

Fostering Occupant Engagement for Resource Efficiency

Care about the human element in resource efficiency strategies

The human element is perhaps the most significant contributor to energy consumption in small commercial buildings. Negligent or wasteful habits can cause a high performance building equipped with the latest energy efficient systems to underperform a code-built counterpart.¹ However, studies have shown through coordinated behavior change and occupant education it is possible to reduce energy consumption by as much as 30 percent. In order to optimize the energy savings potential of various energy reduction measures, a stable and systematic strategy to improving occupant behavior must be implemented, and most importantly, maintained.



GETTING STARTED

Consider optimizing resource efficiency strategies that include design and human behavior.

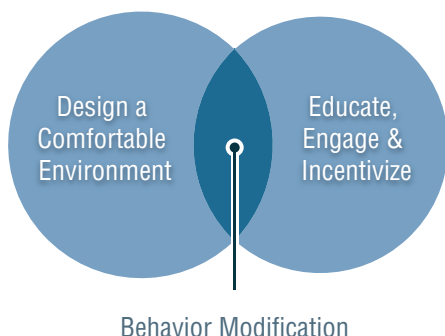
Customize your approach to focus on the following areas as they are currently the top resource consumers:

- Heating
- Cooling
- Ventilation and Window Operation
- Domestic Hot Water
- Lavatory water consumption
- Lighting
- Appliances
- Cooking

THE PROCESS

Improving occupant behavior can be accomplished considering the below strategies:

- Design a comfortable environment
- Educate, Engage and Incentivize



DESIGN A COMFORTABLE INDOOR ENVIRONMENT

The first step to improving occupant behavior is creating a comfortable indoor environment in the first place. If the design does not support comfort, occupants have a tendency of overreacting to environmental discomfort in energy intensive ways such as modifying the thermostat dramatically to accommodate individual temperature preferences.

The Adaptive Comfort Theory

The adaptive comfort theory suggests by bridging the disconnect between occupants and the outdoors, and providing each occupant with adaptive controls, they will acclimate to, and even prefer, a wider range of indoor environmental conditions.

Below is a list of adaptive comfort measures that can improve occupant satisfaction and reduce energy consumption:

Thermal

- Operable windows allow occupants to regulate the volume of fresh air brought into a space, which affects both air temperature and air quality. Consider an automated system that notifies occupants of prime conditions to open their windows to balance energy efficiency and indoor air quality.
- Personal fans can reduce perceived temperature, making them an excellent way to enhance occupant thermal comfort without the use of a building's HVAC system.
- Solar shading should be installed on south, east and west facing windows allowing occupants to adjust the amount of solar energy entering a space.
- Programmable or intelligent thermostats that learn occupant preferences, occupancy patterns and adjusts thermostat set-points accordingly will increase occupant comfort and optimize HVAC performance.
- Demand controlled ventilation (DCV) systems modulate the volume of fresh air brought into the building through the use of CO₂ sensors. By optimizing ventilation rates with actual occupancy, DCV systems save energy and reduce equipment strain.

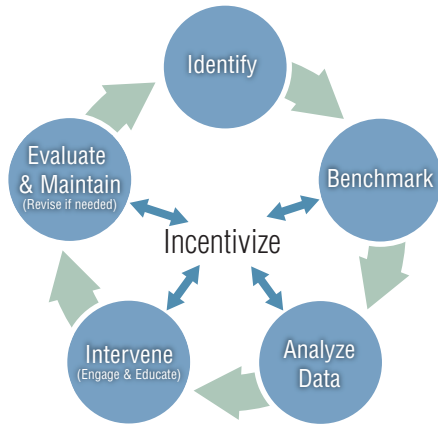
Visual

- Efficient task lighting, such as LED desk fixtures or under-cabinet fixtures, allows occupants to adjust the lighting of individual spaces, increasing employee control and reducing the need for ambient lighting in an entire space.
- Blinds or louvers allow occupants to adjust the amount of daylight entering a space while reducing solar gains. Poorly designed daylighting strategies with extensive unfiltered sunlight can over-illuminate spaces, introduce glare and be unpleasant.
- Lighting controls, daylighting controls, occupancy sensors and multi-level lighting controls allow occupants to customize the lighting level based on real-time needs instead of only turning on all lights in the space at all times.

Placebo Controls

Often the perception of control can lead to improved occupant comfort.^{2,3} If occupants think they control the indoor environment, they are more likely to accept less comfortable conditions. Office buildings often install placebo thermostats that give the impression of control, yet they serve no actual function.

EDUCATE, ENGAGE AND INCENTIVIZE BUILDING OCCUPANTS



In an ideal scenario we have input on the original design of our environment. However, often we do not have this luxury. Implementing a behavior modification plan with the following framework can optimize impact even when you do not have influence over the original design of your environment.

THE PROCESS:

Identify

Determine the specific behavior to be modified or element to be impacted. For example, will you measure all energy consumption or just plug loads?

Benchmark

Before beginning implementation of a behavioral-change strategy, measure and record the performance of your building or system you wish to improve. Measurement can be done by reviewing utility bills or by measuring the consumption and/or performance of separate building systems (e.g. what temperature is your building space conditioned to during each hour of the day and day of the week). These benchmarking measurements are important because they will allow you to determine the effectiveness of your changes after implementation and may indicate the areas of your building that are most susceptible to improvement strategies.

Intervene

Once you have benchmarks, you can begin identifying strategies for changing behaviors. Engaging building occupants in all stages of this process is perhaps the most critical component for improving behavioral change. Occupant engagement and education is a top down process beginning with executive leadership and facilities management and extending to building occupants. Facilities managers must lead by example and provide meaningful opportunities for occupants to participate

actively in the energy reduction process. When developing and implementing changes consider the following:

Provide a Seat at the Table

- Involving affected occupants through a participatory approach is imperative to creating and ensuring continued occupant engagement through the life of an energy efficient building. Consider creating a joint council of, as a minimum, managers, occupants and owners to involve diverse perspectives into the holistic process. Occupant focus groups are another great way to elicit feedback. Consider embedding this process into your organization's policy and procedures.

Champion Ownership

- Many implementation strategies are people-based and driven by the behavior of your occupants. Their success or failure rely on the engagement and interest of your occupants. Having individual occupants champion different efforts is a great way to promote successful implementation. It incorporates and motivates staff, removes the burden of ownership from one individual and produces greater results.

EDUCATE OCCUPANTS

Once you have identified a list of behavioral improvements through your participatory approach outlined above, give occupants an *itemized checklist* of resource efficiency strategies. Offering educational trainings, webinars or informative e-blasts are great ways to keep everyone informed of initiatives and their reasoning. With this communication, explain the participatory process taken in developing the checklist, explain the importance of each measure and, perhaps most importantly, explain how their behavior is critical to executing the measures. For example, strategies may include:

- Using the stairs instead of the elevator
- Avoid adjusting the thermostat set-points
- Running the dishwasher only when it is full
- Relying on daylight rather than mechanical light when possible
- Unplug computers when leaving
- Turn off lights when leaving rooms
- Minimizing excess power use at each workstation

Uphold these measures by providing ongoing and evolving communication strategies such as signage on light switch covers in high traffic areas. Consider sending periodic email notifications to building occupants and including strategies in team discussions to remind them of their duties to reduce consumption. Additionally, consider incorporating behavior modification efforts into employee onboarding process to begin embedding strategies into your organization's culture.

Share Progress

- Keep occupants informed on how their hard work is succeeding. Consider installing a building energy performance dashboard that displays real-time energy usage and tracks current consumption against a baseline. Having real-time data can allow occupants to make data-driven decisions about sustainable building use.

EVALUATE, MAINTAIN AND REVISE

Evaluate

Using your base line measurements as a reference point, compare performance after a given period of time to analyze and evaluate the impact of the behavior modification efforts. Consider evaluating the impact of the efforts on multiple levels such as energy use and the impact on the building occupants. This broad understanding will help understand the focus of ongoing efforts and guide any revisions.

Obtain Feedback

Occupants are the ones putting the energy design into practice. Establish a line of communication between occupants and facilities staff to allow occupants to share ideas, voice concerns and help create solutions.

Maintain and Revise – Continual Evolution towards Best Practice

The best behavioral-improvement strategies are the ones that never fade away and mature with time. As you implement different strategies and receive feedback from occupants, compare the results to benchmarking data and listen to the opinions of participants to revise your implementation strategy. By evolving your programs, they will mature into the best-fit for your building conditions and occupant population. No one solution is a perfect fit for each building; reviewing feedback and revising your unique program is key. Consider embedding the revision process into your facilities management plan to ensure ongoing implementation regardless of staff consistency.

INCENTIVIZE ENERGY EFFICIENT BEHAVIOR

Incentives need to occur throughout all stages of the behavior change process. It is essential to understand one person or team may be motivated very differently than another person or team. Keep the diverse needs of your organization in mind with incentive strategies. Below are some examples and additional resources for encouraging optimal behavior modification.

Offer Rewards

Offering incentives and recognition to departments or individual occupants who have reduced energy consumption is a great way to motivate environmentally conscious behavior. Rewarding occupants will show them how valuable their efforts are while inciting others to intensify their efforts. Below are some ideas for incentives, including priority parking, cash bonuses, team building social events, extended lunch or even an extra vacation day.

Recognition

Energy efficient behavior deserves companywide appreciation. If no funds exist for material prizes, consider offering a symbolic reward such as an “energy saver of the month” title. Whatever the prize may be, consider presenting it in front of an audience (e.g. staff meetings) to continually increase awareness of efforts.

Competitions

Consider hosting an internal energy reduction competition between occupants. Harnessing people’s competitive nature is a great way to foster collaboration while driving occupant awareness. Consider using *ENERGY STAR’s Energy Efficiency Competition Guide*⁴ to get started. National energy reduction competitions are also available that focus on commercial buildings. Take, for example, the *EPA’s Battle of the Buildings Team Challenge*,⁵ where commercial buildings nationwide are pitted against each other to see who can realize the most energy reductions.

CONCLUSION

From the above we see there are a range of factors to consider when encouraging behavior change for resource optimization. The first steps to success are, of course, designing and constructing a comfortable indoor environment. The next essential element is to implement an ongoing behavior modification strategy. Ensure the strategy implements a participatory process, baseline and post-effort measurements. Continual strategy refinement can not only create buy-in to the solutions but also reap continual savings in utilities and transform workplace culture. Undoubtedly, when done effectively, a behavior modification strategy can be a low-cost solution that not only profits an organization financially but can also lead to a more unified and collaborative workplace.

REFERENCES AND RESOURCES:

- 1 www.saylor dot org .github .io/text_organizational-behavior-v1.1/s09-theories-of-motivation.html
- 2 www.eande.lbl.gov/sites/all/files/lbnl-6128e.pdf
- 3 www.ncbi.nlm.nih.gov/pmc/articles/PMC4881069/
- 4 www.energystar.gov/buildings/about-us/how-can-we-help-you/communicate/energy-star-communications-toolkit/motivate-competition-0
- 5 www.energystar.gov/buildings/tools-and-resources/energy-efficiency-competition-guide