

Gender Differences in Behavior and Perceptions of Energy Efficiency in Public Buildings in Turkey



ACKNOWLEDGEMENTS

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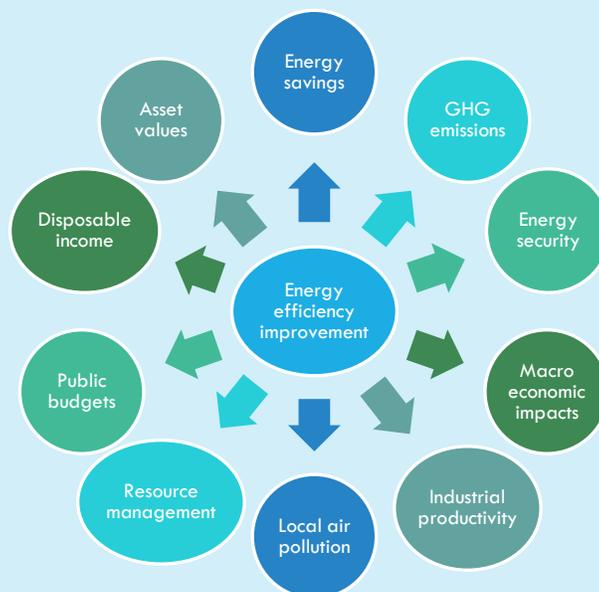
WHAT WE DID

The *Turkey Energy Efficiency in Public Buildings Project* aims to reduce energy consumption and fossil fuel use in public buildings through technical investments (for example, in energy efficiency) and behavioral solutions. During preparation of the project, a qualitative assessment was carried out to understand gender differences in perceptions, attitudes, and behavior toward energy efficiency among employees and users of public buildings. Between July and October 2018, approx. 700 employees (327 women and 381 men) of 16 public buildings in four cities (Ankara, Istanbul, Izmir, and Erzurum) responded to a survey on energy use and behaviors. The survey was complemented with 17 focus group discussions (FGDs) with nearly 100 employees (54 women and 45 men), 17 in-depth interviews (IDIs), and six key informant interviews (KIs) with energy experts.

Box 1. What is Energy Efficiency and What Are Its Benefits?

Energy efficiency is usually defined by the ratio of energy consumed to the output produced or service performed. Reducing energy demand, or conserving energy, has been the main driver for energy efficiency policies in many countries. This goal is pursued primarily by improving the efficiency of energy-consuming products and processes on both the demand and the supply side. Demand-side measures include energy codes for buildings, setting minimum energy performance requirements for energy-using equipment, setting standards to improve vehicle fuel efficiency, developing efficient public transport systems, and promoting energy management systems in industry. On the supply-side, energy efficiency focuses on reducing technical losses in generation, transmission, and distribution.

The many benefits of energy efficiency include reduced energy expenditures, increased affordability of basic energy services, and greater comfort resulting from building retrofits, budgetary savings, increased energy security, reduced pressures for new generation capacity, and lower greenhouse gas (GHG) emissions, among others.



Source: International Energy Agency 2014

THE CONTEXT

Energy efficiency in public buildings in Turkey is currently at a low level. Energy use in the country's public and service sectors experienced a five-fold increase between 2000 and 2015 (World Bank 2019). Total GHG emissions increased by more than 120 percent from 1990 to 2015, constituting a significant

environmental challenge (World Bank 2019). Several policy, regulatory, financial and technical barriers have prevented meaningful improvements to date.

The Government of Turkey recognizes these challenges and has made energy efficiency a key component of its energy security strategy, The Tenth Development Plan: 2014 – 2018, and Turkey’s National Climate Change Action Plan: 2011 - 2023. The government aims to substantially reduce its energy consumption in all strategic sectors, i.e. buildings, industry, and transport. Several legal requirements are in place for energy efficiency, such as the Energy Efficiency Law, a regulation on Energy Performance in Buildings, and regulation on Increasing Energy Efficiency in The Use of Energy Resources. The government has also adopted a broad policy framework and is supporting legislation to encourage energy efficiency throughout the economy. The National Energy Efficiency Strategy (2012) calls for a 10 percent reduction in energy intensity across all sectors, and the National Energy Efficiency Action Plan, approved in January 2018, calls for a US\$11 billion investment in energy efficiency to reduce consumption by 14 percent by 2023 (World Bank 2019). The Plan suggests 55 actions across six categories to reduce the total primary energy consumption by 14 percent between 2017 and 2023. According to the National Energy Efficiency Strategy, at least 25 percent of the building stock should be upgraded to sustainable buildings by 2023. The 2011 National Climate Change Action Plan aims for public buildings and facilities to serve as a role model, decreasing annual energy consumption by 20 percent within the same timeframe.

In support of the government’s plan to curb energy consumption, the World Bank’s *Energy Efficiency in Public Buildings Project* was approved on November 5, 2019, to demonstrate the renovation of a large share of the central government building stock, and develop sustainable financing and institutional mechanisms to support a scaled-up, national program for energy efficiency in public buildings in Turkey. Partly funded with concessional lending from the Clean Technology Fund,¹ the project supports the renovation of approximately 500-700 central government and central-government affiliated buildings (i.e. public buildings under central line ministries, such as schools and hospitals) based on periodic calls for proposals to improve energy performance. Through these renovations and experiences, the government will develop a national program covering the more than 175,000 central and municipal buildings across the country and introduce sustainable financing and implementation schemes.

THE RESULTS

Women and men are impacted differently by energy use decisions in public buildings

The assessment found that women and men have different preferences when it comes to office temperatures based on different metabolisms and dress codes. Female employees are particularly affected by thermal discomfort during the winter months, while male employees experience thermal discomfort during the summer months. In the quantitative survey, when directly asked whether respondents thought inefficient heating and cooling systems impact men or women more, 47 percent of participants reported that women are mostly affected; only 11 percent said that men were more affected. In response to such differences in thermal demands, female employees often seek individual solutions to avoid feeling cold during the winter months. Participants mentioned using portable heaters although in some buildings the use of such appliances is not allowed for safety reasons. In the summer months, male employees have a stricter dress code than women (i.e. wearing suits and ties), and therefore have an increased need for cooling during this time. Male and female employees in public buildings often mentioned having conflicts over adjusting the cooling temperatures during the summer months.

¹ The Clean Technology Fund was set up in 2009 to provide financing for low-carbon technologies and reduce GHG emissions, until a new global climate change agreement is negotiated and becomes effective. The governments of Australia, Canada, France, Germany, Japan, Spain, Sweden, United Kingdom, and United States have pledged US\$5.2 billion to this multilateral fund managed by the World Bank and administered through the World Bank Group and other multilateral development banks. The Clean Technology Fund provides new large-scale financial resources to invest in clean technology projects in developing countries, which contribute to the demonstration, deployment, and transfer of low-carbon technologies with a significant potential for long-term GHG emissions savings. For more information see: <https://www.climateinvestmentfunds.org/>

The study found that temperature discomfort in office buildings leads to impacts on health and reduced productivity. In the quantitative survey, 26 percent of female participants indicated that inadequate or excessive heating or cooling negatively affect their health, compared to 19 percent of male participants. According to the survey results, 37 percent of male participants indicated that inadequate or excessive heating or cooling negatively affect their performance, compared to 31 percent of female participants.

Cooling systems are less efficient than heating systems, particularly in old buildings

Survey respondents perceived space heating systems in public buildings to be more efficient than cooling systems. When surveyed during the hot summer months, 87 percent of respondents indicated that space heating systems were efficient, while 13 percent of participants thought they were not efficient. Respondents were less satisfied with cooling systems: 77 percent indicated that space cooling systems were efficient. The need for additional air conditioning units and insufficient funding might have contributed to this lower level of satisfaction. There were significant differences between users of older buildings and newer buildings (including new and renovated buildings). Employees and other users in newer public buildings were more likely to report that heating and cooling systems were efficient.

There is a lack of awareness about energy efficiency policies among both men and women

Female and male employees and users of public buildings were not aware of energy efficiency policies for their buildings (with no statistically significant gender differences), and expressed a lack of effective communication on energy efficiency. During the qualitative research, participants mentioned that they could not recall any briefings on energy efficiency in their buildings or information provision on energy use levels or devices that use the most energy. Apart from lighting-related measures, most employees were unaware of any energy efficiency principles relevant to their buildings unless they worked in a related department. Even more strikingly, in the quantitative survey, 80 percent of employees responded that “there was nothing to report” to an open-ended question on energy savings/efficiency activities or regulations in their building. The only relevant policies mentioned were related to restrictions on the use of personal space heaters and appliances for safety reasons. In the survey, 42 percent of male and female employees reported that they were not aware of any sources of information on energy efficiency in the public buildings where they worked; 28 percent of participants reported that bulletin boards in common areas were sometimes used to display energy-related information, 24 percent reported that relevant information was exchanged between employers and managers, and 15 percent indicated that building-level rules were circulated.

Further, 54 percent of survey respondents said they were not familiar with the recent government campaigns on energy efficiency. Research participants were also asked if they had heard about the Energy Hanim (“Energy Lady”) project led by the Ministry of Energy and Natural Resources, which focuses on teaching women to use energy efficiently, primarily at home; 72 percent of respondents had not heard about this project. Experts indicated that awareness-raising campaigns and the provision of information on energy efficiency are weak.

Women have misconceptions of what energy efficiency entails

The survey found that there are differences in perceptions of and attitudes toward energy efficiency between men and women. For example, women often associate energy efficiency with energy conservation, and believe they need to sacrifice comfort to adopt efficient behaviors in public buildings. Therefore, women and men should be equally engaged in awareness-raising activities to dispel misconceptions that they should

PERSPECTIVES

“We are at the basement level and it is very cold in the winter. We try to use personal heaters without being caught.”

-Female employee, Erzurum

“During the summer months when the AC is being used we feel very cold and even get sick.”

-Female employee, Ankara

“We wear suits and our female colleagues wear dresses with straps during the summer. This situation results in different demands for cooling temperatures.”

-Male employee, Izmir

sacrifice their comfort to achieve energy efficiency and prevent the perception that energy efficiency puts a burden on women.

Women are more concerned about energy conservation

The assessment also found that both men and women agreed that women were more concerned about the impacts of energy consumption on the environment and its potential implications for future generations including their own children. Better understanding these differences is important to define the messaging and targeting of behavior change campaigns on energy efficiency; it also opens up opportunities for women to become key agents of change. There are good examples of how this can be done. For example, the “Energy Clinic” program of energy conservation activities in the state of Kerala, India, chose respected local women as “clinic animators” to organize demonstration classes on energy conservation in their own villages, which attracted large numbers of people, including housewives, teachers, local administrators and others (Unnithan 2018). Tata Power Delhi Distribution Limited, also in India, has documented similar experiences by successfully appointing women “Brand Ambassadors” to raise awareness about the benefits of legal connection, help facilitate new connections, and educate consumers on consumption patterns and bill payments, with about 300 households being reached by each “Brand Ambassador” (Smyser 2016).

Women and men access different sources of information on energy-efficiency measures

Female participants in FGDs and IDIs mentioned relying on Internet forums,² advertisements, and social circles for gathering information on energy efficiency, while men reported getting most of their information from sales representatives and acquaintances. In the quantitative survey, research participants were asked which channels they use to gather information on energy efficiency. Nearly half (43 percent) mentioned using the Internet (including social media (i.e. Facebook, Twitter, YouTube) and forums) as their main source of information on energy efficiency, followed by sales representatives (31 percent), television (26 percent), and word of mouth (25 percent). One-fifth of the sample reported that they do not look for information on energy efficiency when buying new appliances or consumer electronics, mostly due to a lack of interest (89 percent). This result indicates that while there is awareness of energy-efficiency related issues, they are less likely to be considered when making investments or purchase decisions. The qualitative results also revealed that other factors (e.g. the appearance of electrical appliances) were considered more important to participants than efficiency when making purchasing decisions.

A lack of incentives is responsible for wasteful energy consumption behaviors by employees and users of public buildings

During the qualitative research, participants indicated that because employees and other users of public buildings are not responsible for paying energy bills in public buildings, they engage in more wasteful energy use behaviors. According to the survey results, in the absence of such incentives in public buildings, 60 percent of survey respondents believe energy use can be reduced in

public buildings, compared to 73 percent of participants who believe it can be reduced in residential buildings. However, when asked about the feasibility of implementing a series of energy-efficiency and energy-conservation methods including the use of sensor-activated lighting, more energy-efficient electric devices, etc., more than two-thirds of the survey respondents (around 70 percent) agreed that most of these methods were feasible. Similarly, FGDs and IDIs revealed that individual efforts to improve energy efficiency would not succeed if they were perceived as sacrificing their comfort levels. Most survey respondents

PERSPECTIVES

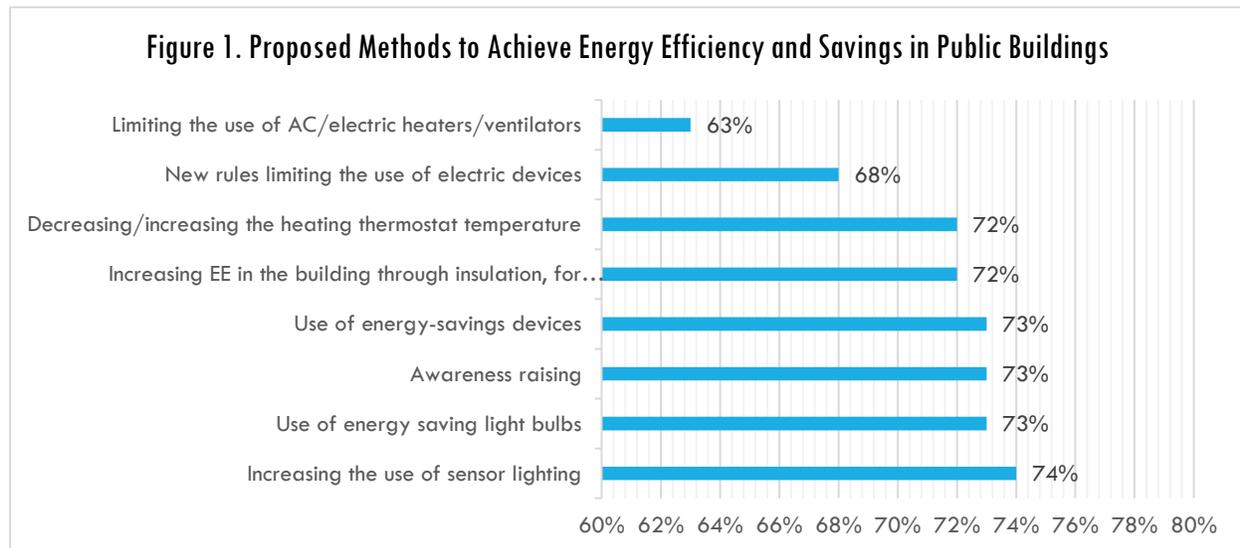
“Old power cables can cause more electricity use. The electrical system needs to be completely replaced. The fact that the network is old reduces energy savings.”

-Male employee, Izmir

² There are various Internet forums in Turkey that are mainly used by women, such as “Kadinlar Klubu” (Women’s Club - <https://www.kadinlarkulubu.com/forum/>), which includes discussion threads on small electrical appliances such as kitchen appliances, etc.

expressed concerns that the poor design of buildings and heating/cooling systems were driving inefficient energy use.

Survey respondents listed several ways to reduce energy use in public buildings where they work. Both male and female respondents mentioned increasing the use of sensor-activated lighting, energy-saving bulbs, and other energy-saving devices; enhancing users' awareness of energy-saving and efficiency; augmenting building-level energy efficiency (e.g. insulation), seasonally decreasing/increasing the heating temperature, and introducing rules limiting the use of electronic devices (Figure 1).



Source: Survey to employees and users of public buildings to measure attitudes and behaviors on energy efficiency.

Energy efficiency measures implemented in public buildings can lead to the adoption of energy-efficient behaviors in residential buildings

Many research participants reported during FGDs and IDIs that they have started using energy-efficient lightbulbs in their homes after observing their wide use at work (i.e. public buildings). Also, employees who work in “smart” buildings explained how these buildings had a very positive impact on their awareness of energy efficiency and had even transformed their behaviors at home.

DESIGN IMPLICATIONS

Training and awareness-raising campaigns on energy efficiency

Awareness raising and trainings are essential tools for introducing new information and ways of thinking, and reorienting behaviors towards new actions, which can become habits. Implementing energy efficiency measures requires individuals to gain new awareness and new skills. Such interventions should begin with those who are best placed to make a change, but also those who are best placed to influence others. Trainings can help reorient individuals towards new ideas, reducing their biases, and giving them new cognitive resources to make decisions; trainings can therefore lead to long-term reorientation and behavior change. As trainings can be intensive and expensive, it may not be feasible to reach all target audiences through trainings, but training an individual to take the lead in a community is a good start.

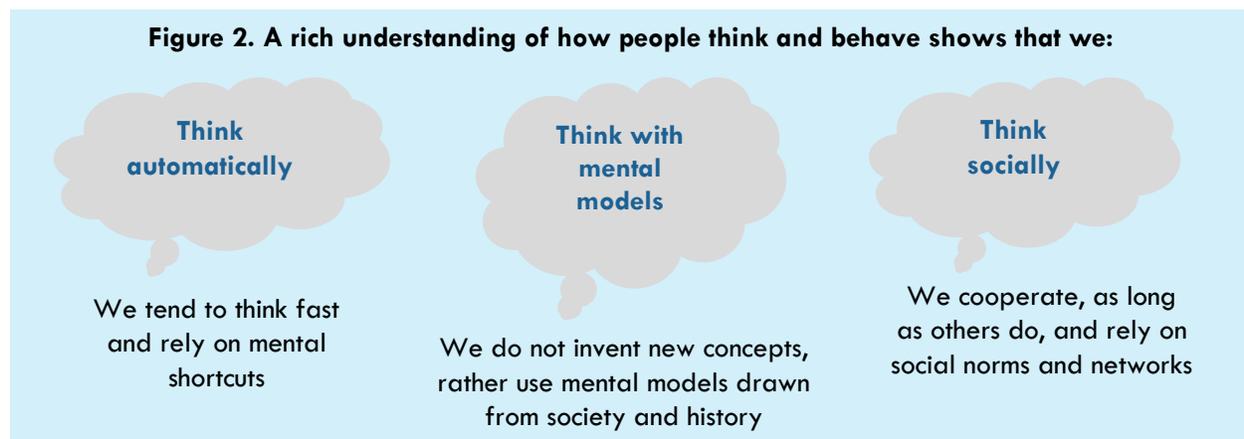
In the case of Turkey, awareness-raising activities should address the misconceptions about energy efficiency, and convey messages that can further motivate individuals to adopt energy-efficient behaviors. Awareness-raising activities can highlight the positive environmental impacts of energy efficiency, which can be a particularly effective message for female users of public buildings. Awareness-raising activities can target people's sensitivity to the environmental impacts of wasteful energy use, and also increase other users'

awareness of the topic. This can be a particularly important message to raise awareness of energy efficiency in public buildings since the qualitative research findings indicate that reducing energy bills is not seen as a driving force for changing behaviors toward energy efficiency in public buildings, as occupants are not directly paying the energy bills. Further, awareness-raising activities should consider the different sources that women and men use to get information on energy efficiency.

Design behavior change interventions to reduce energy consumption

Along with technology measures and investments (e.g. replacing technology or hardware with more efficient models), dedicated behavior-change strategies and programs have shown strong potential to reduce energy consumption (Allcott & Mulliaianathan 2010, SEAI 2018). A recent analysis in Ireland showed how the implementation of behavioral measures could enable Ireland to avoid 6.5 TWh of energy consumption in 2020, equivalent to approximately 5 percent of total energy consumption across the country in 2015 (SEAI 2018). In the United States, behavior programs account for a substantial portion of utility companies' first-year energy efficiency savings goals for residential demand-side management portfolios. The 10 states³ in the United States that were most reliant on these programs in 2013 claimed that 13–28 percent of their savings came from behavior programs (Opinion Dynamics Corporation and DNV-GL 2015). While changes to public buildings may play an important role in reducing emissions, the very long lifespans of buildings and retrofits require behavioral changes of its users to further reduce energy use.

Behavior change strategies and programs are based on social science theories of human decision making and the understanding of what motivates people and drives their behavior. They are designed to enable people to initiate and sustain positive attitudes about a situation. The *World Development Report 2015: Mind, Society, and Behavior* distilled the hundreds of empirical papers on human decision making to three principles (World Bank 2015). First, people make most judgments and most choices automatically, not deliberately (i.e. “thinking automatically”). Second, how people act and think often depends on what others around them do and think (i.e. “thinking socially”). Third, individuals in a given society share a common perspective on making sense of the world around them and understanding themselves (i.e. “thinking with mental models,” Figure 2).



Source: World Bank 2015

Behavior change interventions to reduce energy consumption in public buildings aim to change repeated behaviors among office building occupants. The focus is hence on routine behaviors driven by “thinking automatically” that contribute to wasteful energy consumption. The personal motivations for energy consumption and energy savings in an office setting is different to a household setting. The existence of split incentives—whereby organizations reap the financial benefits of changes in behavior enacted by employees—presents a potential barrier to behavior change (Miller 2013). Those engaged in behavior change likely perceive the process as providing only costs and no tangible benefits. Individual motivation to

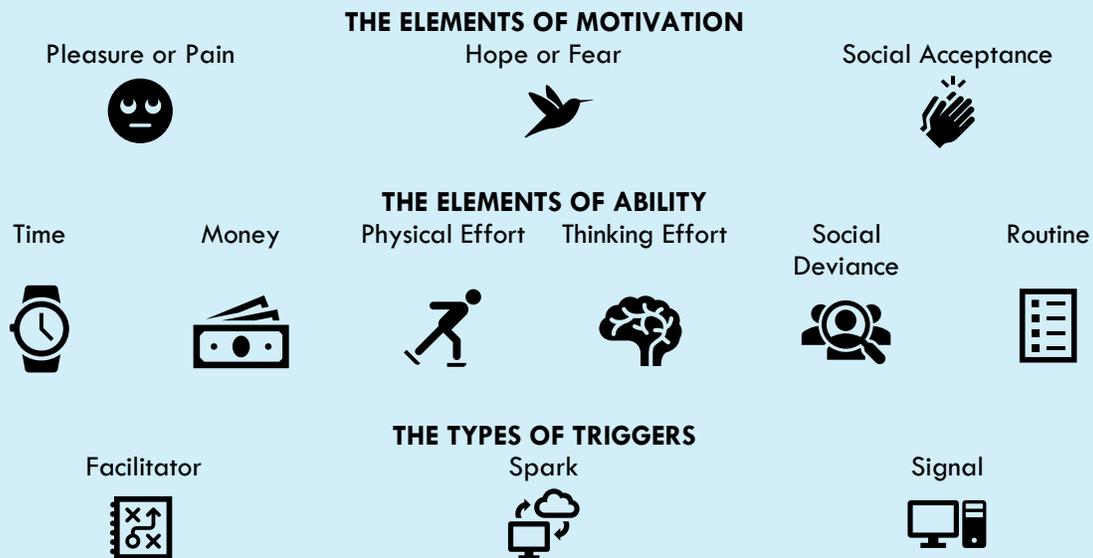
³ Indiana, Idaho, Rhode Island, Illinois, New Mexico, California, South Carolina, Arizona, Kentucky, and Colorado.

reduce energy use in office buildings is perhaps the most complex, requiring engagement in not only information, but the translation of abstract data into meaningful information for people to use, and tools to help them make a positive impact (Neese and others 2011). Core behavior change messages must focus on areas that building users can enact change in, following the three elements of influence from the Fogg Behavior Model (FBM) (Box 2).

Box 2. Fogg Behavior Model (FBM)

Stanford behavior researcher BJ Fogg developed a tool to help understand and influence behavior, the Fogg Behavior Model (FBM). The FBM identifies three essential elements needed to exert influence over behavior: motivation, ability, and trigger. In relation to changing people’s energy savings behavior, these can be defined as follows:

- **Motivation:** Strengthening users’ motivation to conserve and use energy more effectively and keep them motivated about sustainability. Activities related to the motivation factor comprise measures to create and increase users’ awareness of energy consumption and usage patterns, as well as measures that relate their own individual energy consumption to a larger context.
- **Ability:** Setting up usable services and technical infrastructure that allow individuals to execute actions as easily as possible.
- **Trigger:** Identifying opportunities when the user should perform actions that contribute to efficient energy use, and providing appropriate notifications as triggers.



The online tool Fogg behavior wizard (www.behaviorwizard.org/wp/) asks a series of simple questions about the behavior that one wants to see changed, guiding towards an appropriate behavior change strategy for the chosen behavior pattern and duration.

Source: Fogg 2009

Sample areas of behavior change intervention include:

- **Providing consumer feedback to change behavior:**
 - Energy efficiency dashboards: Providing real-time energy use information allows users of public buildings to identify behaviors that they can immediately change. For example, the design company Teague teamed up with FastCo design to address the high levels of water use in the office. Initial dashboard designs maintained an interface on staff computers but yielded no results. Teague then placed the real-time information on water use directly in front of the tap, resulting in an immediate water use reduction of 75 percent (Neese and others 2011).

- Setting and monitoring 'green' targets as part of normal business reporting, and building it into training and human resource processes enable staff to be aware of the targets and feel motivated to achieve them (Plank 2011).
- **Ambient energy displays and signage** can reinforce the positive message about energy efficiency achievements, and convey information about energy efficiency performance. For example, an energy-focused public art display offering public building users an opportunity to tell their energy efficiency story through information and design.
- **Enabling strategies and reminders to encourage to switch off electrical equipment, such as:**
 - Training building occupants on how to operate the equipment in the building, setting thermostats, turning off lights, using power saving features in computers, etc.
 - Placing posters prominently on doors reminding users to perform a certain action as they leave.
 - Placing stickers on essential devices that should not be turned off, thus making it more evident for employees what devices should be turned off.
 - Organizing one-on-one conversations or presentations in meetings to inform managers, employees or users of public building of the energy and cost reductions possible if these behavioral changes are made. The individuals leading the presentations should then model the behavior and educate and persuade their peers about the energy savings of switching devices.
 - Providing individualized assistance to employees, to help them reduce energy use in their working space.
- **Community and workplace initiatives:** Community initiatives encourage monitoring and feedback within the group, with an aspect of competition. They can involve public pledges to make energy savings, which are harder to break than private pledges, due to social pressure. For example, the "Cool Biz" campaign is a Japanese campaign initiated by the Japanese Ministry of the Environment in the summer of 2005 as a means to help reduce Japanese electricity consumption by limiting the use of air conditioning and encouraging thermostat setpoints of at least 28 degrees Celsius. By 2012, more than 2.2 million tons of carbon emissions had been avoided from this campaign (Takagi 2015).⁴ In 2015, a survey conducted by the Ministry of the Environment showed that 96.1 percent of the Japanese population was aware of the initiative (Takagi 2015). In the United Kingdom, The Big Switch Off campaign is an initiative by Durham County Council, active since 2012, to implement energy savings measures in council buildings, by engaging building users. It has directly impacted 18,000 staff members, and indirectly impacted thousands of other users. Durham estimated that it could reach 5-10 percent savings by switching off unused lights and computers and reducing gas consumption for one hour per day. Staff were trained in each building, and the competition was introduced to see which building could make the most savings over a set period. Within 12 months, energy use had fallen by 17 percent (Interreg Europe 2018).

Monitoring comfort levels of male and female employees before and after the implementation of energy efficiency investments

The research highlighted the need to consider gender differences in thermal comfort and illumination levels during the design of energy-efficiency investments in public buildings. A baseline survey should be conducted to examine female and male employees' experiences with thermal comfort and illumination levels. The survey results should inform the design of energy efficiency investments. After the energy efficiency investments have been implemented, a follow-up survey could be conducted to monitor changes in the satisfaction of female and male employees and users of public buildings.

⁴ More information can be found at <https://www.eesi.org/articles/view/the-japanese-cool-biz-campaign-increasing-comfort-in-the-workplace>

WHAT'S NEXT?

The project plans to renovate about 35 buildings in the first year, for insulation, window/door replacement, heating/cooling systems, lighting, and solar panels. It will conduct pre- and post-renovation surveys to measure satisfaction with energy efficiency interventions. Indicators will measure the engagement of the building users and overall satisfaction disaggregated by gender.

The Europe and Central Asia region (ECA) has the largest portfolio of investment operations focused on energy efficiency across the World Bank. ECA has supported more than US\$4 billion in energy efficiency operations in the last decade, almost US\$1 billion of which was targeted at public buildings. The results of this study provide useful inputs to other energy efficiency operations in ECA and elsewhere.

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