseph Grenny, Kerry Patterson, David Maxfield, Ron McMillan and Al Switzler) McGraw-Hill Education. May 14, 2013.

6.3.2 NEEA CRE Market Partner Program - JSH Properties

NEEA's Market Partner Program helped enable JSH to manage energy as a whole.

<http://www.betterbricks.com/market-partners/jsh-properties>

6.3.3 Landlords and Tenants Team Up for Energy Efficiency

http://www.energystar.gov/sites/default/files/buildings/tools/EPA_ES_Tenant_Report_508.pdf

6.3.4 Skill Building Webinar Series - Communicating to Building Occupants

<http://www.theboc.info/m-prerecorded-webinars.html>

6.3.5 Utility Grants, Rebates and Incentives for Occupant Engagement

www.dsireusa.org

Resource Conservation Manager – Puget Sound Energy

Strategic Energy Management – Energy Trust of Oregon and Northwest Energy Efficiency Alliance

Customer Engagement – National Grid & OPower