

UBC Social Ecological Economic Development Studies (SEEDS) Student Report

**Energy Conservation and Behaviour Change Opportunities at UBC
A Community-based Social Marketing Approach**

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Energy Conservation and Behaviour Change Opportunities at UBC

A Community-based Social Marketing Approach

By Chris Karu

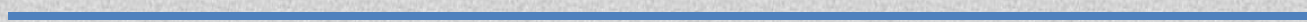


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Introduction

This project was undertaken over a 4 month course entitled *Geography 419 Research in Environmental Geography* and in conjunction with the community partner UBC SEEDS (Social, Ecological, Economic, Development Studies). The overarching aim, as requested by UBC SEEDS was to use community based social marketing (CBSM) to determine what barriers exist for UBC staff in the workplace to reduce energy consumption regarding lighting, computer use, and shared equipment use. The results of this were used to recommend how best to motivate staff to decrease their energy conservation consumption accordingly.

As per the CBSM methodology and course requirements, a literature review of the theoretical and empirical studies of behaviour change and energy conservation was undertaken to better understand the subject. Following this a survey was designed, edited, piloted, and then administered attempting to understand the barriers to implementation.

Results of the survey demonstrate which of the activities are least performed and why individuals do not undertake them. From these results, select behaviour change tools are recommended to be implemented by UBC SEEDS in conjunction with the UBC Sustainability Office.

Background and Rationale

UBC aims to reduce emissions below 2007 levels by 33% in 2015, 67% in 2020 and 100% in 2050.¹ Towards this end UBC implemented Ecotrek, a water, energy and Greenhouse gas reduction project, which resulted in a 20% energy use and 30% water use reduction through Energy Performance Contracting².

Above and beyond this, UBC academic and administrative buildings consume over 178 million kWh each year and lighting accounts for approximately 40% of the total electricity use on campus - about 25% of the total utility costs³.

As UBC Professor John Robinson outlines, there are two forms of an environmental response: a “technical fix” and a “value change”⁴. The former is distinguished by a focus on conservation and technology (collective policies) with a preferred language of sustainable development, whereas the latter is characterised with notions of preservation and views lifestyle change (individual values) as the key to sustainability⁵. He further notes that “technical fixes are necessary, but not sufficient” in addressing our environmental impact and that behaviour change addresses issues of “opportunity, distribution, material needs, consumption and empowerment” and is more likely to achieve intractable improvements than an eco-efficiency project⁶. It is for these reasons that understanding barriers to energy conservation behaviour would prove fruitful for furthering sustainability at UBC.

¹ Climate Action Plan (2011)

² Ecotrek (2011)

³ UBC Sustainability (2011)

⁴ Robinson (2004)

⁵ Robinson (2004)

⁶ Robinson (2004)

Community-Based Social Marketing

Fostering Sustainable Behaviour: An Introduction to Community-Based Social Marketing by Canadian environmental psychologist Douglas McKenzie-Mohr was specified by the community partner to be the guide for this project. CBSM draws heavily on research in social psychology, indicating that behaviour change initiatives are most effective when carried out in a community setting involving direct contact with people⁷. This methodology involves:

“...*identifying* barriers to a sustainable behaviour, *designing* a strategy that utilizes behaviour change tools, *piloting* the strategy with a small segment of a community, and finally, *evaluating* the impact of the program once it has been implemented across a community.⁸”

McKenzie-Mohr explains that there are 3 steps to undertaking identifying barriers – a literature review, focus groups and a survey. The literature review is completed to understand the relevant articles and reports on the subject, and will be discussed further in this paper. Due to time and ethics board review constraints, unfortunately a focus group was not organized in this project, and will be reviewed under limitations. Finally, the survey was the main focus of this project and this process is explored after the literature review.

Once barriers have been recognized, the CBSM methodology outlines tools which can be tailored and implemented to help overcome the established behaviour impediments. *Fostering Sustainable Behaviour* lists 6 tools: commitments, prompts, norms, communications, incentives, convenience.

Following the barrier identification and tool selection, the next step is to implement a pilot strategy. Given the scope of this project the tools will be recommended for UBC SEEDS to pilot and eventually implement if they so choose.

In brief, *Fostering Sustainable Behaviour* proved to be the most important and guiding source for understanding and mapping the behaviour change of UBC staff.

⁷ McKenzie-Mohr and Smith (1999)

⁸ Ibid.

Literature Review

An academic search of the terms “energy conservation”, “behaviour change” or “community-based social marketing” yields a considerable amount of peer-reviewed papers and many were found to be relevant to this project and offered some guidance in the survey design.

While a list of all the papers researched would be exhaustive, in the interest of succinctness only 2 shall be outlined given their importance in the survey design.

The first is *Toward a Coherent Theory of Environmentally Significant Behavior* by US National Research Council’s Paul Stern. This paper presents a theory on the basis of support for social movements – Value-Belief-Norm (VBN) Theory – which postulates that:

“...individuals who accept a movement’s basic values, believe that valued objects are threatened, and believe that their actions can help restore those values experience an obligation (personal norm) for pro-movement action that creates a predisposition to provide support”⁹.

Of importance from this paper is the idea of the causal linkages between values, beliefs and norms regarding environmentalism. In other words, if a person maintains environmental values, this will be reflected in their beliefs towards sustainability, and ultimately in their actions. This paper thus establishes that those with high environmental values will be more likely to report above average energy conservation behaviours, and was included in the survey design to test as a hypothesis within the UBC context.

The second paper utilized is *Exploring Individual Factors Related to Employee Energy-Conservation Behaviors at Work* by Charles Scherbaum et al. This paper summarized a similar research project in a large US university using focus groups and surveys similar to the CBSM model. Furthermore it utilized and built upon the VBN theory with a focus on energy conservation of the universities’ employees, similar to this project. Given these similarities, this project’s survey questions were based on those from this paper in mapping respondent’s environmental values, beliefs and intentions.

Thus these two papers were both influential in designing the survey. While other articles did inform this project to some extent (i.e. survey design, behaviour change barriers or energy conservation), it is these two – in conjunction with *Fostering Sustainable Behaviour* – that had the most significant impact.

⁹ Stern (2000)

Survey Design

The behaviours to be studied were submitted by the community partner listed according to level of research priority. While the initial list included some 19 various workplace behaviours UBC SEEDS wished to have studied, in order to maintain brevity and exclude overlapping behaviours it was reduced to only 8 within 3 categories:

Lighting

1. Turning off lights when leaving personal office or workstation for a few minutes
2. Turning off lights when leaving personal office or workstation at the end of the day
3. Turning off lights for the entire office at the end of the day

Workstation Equipment Use

4. Adjust power management settings on computer as outlined in UBC's Energy Policy
5. Turning off monitors when away from work area
6. Turning off computers and monitors at the end of the day
7. Turning off personal office or workstation electronic equipment (fans, radio, etc) at the end of the day

Shared Equipment

8. Turning off shared office equipment (copy machines, printers) at the end of the day

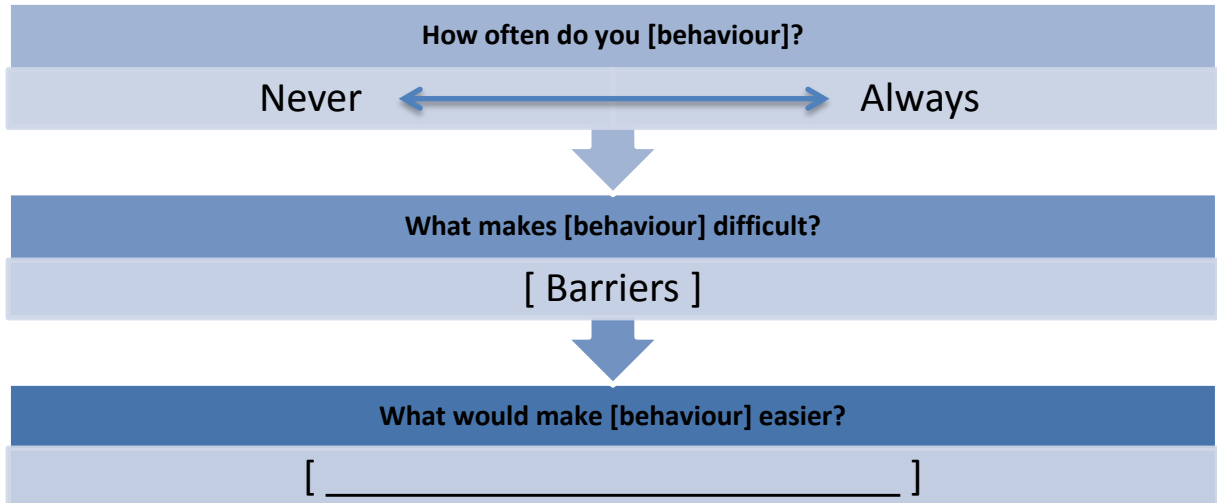
The CBSM framework devises a 7 step process for designing a survey regarding behaviour change. These were followed in designing ways to map the barriers to the above behaviours:

1. Clarifying your objective
2. List items to be included
3. Write the survey
 - Aim for a 10 minute or less survey; focus on closed-ended questions
 - 5 point scales are better than less
 - i. Include a mid-point for respondents who are divided/unsure;
 - 6 questions to be asked about each activity:
 - i. Barriers:
 1. What makes it difficult to do "X"
 2. What makes it easy to do "X"
 - ii. Benefits
 1. What positive effects are associated with doing "X"
 2. What negative effects are associated with doing "X"
 - iii. Social Norms
 1. Who wants you to do "X", and how much do you care about their opinion?
 2. Who doesn't want, or care if you do "X", and how much do you care about their opinion?
4. Pilot the survey
5. Select the sample
6. Conduct the survey

7. Analyze the data¹⁰

The social norms of the survey were not required as they are intended for individual activities outside the context of an organization. The benefit questions were later dropped in order to reduce the length of the survey.

Thus for each of the above 8 behaviours, 3 questions were asked:



In listing the barriers for the second question, a set of informally given reasons for a lack of energy conservation was referred to from the UBC Sustainability Coordinator's Toolkit¹¹. While having little empirical evidence to support the proposed barriers, they offered a sound variety of energy conservation barriers.

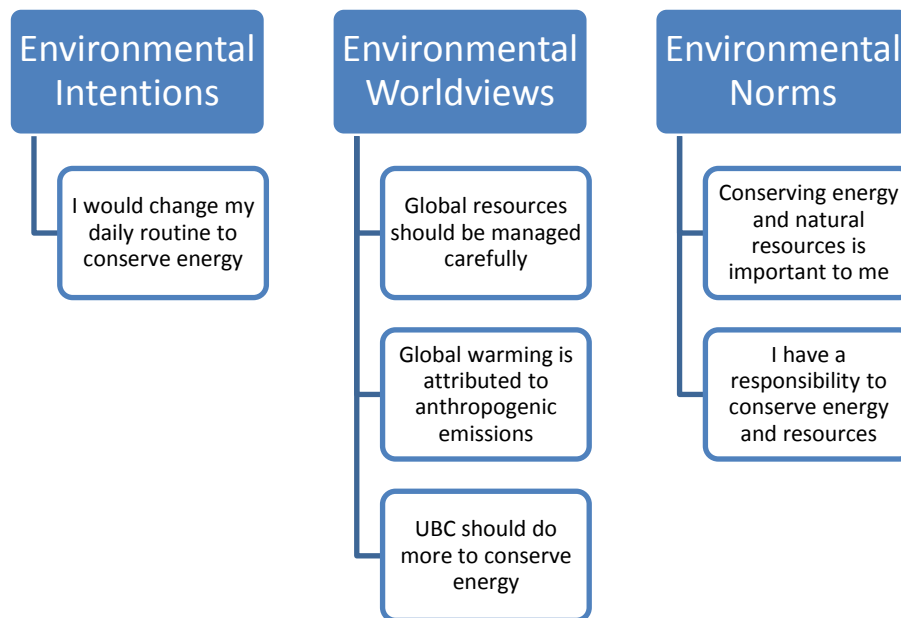
In order to map the VBN theory within the UBC workplace environment, the survey also had a section on behavioural intentions, environmental worldviews, and environmental personal norms. The rationale for including this into the survey was mainly to have a hypothesis to test:

(H1): Those with stronger environmental values will engage in more eco-friendly behaviour

The questions to map this theory were phrased as statements and respondents were asked whether they "strongly agree", "agree", are "neutral", "disagree" or "strongly disagree" with the following statements:

¹⁰ McKenzie-Mohr and Smith (1999)

¹¹ UBC Sustainability (2011)



The behavioural intention item measured individuals' intentions to engage in energy conservation behaviours, the environmental worldview items measured the degree to which the individual believes that energy conservation in general is an issue of concern, and the environmental personal norms items measured the degree of personal responsibility felt by an individual to conserve energy.

In addition, demographic information was inquired to better understand the population distribution of the respondents. This included questions on age, sex, years employed at UBC, whether they were faculty or staff and if they were part-time or full-time.

Once the survey was completed, it was then piloted by having Dr. Pacheco-Vega (a Political Science Professor at UBC and expert in survey design), colleagues, and the community partner read through and edit it. Once the survey was deemed worthy of implementation, it was formatted and uploaded to the UBC Online Survey Webpage *Vovici EFM Continuum*.

After the survey was finalized, consent forms and invitation letters were written with the assistance and expertise of Professor David Brownstein, and were submitted for review by the UBC ethics review board.

Upon approval, the surveys were administered via email to UBC employees through the community partner's Kara Bowen and Brenda Sawada on March 25th 2011. They invited a variety of contacts to both partake in the survey and invite others to as well, and were limited to those working in buildings not currently implementing the continuous optimization program¹² including: The Henry Angus (Sauder) Building, General Services and Administration Building, Aquatic Ecosystems Research Laboratory Building, the Geography Building, the Liu Centre, and the CK Choi Building.

On March 25th the survey was closed with 28 total respondents and the results were then analyzed.

¹² The optimization program includes identifying and implementing low-cost operational and maintenance changes, and then maintains this new optimized state through real-time performance monitoring and response (Ecotrek 2011)

Results

(For detailed results of all respondent answers please consult the attached appendix)

In reviewing the results of the survey the first thing noted is that of the 8 behaviours examined, 4 included a majority of respondents reporting already implementing them:

Behaviour	Always/Usually	Never/Rarely
B1. Turning off (personal) lights for a few minutes	6 (21%)	17 (61%)
B2. Turning off (personal) lights at the end of the day	23 (82%)	5 (18%)
B3. Turning off (general) lights at the end of the day	14 (50%)	13 (46%)
B4. Adjusting computer power settings (Yes/No)	20 (71%)	8 (29%)
B5. Turning off monitors when away from work area	9 (22%)	16 (59%)
B6. Turning off computer/monitor at the end of the day	19 (68%)	9 (22%)
B7. Turning off personal equipment at the end of the day	24 (86%)	3 (12%)
B8. Turning off shared office equipment at the end of the day	4 (14%)	22 (79%)

Thus it would seem that of those responding, a significant majority usually or always:

- Turn off personal lights at the end of the day
- Have adjusted their computer power settings
- Turn off their computer/monitors at the end of the day
- Turn off personal office equipment at the end of the day

The focus of the project should then remain on the four behaviours not being implemented and try to understand better why they are not.

B1. Turning off (personal) lights for a few minutes

In response to what makes this behaviour difficult:

Barrier	Response Frequency
I think I will return shortly	12
Other	12
Do not control overhead lighting	5
I forget	4

Of those 12 indicating “other” 7 cited the shared workspace as being problematic (begging the question: why did they not select “do not control overhead lighting”)

In response to what would make this an easier behaviour to implement respondents noted:

- “Less lighting to turn off”
- “A notice by the switch”
- “An e-mail reminding everyone to turn lights off, even for short periods of time”
- “Lights should be properly labelled and easy to reach”

B3. Turning off (general) lights at the end of the day

In response to what makes this behaviour difficult:

Barrier	Response Frequency
Other	25

Of those 25 indicating “other”, 14 cited either a shared workspace or being unsure if last to leave as being barriers to making this difficult. Interestingly, 8 mentioned that it wasn’t a problem and that they already do turn them off.

In response to what would make this an easier behaviour to implement respondents noted:

- “Less lighting to turn off”
- “Being the last one to leave”
- “Label the switches for me”
- “Make it a habit”

B5. Turning off monitors when away from work area

In response to what makes this behaviour difficult:

Barrier	Response Frequency
Other	14
I think I will return shortly	7
I forget	5
Inconvenient/don’t care	4

Of those 14 indicating “other” 7 cited that it was not difficult or that it does it automatically, 3 reported that the computer goes to sleep mode and takes too long to reboot, and 2 said that they don’t know how.

In response to what would make this an easier behaviour to implement respondents noted:

- “Making a habit of it”
- “A sign located on the monitor reminding us to do so”
- “Show me how”

B8. Turning off shared office equipment at the end of the day

In response to what makes this behaviour difficult:

Barrier	Response Frequency
Other	15
Do not feel responsible	9
Unsure if last to leave	3
I forget	2

Of those 15 indicating “other” 5 stated that their equipment automatically switches into power save mode or turns off automatically, 4 said they require the equipment after hours or that others may still need it, and 4 reported not applicable/difficult.

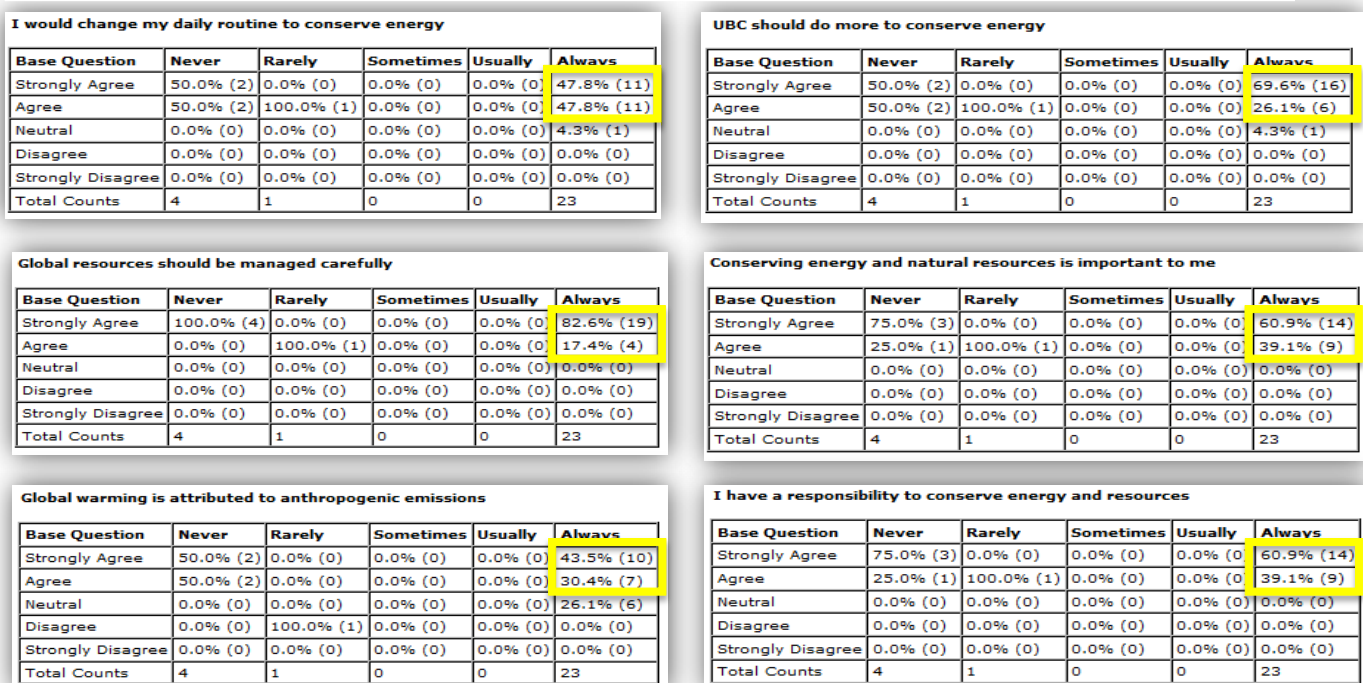
In response to what would make this an easier behaviour to implement respondents highlighted:

- “A posted notice”
- “Knowing you were the last to leave”
- “Email a reminder to everyone”

With respect to the hypothesis “Those with stronger ecological values will engage in more eco-friendly behaviour” the evidence was mixed due to the design of the survey.

When comparing how strongly respondents agreed with the 6 environmental value statements (listed above under environmental worldviews, intents and norms) against the behaviours which had a majority reporting “always” or “usually” implementing the behaviours (i.e. B2, B4, B6, and B7) the evidence indicated that the hypothesis held – see Figure 1.

Figure 1: Cross-tabulation against “Turning off (personal) lights at the end of the day”



However, the evidence is unclear due those behaviours which are rarely/never implemented due to inapplicability or structural constraints (i.e. cannot turn off overhead lighting), as demonstrated by Figure 2.

Figure 2: Cross-tabulation against “Turning off (personal) lights for a few minutes”

I would change my daily routine to conserve energy

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	35.7% (5)	33.3% (1)	0.0% (4)	66.7% (2)	33.3% (1)
Agree	57.1% (8)	66.7% (2)	0.0% (1)	33.3% (1)	66.7% (2)
Neutral	7.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

UBC should do more to conserve energy

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	50.0% (7)	66.7% (2)	0.0% (5)	100.0% (3)	33.3% (1)
Agree	42.9% (6)	33.3% (1)	0.0% (0)	0.0% (0)	66.7% (2)
Neutral	7.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

Global resources should be managed carefully

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	85.7% (12)	33.3% (1)	0.0% (5)	100.0% (3)	66.7% (2)
Agree	14.3% (2)	66.7% (2)	0.0% (0)	0.0% (0)	33.3% (1)
Neutral	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

I have a responsibility to conserve energy and resources

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	50.0% (7)	33.3% (1)	0.0% (5)	100.0% (3)	33.3% (1)
Agree	50.0% (7)	66.7% (2)	0.0% (0)	0.0% (0)	66.7% (2)
Neutral	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

Global warming is attributed to anthropogenic emissions

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	42.9% (6)	33.3% (1)	0.0% (3)	66.7% (2)	0.0% (0)
Agree	28.6% (4)	33.3% (1)	0.0% (2)	0.0% (0)	66.7% (2)
Neutral	28.6% (4)	0.0% (0)	0.0% (0)	33.3% (1)	33.3% (1)
Disagree	7.1% (1)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

Conserving energy and natural resources is important to me

Base Question	Never	Rarely	Sometimes	Usually	Always
Strongly Agree	50.0% (7)	33.3% (1)	100.0% (5)	100.0% (3)	33.3% (1)
Agree	50.0% (7)	66.7% (2)	0.0% (0)	0.0% (0)	66.7% (2)
Neutral	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Strongly Disagree	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total Counts	14	3	5	3	3

As for the demographics they were as follows:

Category	Response
Sex	19 = female, 9 = male
Age	5 = 0-34 years, 21 = 35-54 years, 2 = 55+ years
Years Employed	9 = 1-3 years, 7 = 3-10 years, 12 = 10+ years
Faculty/Staff	27 = staff, 1 = faculty
Part-time/Full-time	28 = full-time, 0 = part-time

Thus the majority of respondents were female, aged 35-53, have been working at UBC for over 10 years full-time and are staff.

Summary

This survey thus suggests that for each of the 8 behaviours studied, the presence and applicable barriers can be summarized as such:

Behaviour	Barrier?
B1. Turn off lights when leaving your personal office or workstation for <u>a few minutes</u>	• Yes: shared lighting/think they will return shortly
B2. Turn off the lights when leaving your personal office or workstation at <u>the end of the day</u>	• No: majority always/usually engages in behaviour
B3. Turn off lights for the entire office at <u>the end of day</u>	• Yes: shared lighting/not last to leave
B4. Adjust power management settings on computer	• No: majority already engaged in behaviour
B5. Turn off monitors when away from work area	• Yes: think they will return shortly/forget/technical problem
B6. Turn off computer and monitor at <u>the end of the day</u>	• No: majority always /usually engages in behaviour
B7. Turn off personal office or workstation electronic equipment at <u>the end of the day?</u>	• No: majority always/usually engages in behaviour
B8. Turn off shared office equipment at the end of day	• Yes: require equipment afterhours/not last to leave

Furthermore, regarding those behaviours with no reported barrier, a cross-tabulation against the environmental value questions indicated that the hypothesis held and the VBN theory does play out in the UBC workplace context.

These survey results will now be compared with the CBSM behaviour change tools and insights from the literature review.

Recommendation

Fostering Sustainable Behaviour lists 6 possible tools to facilitate overcoming barriers: commitments, prompts, norms, communications, incentives, and convenience. As noted above, only 4 of the 8 behaviours surveyed indicated barriers to the actions and will now be prescribed recommendations.

For *B1. Turning off (personal) lights for a few minutes* and *B5. Turning off monitors when away from work area*, there seems to be considerable overlap in the barriers noted by survey respondents, as well as similarity in behaviour itself (lighting and monitors are located in close proximity at the workstation), and will thus be prescribed recommendations in conjunction with each other.

B1:

Barrier	Response Frequency
I think I will return shortly	12
Other	12
Do not control overhead lighting	5
I forget	4

(Of those 12 indicating “other” 7 cited the shared workspace as being problematic. It appears then that a lot of UBC staff face structural problems when turning off their lights if leaving their desk for only a few moments, excluding a behaviour change)

B5:

Barrier	Response Frequency
Other	14
I think I will return shortly	7
I forget	5
Inconvenient/don't care	4

(Of those 14 indicating “other” 7 indicated that it was not difficult or that it does it automatically, 3 reported that the computer goes to sleep mode and takes too long to reboot, and 2 said that they don't know how.)

However, 16 of the 28 respondents noted that they do not turn of the lights because they either forget or think they will return shortly to their station, and 17 cite these same issues for turning off their monitors. Given this, a 3-pronged approach could be implemented for these 2 behaviours:

- Communicating the cumulative individual and group effects of having lights and monitors turned off for only 5 minutes
 - Include steps on how to implement a power-save mode including assurances it will not disrupt any computer processes

- Offering voluntary prompts for employees in the form of stickers/decals to be placed at their workstation lighting and on their monitors
- The norm of turning lighting and monitors off when leaving the workstation for a few minutes should be appealed to through a variety of actions including:
 - Departmental heads could write an explanatory email (achieving the first prong of communication) regarding office space energy conservation
 - Motivating peer educators (appealing to those with a higher than average environmental value set to assume this role) to further disseminate information and encourage colleagues to implement these behaviour changes

Communication, prompts and norms are all shown to be more effective when executed in combination with each other by offering multiple reminders and parlaying the information in several ways to help foster norm creation surrounding the behaviours targeted¹³.

The next behaviour, *B3. Turning off (general) lights at the end of the day* the results showed that 25 of the 28 respondents indicated “other” as the reason for making this activity difficult. Of those selecting “other”, 14 cited either a shared workspace or being unsure if last to leave as being barriers to making this difficult while 8 mentioned that it wasn’t a problem and that they already do turn them off.

These results hint that the problem here is either structural (overhead lighting) or non-existent depending on the context.

However in response to what would make this an easier behaviour to implement respondents noted:

- “Less lighting to turn off”
- “Being the last one to leave”
- “Label the switches for me”
- “Make it a habit”

Given these answers, the recommended behaviour change tools are as follows:

- Communicating the cumulative effects of having overhead lights turned off over night (compared to left on)
- Placing sticker/decal prompts next to the overhead lighting switch asking employees if they are the last to leave
- Build the norm of turning lighting off at the end of the day through:
 - Departmental heads could write an explanatory email (achieving the first prong of communication) regarding office space behaviour and the imperative of turning lights off at the end of the day

¹³ McKenzie-Mohr and Smith (1999)

- Implementing a monthly department-level survey asking employees whether they turned the lights off at the end of the day; this will both further communicate and prompt the behaviour and help foster norm creation

These recommendations should be implemented simultaneously to complement and build upon each other.

Finally, *B8. Turning off shared office equipment at the end of the day* was noted as difficult to perform due to:

Barrier	Response Frequency
Other	15
Do not feel responsible	9
Unsure if last to leave	3
I forget	2

Of those 15 indicating “other” 5 stated that their equipment automatically switches into power save mode or turns off automatically, 4 said they require the equipment after hours or that others may still need it, and 4 reported not applicable/difficult.

While a small percentage cite forgetting or being unsure if they are the last to leave (i.e. behavioural barriers) the large majority state that this behaviour is not actually a problem (already implemented, not applicable/difficult). It would seem it would be advisable then to recommend the implementation of power-save or automatic shut-down settings for all shared office equipment, which could be coordinated by department heads.

Overall then, the final recommendations for energy conservation behaviours are as follows:

Energy Conservation Recommendation for the UBC workplace

- Communicate the cumulative individual and group effects of having lights and monitors turned off for only 5 minutes; as well as lights turned off for the entire night
 - Include steps on how to implement a power-save mode including assurances it will not disrupt any computer processes; ensure shared office equipment is on power-save/automatic shut-down
- Offering voluntary prompts for employees in the form of stickers/decals to be placed at their workstation lighting and on their monitors
- Placing sticker/decal prompts next to the overhead lighting switch asking employees if they are the last to leave
- The norm of turning lighting and monitors off (for a few minutes or at the end of the day) should be appealed to through a variety of actions including:
 - Departmental heads could write an explanatory email (achieving the first prong of communication) regarding office space behaviour – lighting and computer/monitor use
 - Motivating peer educators (appealing to those with a higher than average environmental value set to assume this role) to further disseminate information and encourage colleagues to implement these behaviour changes
 - Monitor these behaviours by undertaking an anonymous department-level survey regarding these behaviours (periodically) – this will both further communicate and prompt the behaviour and help foster norm creation

Limitations and Future Work

The key limitation to this project was a significant time constraint. Due to other commitments the amount of time allocated to this project was limited and thus had repercussions for the depth of research. Dedicating further time and resources would rectify this.

As a result of this and an ethics board approval process, it was not possible to hold focus groups. Outlined by the CBSM model as important to creating the survey, this restricted the amount of contextual knowledge of a UBC employee's behaviours and impediments regarding the outlined activities. This then limited the type of questions and what they addressed in designing the survey. If this research were to be undertaken again it is strongly recommended that focus groups be held.

Another constraint of this research was the inexperience of the researcher in designing and implementing surveys. Respondent feedback indicated that the survey could have been more detailed and better written. A key oversight was that the questions regarding the type and location of each respondents work area was left out. For future surveys of this type this sort of information would prove extremely useful as it could rule out any structural barriers to behaviour such as overhead lighting.

In terms of the distribution of the respondent population, a severe limitation lay in personality bias - the type of person who would fill out this survey. Indeed, an individual who would voluntarily complete a survey entitled "Energy Conservation and Behaviour Change Opportunities at UBC" is more likely to be environmentally aware and is not indicative of the entire UBC employee population. This may have skewed some of the results (i.e. the environmental worldviews/intents/norms were all strongly agreed with and many of the respondents already implement many of the behaviours studied). In the future a different invitation could be sent out, one where the survey title would be neutral and the sample population reached would be larger and less-likely to have strong environmental values.

In terms of future research stemming from this project, the prevalence and applicability of prompts in the workplace could be studied. That is, finding out whether employees already have prompts in place and if they are found to be effective. Furthermore an exploration into the possibility of creating incentives in the workplace may prove fruitful for motivating employees within the UBC workplace to enact energy conservation behaviours. While the literature reviewed cited many difficulties in implementing incentives within an organizational setting (no direct financial responsibility, 'tragedy of the common's etc) the evidence from the UBC residence "Do it in the Dark" competition which had building competitions to reduce their energy proved effective, suggesting that this is an area of research to be undertaken within the UBC workplace.

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Survey Results
& Analysis

for

Energy Conservation and Behaviour Change Opportunities at UBC Vancouver

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Executive Summary

This report contains a detailed statistical analysis of the results to the survey titled *Energy Conservation and Behaviour Change Opportunities at UBC Vancouver*. The results analysis includes answers from all respondents who took the survey in the 6 day period from Friday, March 25, 2011 to Wednesday, March 30, 2011. 28 completed responses were received to the survey during this time.

Survey Results & Analysis

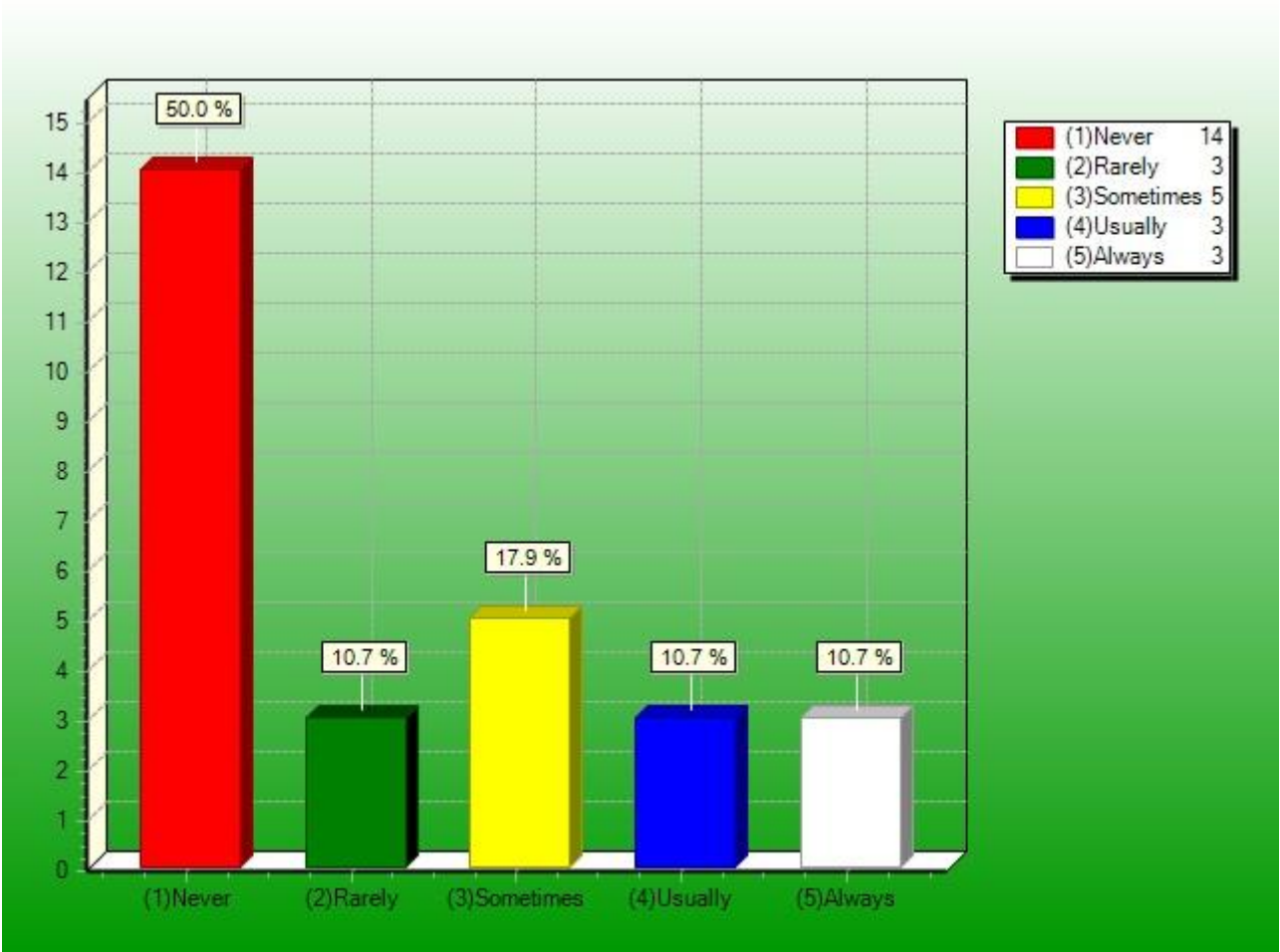
Survey: Energy Conservation and Behaviour Change Opportunities at UBC Vancouver

Author:

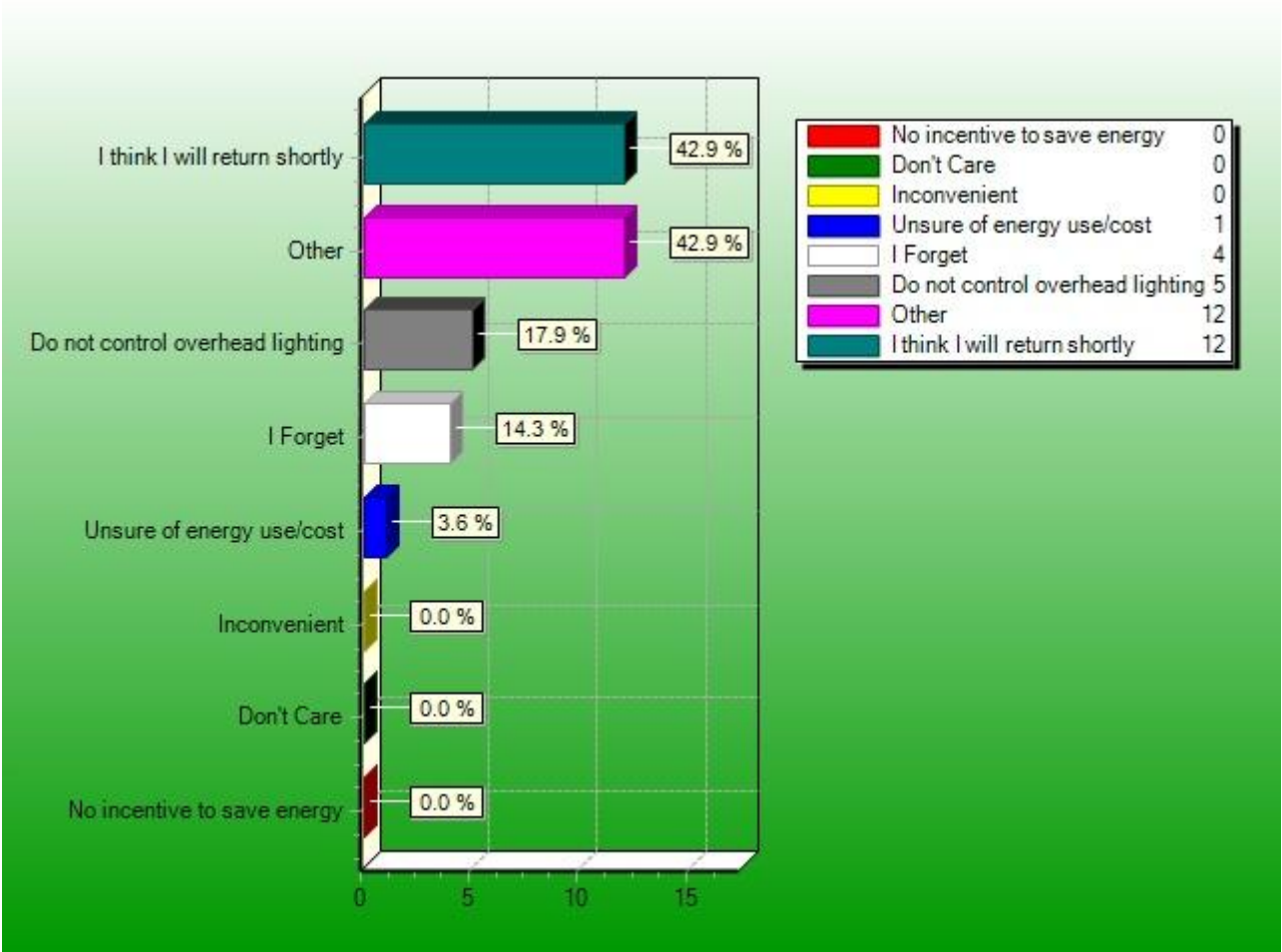
Filter:

Responses Received: 28

How often do you turn off the lights when leaving your personal office or workstation for a few minutes (task lighting and overhead lighting if the staff member or student has the ability to control)



What makes turning off the lights when leaving your personal office or work station for a few minutes difficult? (select all that apply)

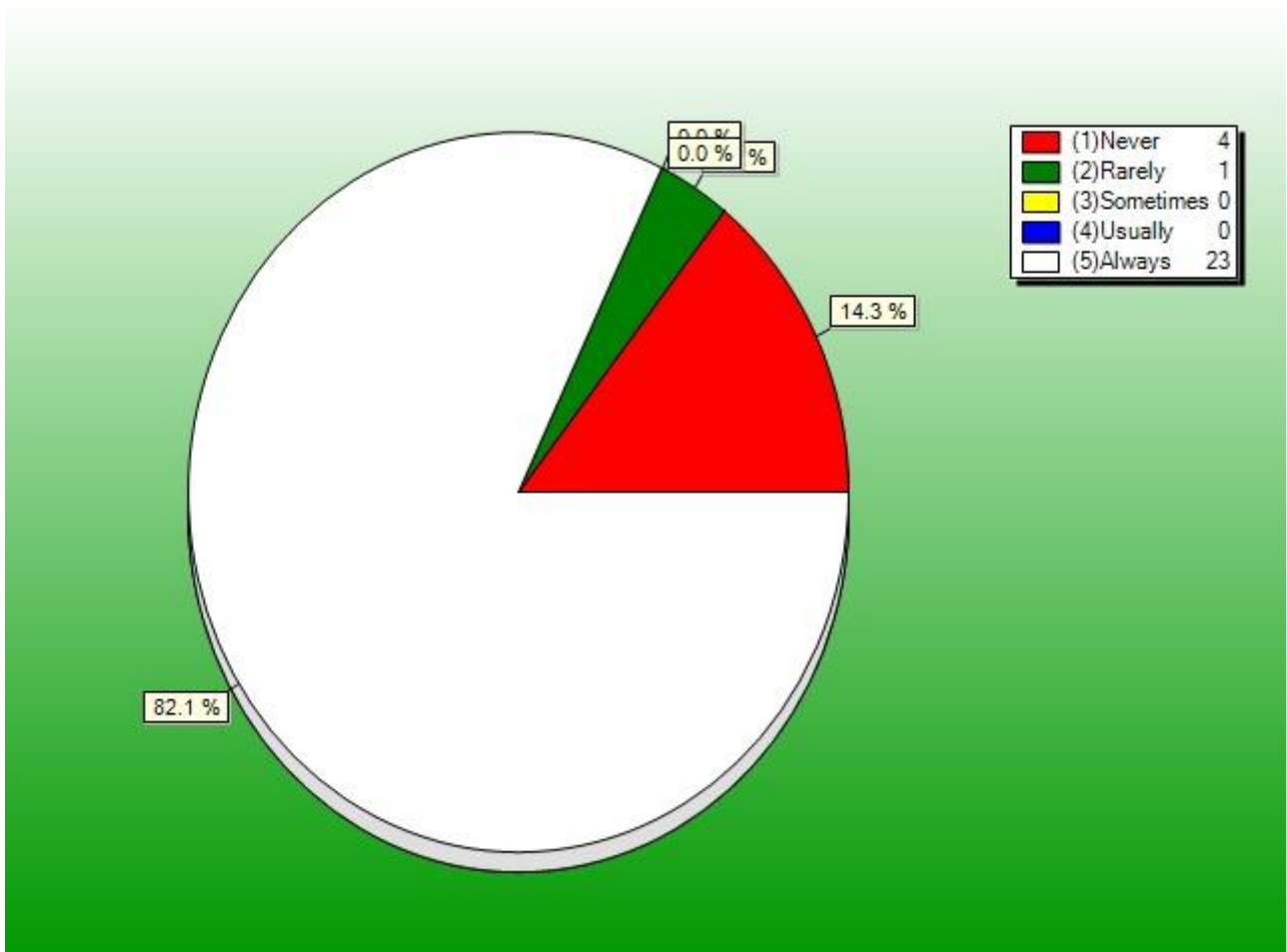


What would make turning off the lights when leaving your personal office or workstation for a few minutes easier?

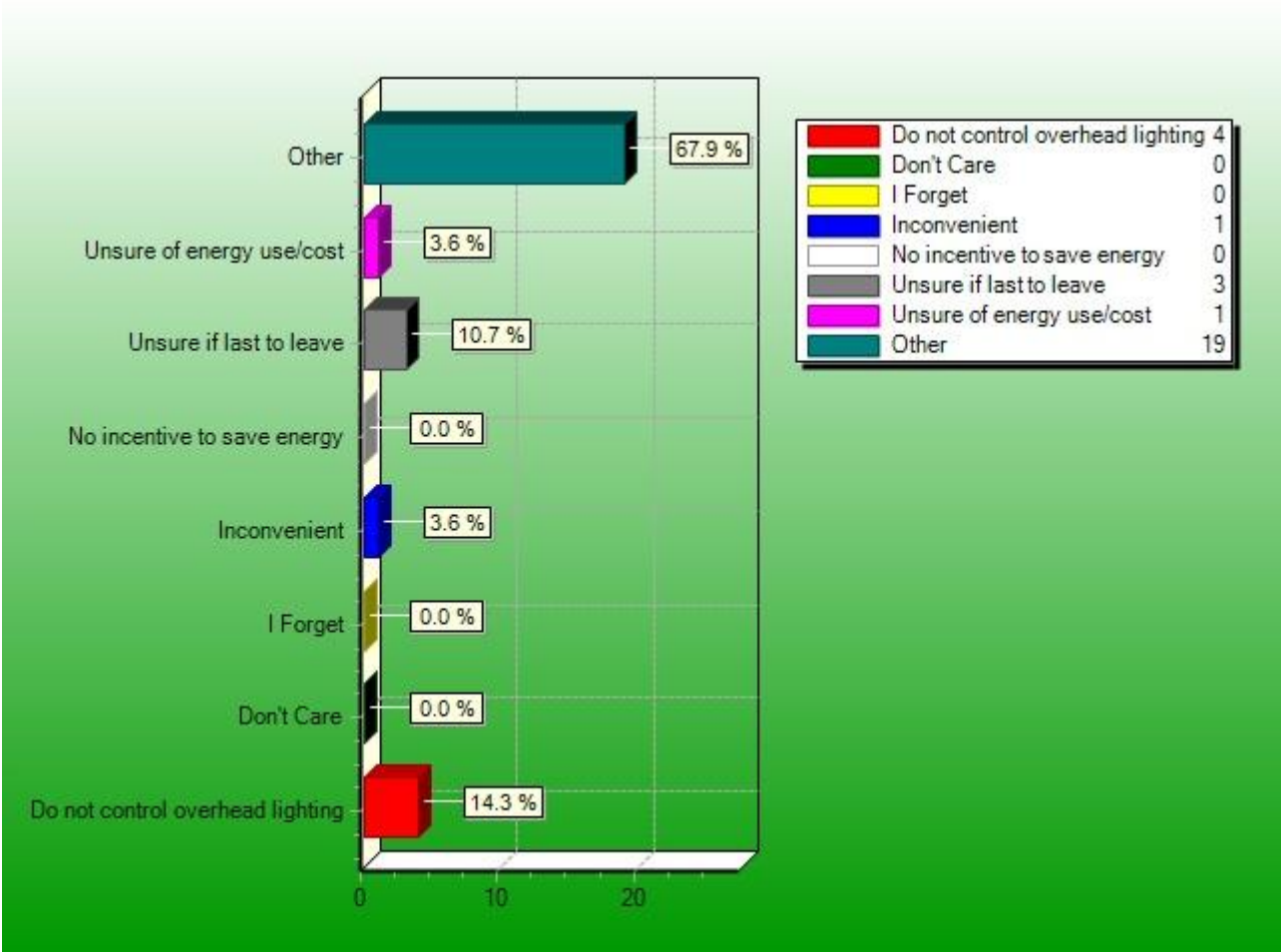
What would make turning off the lights when leaving your personal office or workstation for a few minutes easier?
N/A - no task lighting, can't turn off my overhead lights due to neighbours.
Less lighting to turn off. I'm in a space that wasn't meant to be an office, with lighting that is not that great, so I supplement. I use two lamps and one switch isn't that easy to reach.
Notice by the switch
If all persons in the office have left. Otherwise lights remain on for their use.
they are on a sensor so not an issue
I could not do so as the light switch controls the entire office space lighting and other staff members often work late.
If it was on a motion sensor and turned off when I was gone for more than X amount of time.
n/a
NOT ONLY ONE IN OFFICE
having control of it
Nothing.
the button doesn't always respond, if I could just wave my hand over a sensor that would be easy
Relocate the switch.
if it was only me
INDIVIDUALLY CONTROLLED LIGHTS
If the switch is closer to the exit door.
AT START, A E-MAIL REMINDING EVERYONE TO TURN LIGHTS OFF, EVEN FOR SHORT PERIODS OF TIME.
A boss who doesn't get angry when it is 'too dark' in the office.
Having individual lighting on my work station.
I always turn it off.
photo sensor
the motion sensor light already takes care of this
If turning off the lights didn't effect the entire office.
Nothing - I always turn off the lights apart from when I leave my office for literally 1-3 minutes.
Control
Light should be properly labeled and easy to reach.
Maybe through a sensor to turn off lights in the room if there is no one there.

My office has really bad lighting so I have lots of different lamps that all require individual switching on and off. If one switch controlled them all; they would always be turned off when I go.

How often do you turn off the lights when leaving your personal office or workstation at the end of the day (task lighting and overhead lighting if the staff member or student has the ability to control)



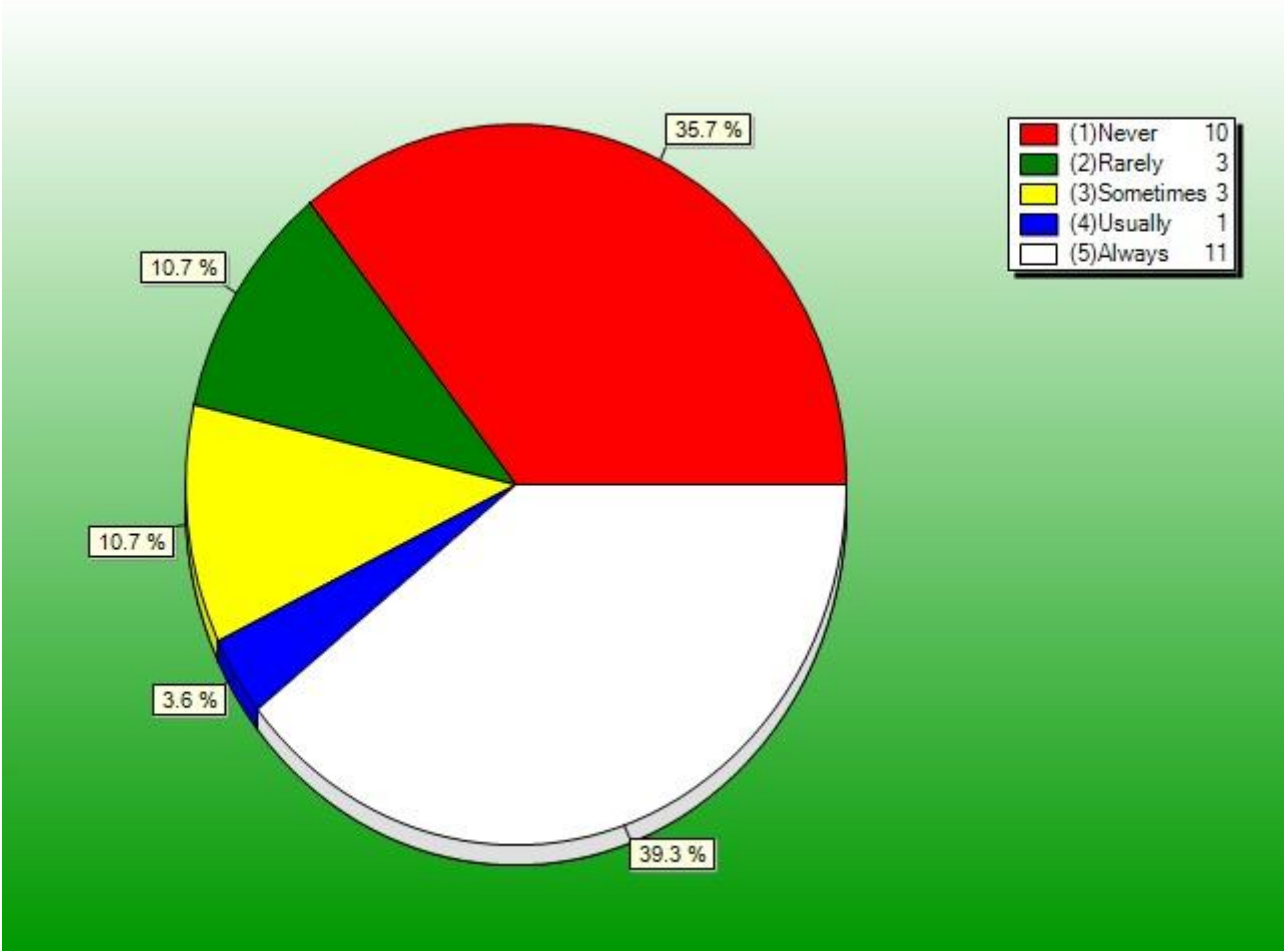
What makes turning off the lights when leaving your personal office or work station at the end of the day difficult? (select all that apply)



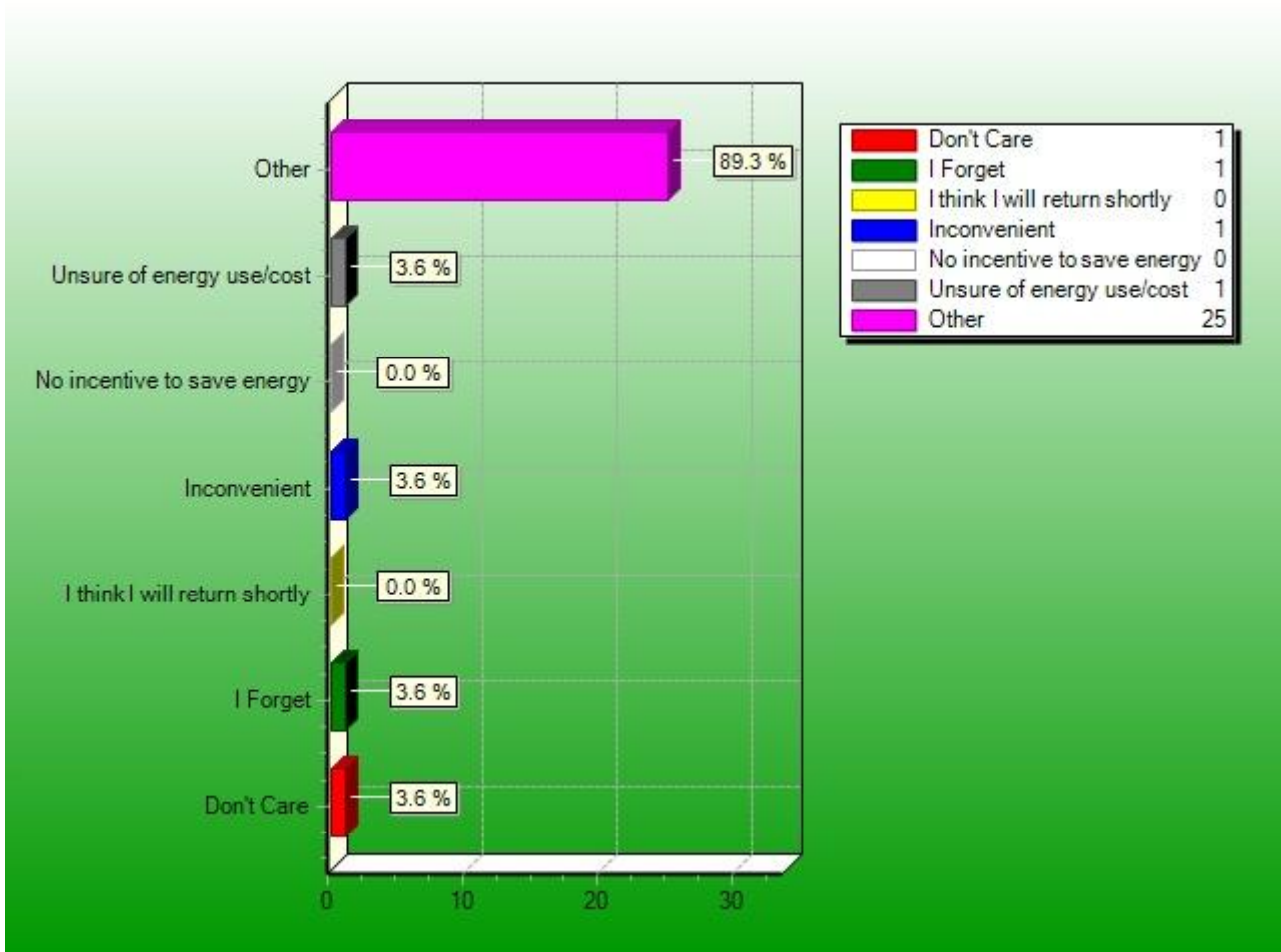
What would make turning off the lights when leaving your personal office or workstation at the end of the day easier?

What would make turning off the lights when leaving your personal office or workstation at the end of the day easier?
Whoever leaves last ALWAYS turns off the lights.
Nothing. It's not a problem.
Notice by the switch
If all persons have left I do turn out the lights
a/a
if lighting was isolated to my area only
Nothing really since I already do it.
n/a
it is easy , i do it every day
same as above
Nothing.
sensor that responded to hand wave and not a small button
n/a
can't think of any
IF I WAS LAST TO LEAVE
If the switch is closer to the exit door.
N.A
Nothing could be easier than turning the switch off at the end of the day.
Having control over this feature.
NA
it is always easy for me to do this as I am usually the last one to leave.
If turning off the lights didn't effect the entire office.
nothing - already very easy
None
Until getting used to turning off the lights, put sticky note up to remind yourself.
the switch located handy
nothing

How often do you turn off the lighting for the entire office at the end of the day?



What makes turning off the lighting for the entire office at the end of the day difficult? (select all that apply)



What would make turning off the lighting for the entire office at the end of the day easier?

What would make turning off the lighting for the entire office at the end of the day easier?

again, N/A

Our lights are on timers, so they will turn off eventually, even if someone forgets.

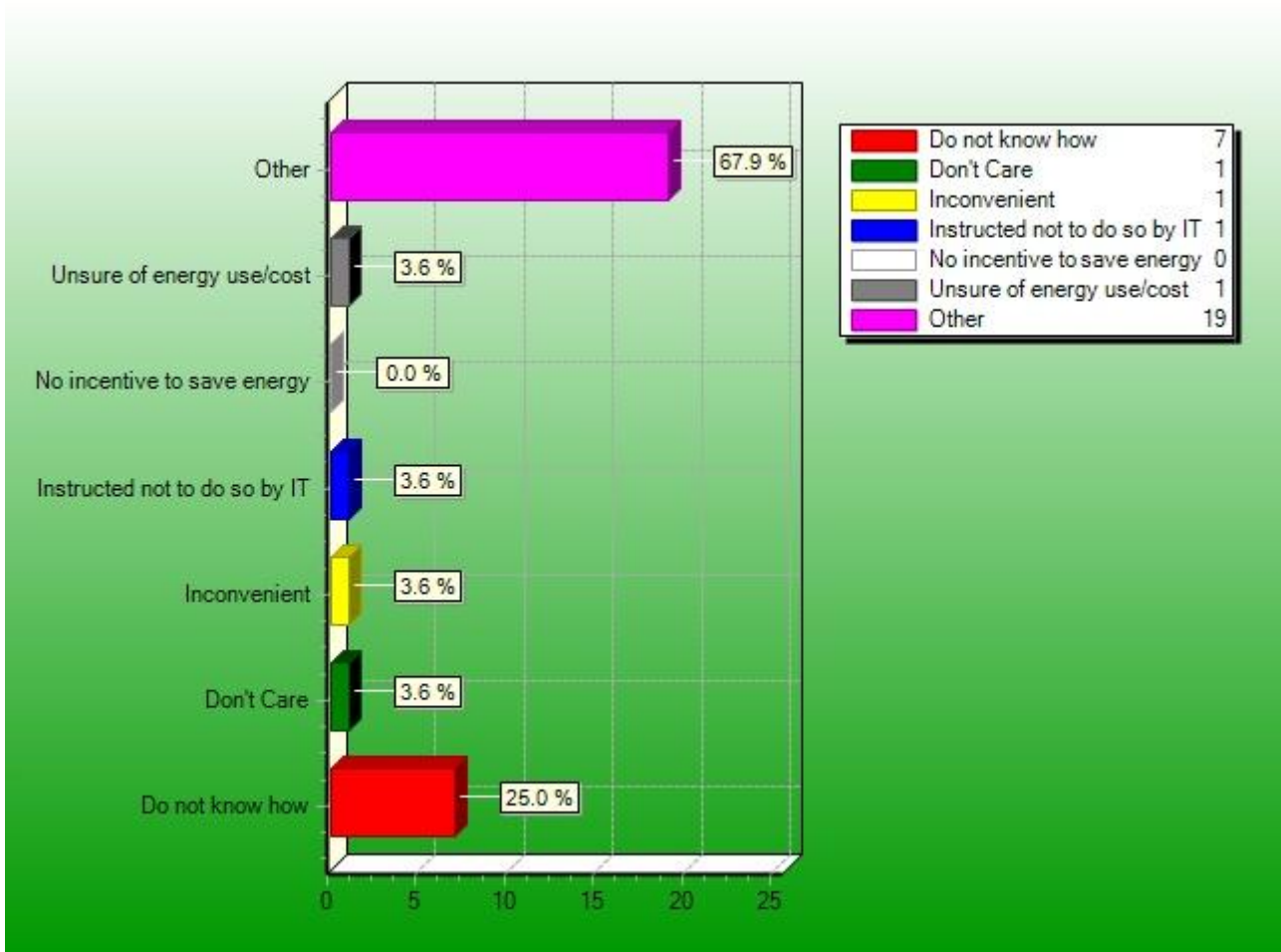
being the last one out

Once all persons have left the office, I turn off the lights, however often times I am not the last person to leave.
a/a
If all staff left at the same time and did not require the lighting to be on
being the last one to leave I guess
n/a
not difficult
being the last one leaving the office
The lights turn off automatically after 30 minutes without any motion detected.
easier switches
Your question assumes the respondent is the last one to leave? It's difficult to turn lights off if I'm not the last one to leave b/c others need light still...
not having anyone there
IF I WAS LAST TO LEAVE
If the switch is closer to the exit door.
SAME AS ABOVE
Being the last to leave.
Nothing
don't know. remind people all the time.
global switching
when I am the last one to leave the office. This is NOT hard for me to do as I am fully aware of conserving energy.
If the lights in our office didn't control the lighting for everyone who might still be working.
Question is not applicable as I have my own office
Nothing it's easy
make it habit.
public education
label the switches for me. make sure I know it is ok to do.

Have you adjusted the power management settings on your computer?[i.e. monitor and CPU set to enter Sleep mode after 5-15 minutes of inactivity; CPU set to enter Standby or Hibernate mode after 30 minutes of inactivity]



If no, why not? (select all that apply)

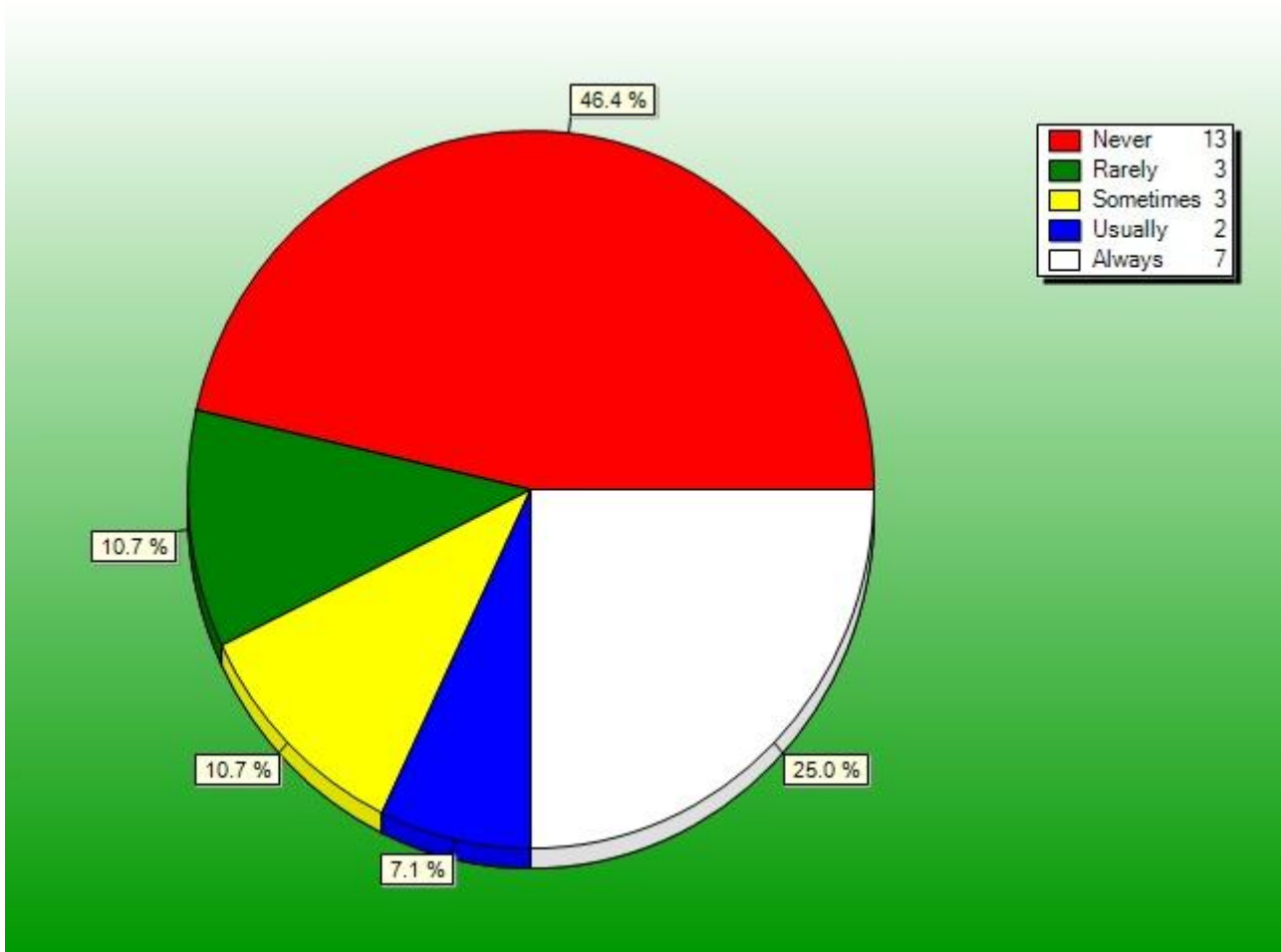


What would make adjusting the computer power management settings easier?

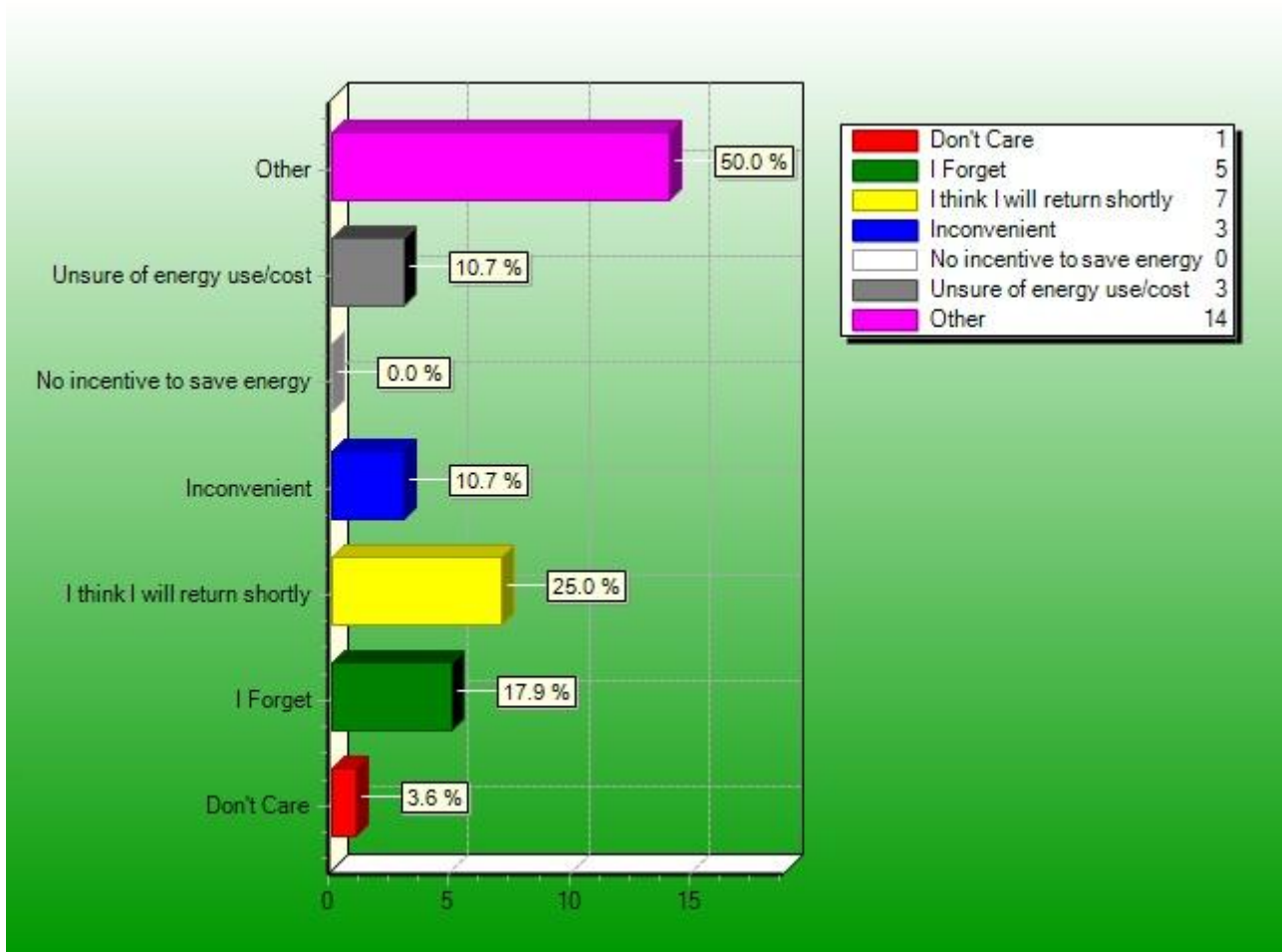
What would make adjusting the computer power management settings easier?
nothing, I'll get to it, I just forgot.
Some direction from our department to all staff might be a very good idea.
education
Instruction on how to do this would be helpful.
nothing

nothing
NA
n/a
do not know
n/a
If someone else did it.
i'm fine with how it is
n/a
it is easy
ALREADY DONE
A "How to" manual beside the monitor may help.
SAME AS ABOVE
Couldn't be easier.
a script from UBC to optimize setting on every computer
Not sure.
help
if step-by-step instructions were given to enable us
I was unaware that this was an option.
the only issue I have is having to leave my computer on when I want to remote in to my desktop from home. This wastes energy.
Reminders from it
When IT guy is setting up the computer for user, IT guy should set up power management at that point.
not sure
show me how

How often do you turn off the monitor when you are away from your work area?



What makes turning off the monitor when you are away from your work area difficult? (select all that apply)

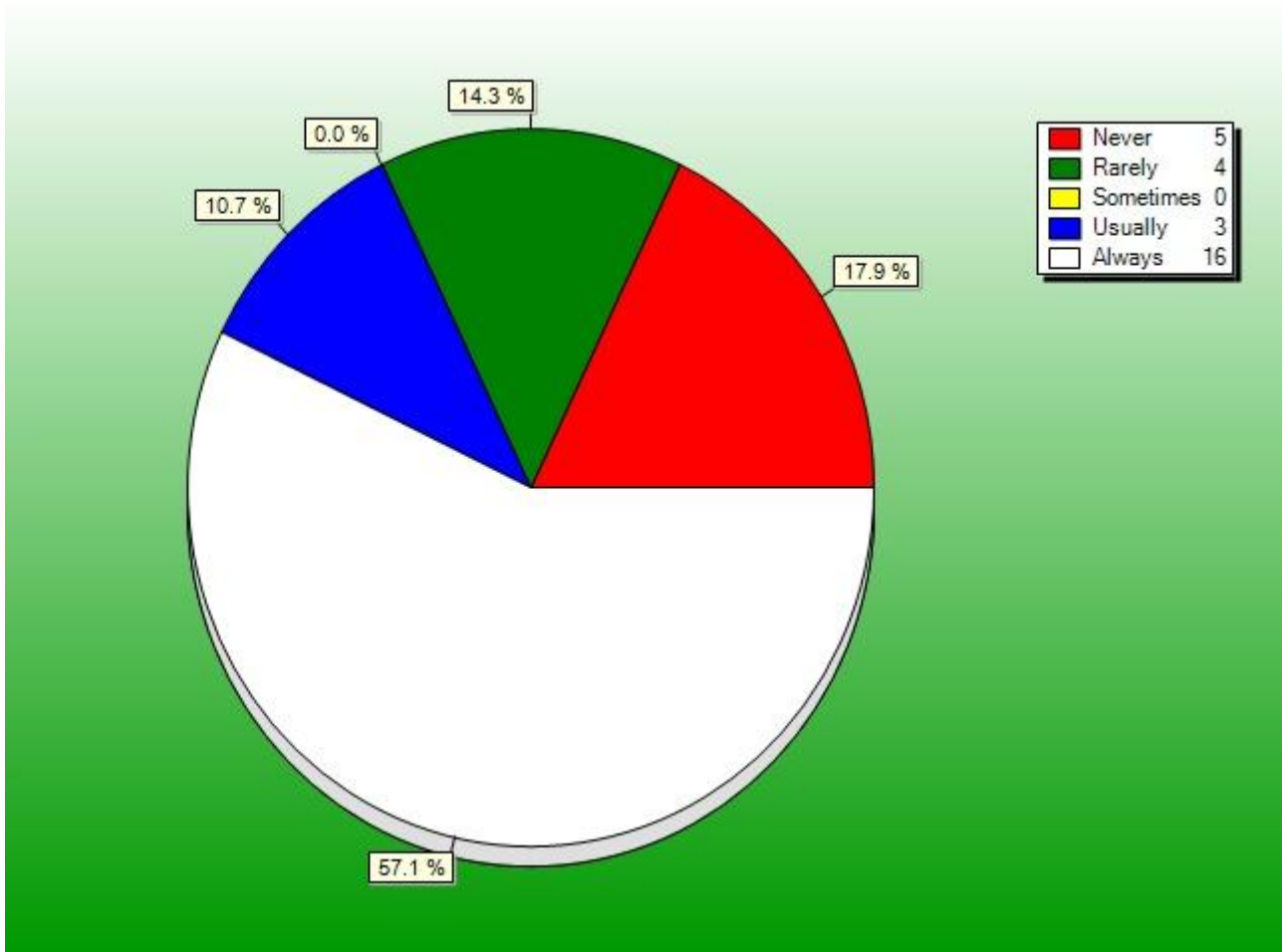


What would make turning off the monitor when you are away from your work area easier?

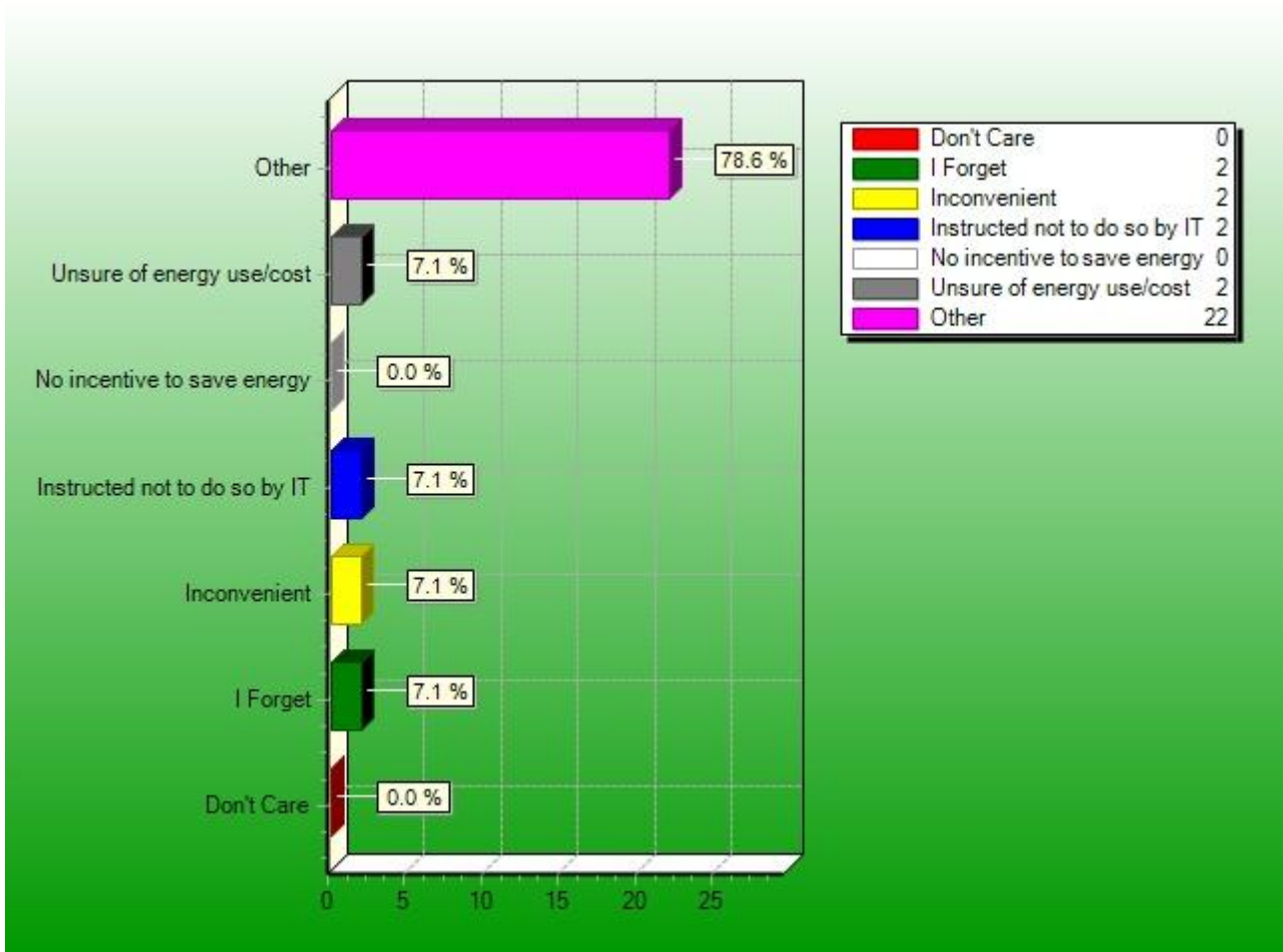
What would make turning off the monitor when you are away from your work area easier?
N/A. Having to put something in every field makes this survey unfriendly to anyone who DOES engage in energy conservation activities.
n/a
set the sleep mode on
n/a

nothing
staff use my computer when I am not using it but I always turn it off at the end of the day
If I knew what the energy cost was.
n/a
not difficult
not sure
If someone else did it.
a button that did not turn off the whole computer but just the monitor would work
a better memory :(
make it a habit, know how much energy I would save
DON'T KNOW
Just making it a habit to turn it off.
NOTHING
A magic Rabbit.
none
I assume computer asleep is sufficient.
single switch for pc
a sign located on the monitor reminding us to do so
NA
not applicable
Nothing
put sticky note to remind myself.
not sure
show me how

How often do you turn off your computer and monitor at the end of the day?



What makes turning off your computer and monitor at the end of the day difficult? (select all that apply)

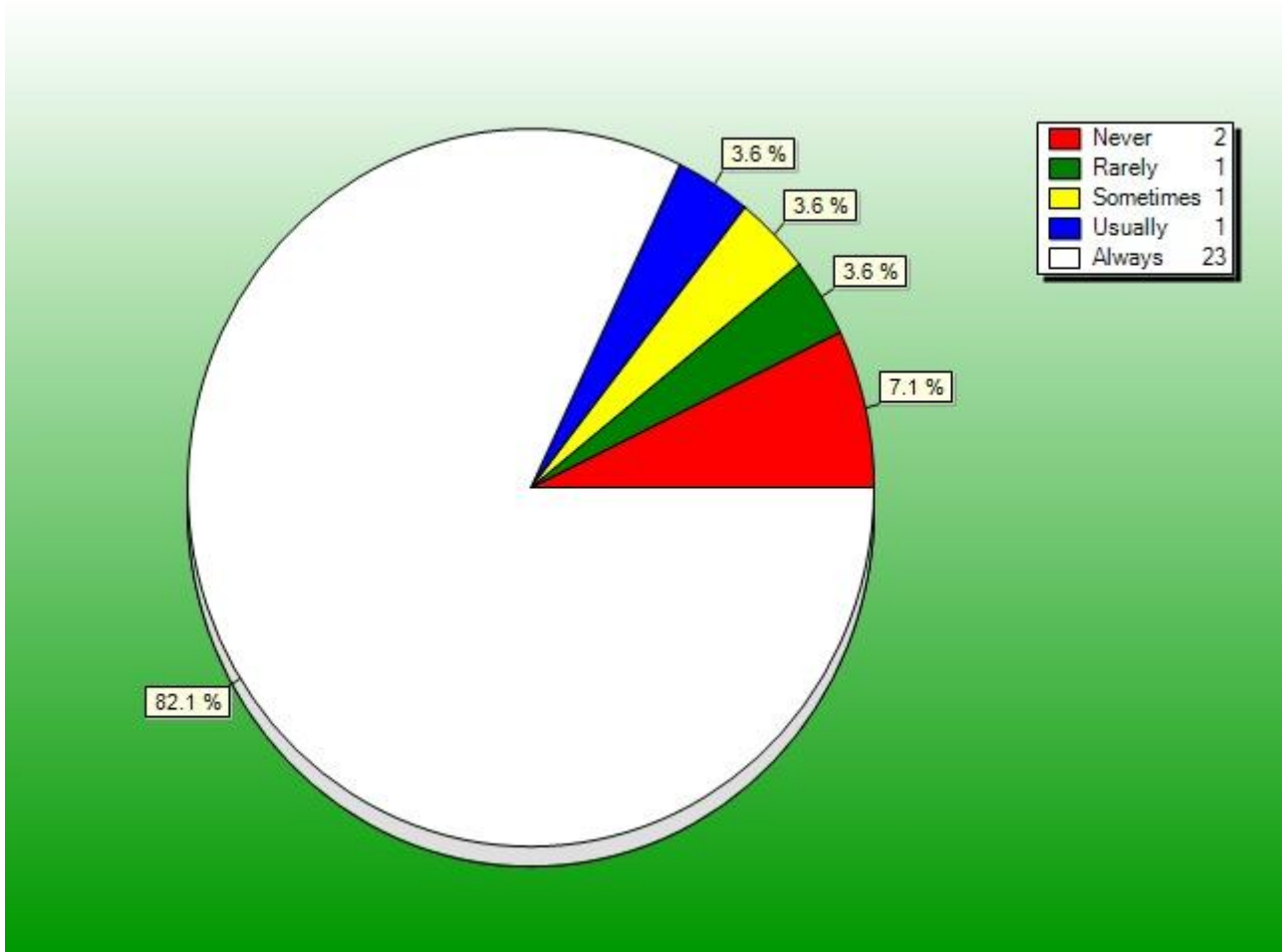


What would make turning off your computer and monitor at the end of the day easier?

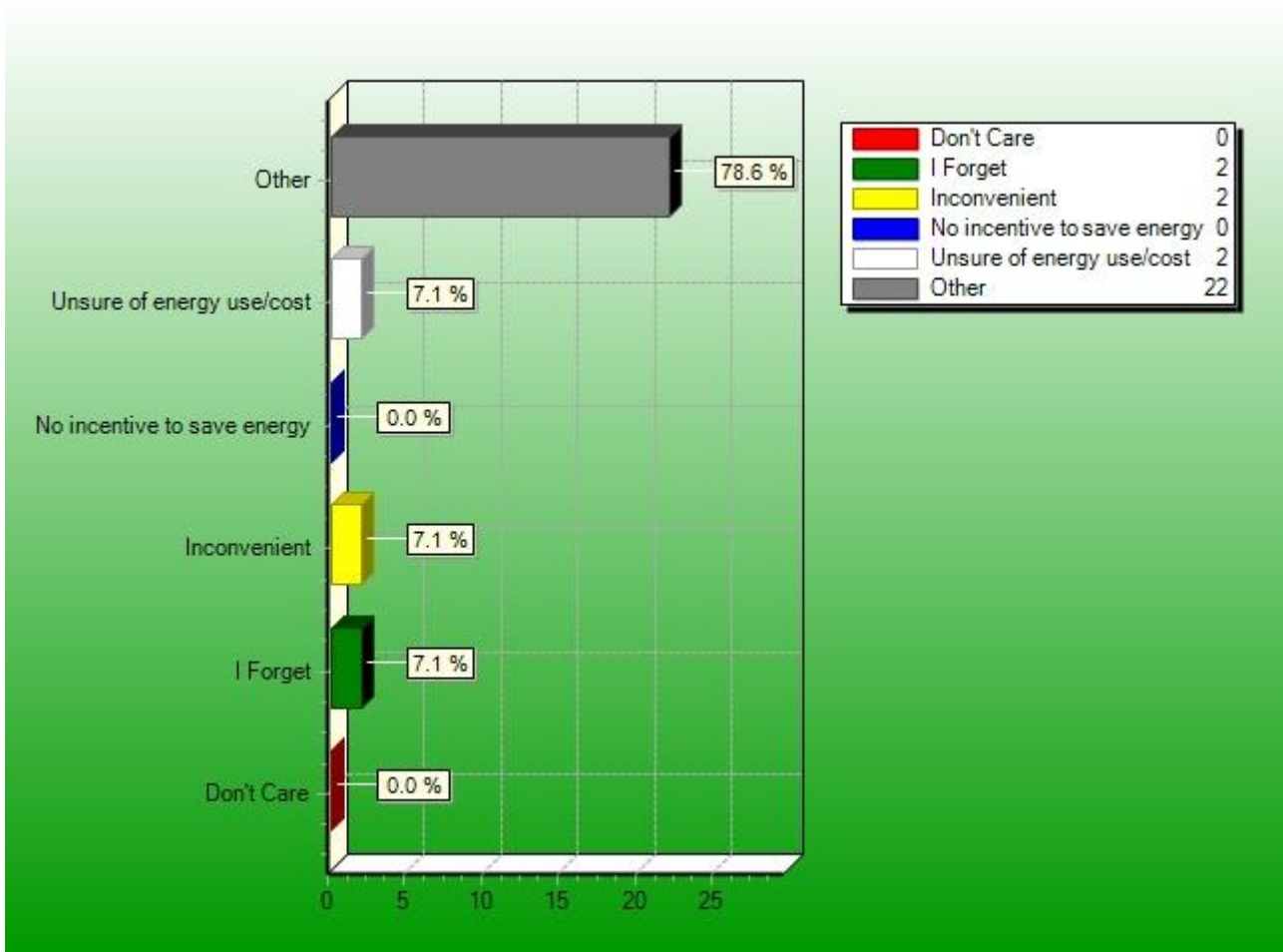
What would make turning off your computer and monitor at the end of the day easier?
to remember the tasks for next day. More work to make notes than just lock computer till next day.
I'd love to shut it down every day. Our IT person doesn't want us to.
reminder notice
n/a
I work on the computer from home so do not turn it off

nothing
Not sure.
n/a
not difficult
n/a
Nothing.
a button that did not turn off the whole computer but just the monitor would work
Nothing. I need to access it from home. I turn the monitor off at the end of the day, though.
it is easy
IT'S DONE
Just making it a habit to turn it off.
NOTHING
Simply not possible.
N/A
I always turn it off.
automatic
Awareness of how much energy cost goes down the drain if one does not do this.
NA
Again, I always turn off my monitor, but rarely my computer so I can remote in to my desktop
Nothing
put sticky note to remind myself.
double check
how about a screen saver that reminds people to do it - with instructions!

How often do you turn off personal office or workstation electronic equipment (fans, radio, computer speakers, etc) at the end of the day?



What makes turning off personal office or workstation electronic equipment at the end of the day difficult? (select all that apply)



What would make turning off personal office or workstation electronic equipment at the end of the day easier?

What would make turning off personal office or workstation electronic equipment at the end of the day easier?

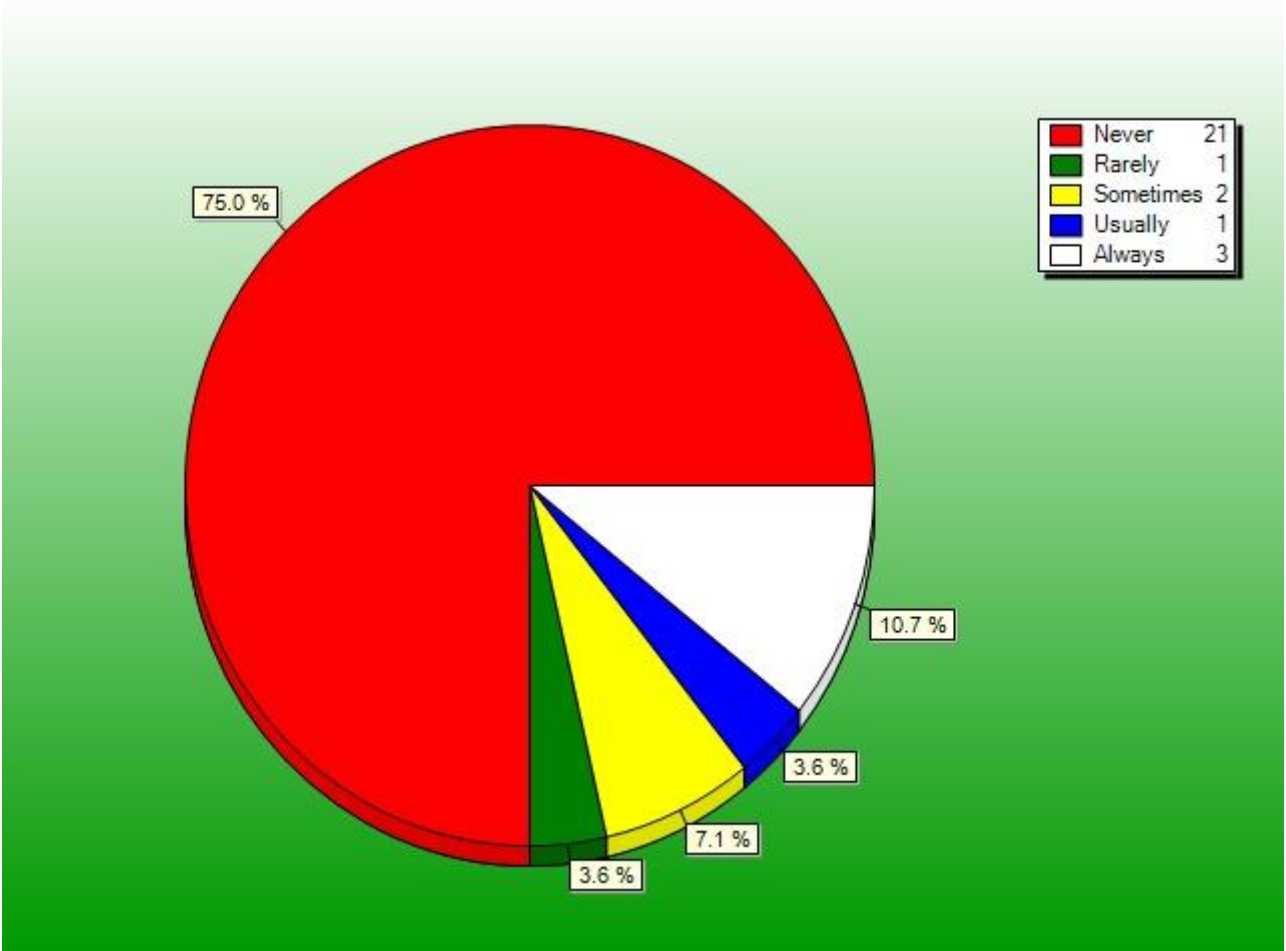
N/A - I have no electronic equipment at my desk.

n/a

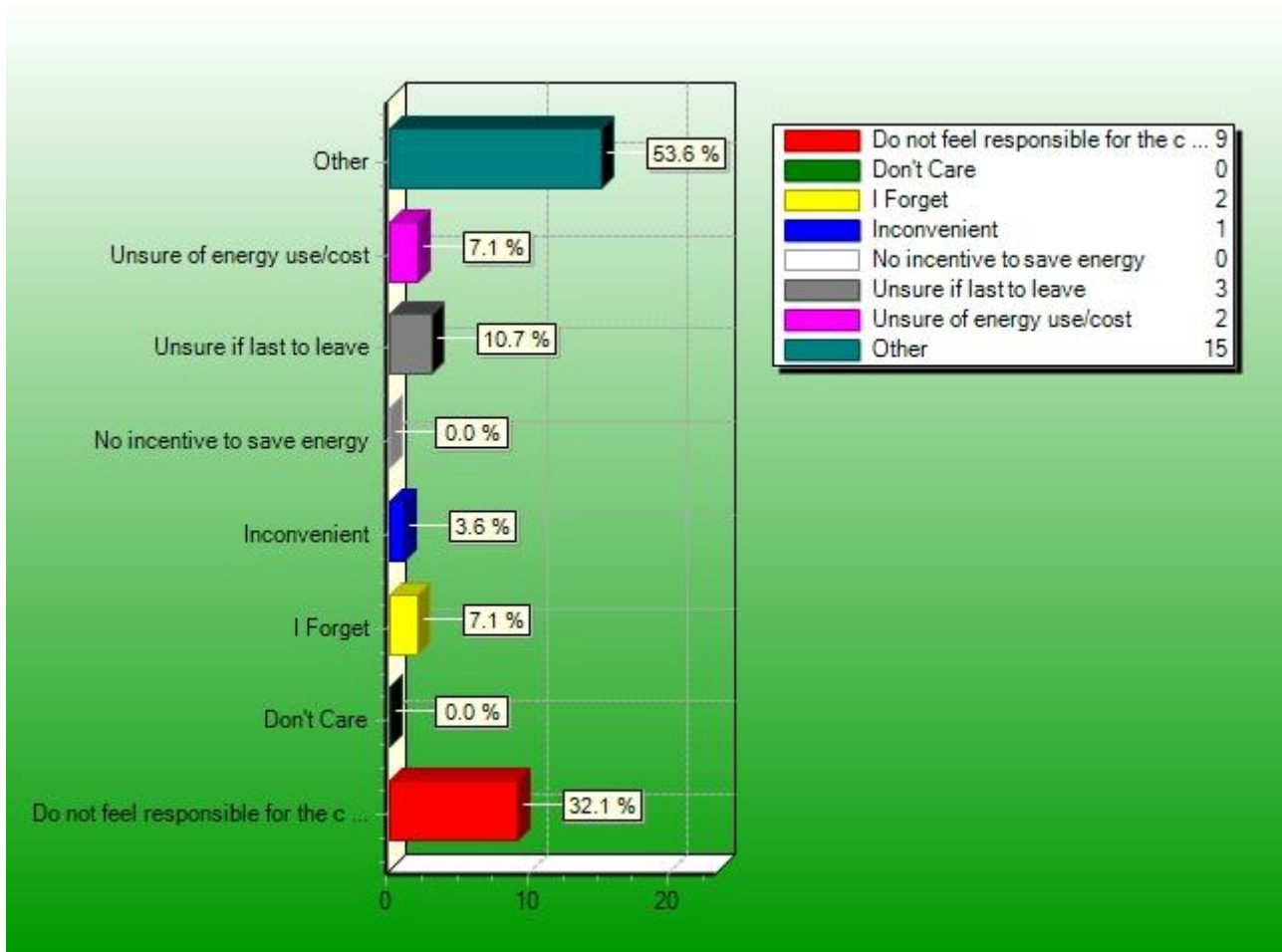
notice posted

n/a
a/a
nothing
NA
n/a
not difficult
n/a
Nothing.
if I had it to turn off
n/a
I do it
AS ABOVE
Think of it as a waste of energy.
EDUCATE US ON THE COST DIFFERENCES.LEARN TO APPLY AT WORK AND HOME.
NA
It all turns off when computer shuts down
I always turn off.
none
for computer speakers - if this is integrated to the main CPU power
NA
NA
Nothing
We should be educated how much energy we are wasting by leaving electronic on overnight and what are the consequences.
set to automatic shut off
don't know

How often do you turn off shared office equipment (copy machines, printers, etc) at the end of the day?



What makes turning off shared office equipment (copy machines, printers, etc) at the end of the day difficult?



What would make turning off shared office equipment (copy machines, printers, etc) at the end of the day easier?

What would make turning off shared office equipment (copy machines, printers, etc) at the end of the day easier?

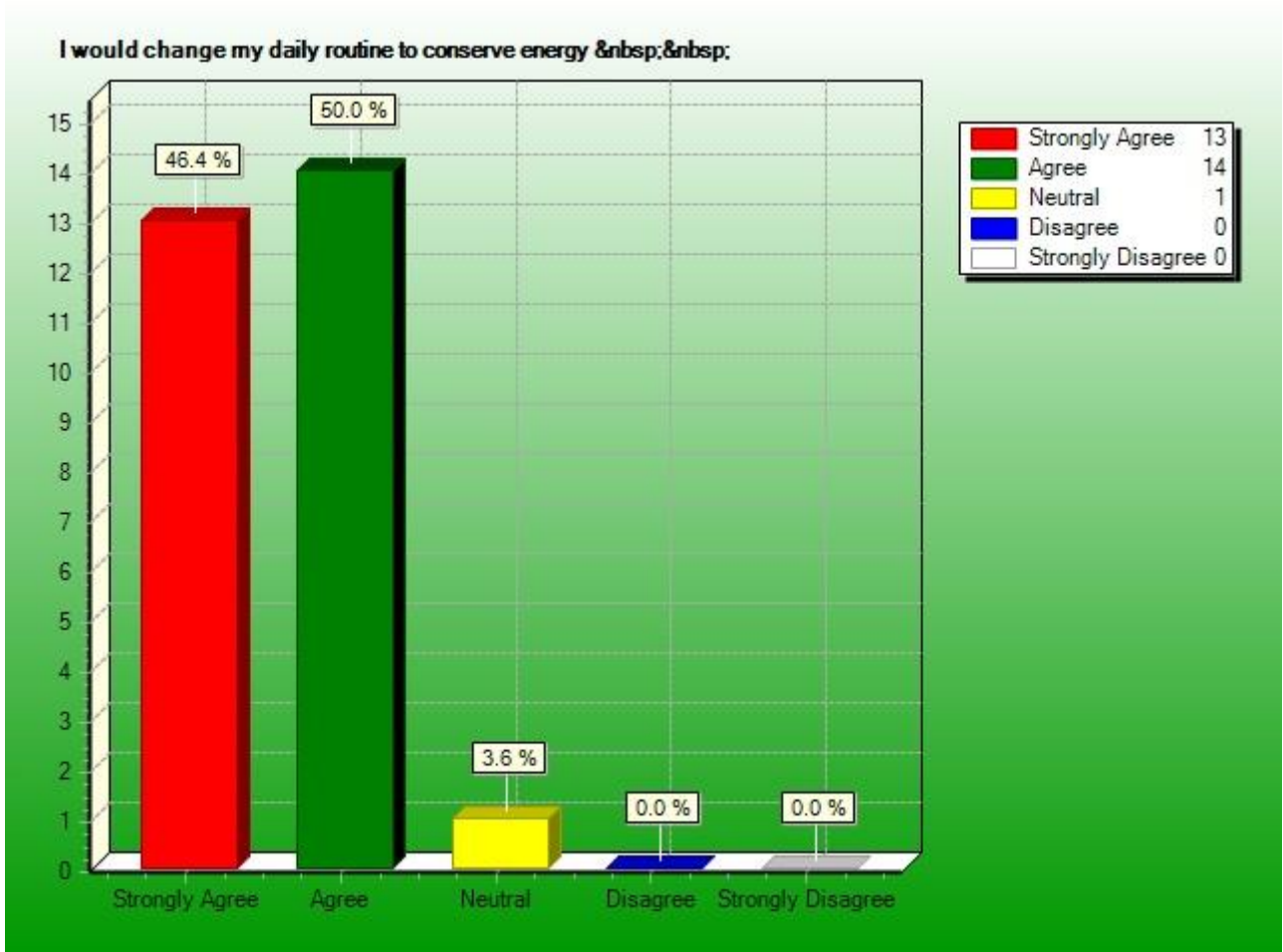
We leave the fax on, but in powersave mode. Just habit. The people I get to do the survey won't know what anthropogenic means. FYI.

It's nothing I would be doing.

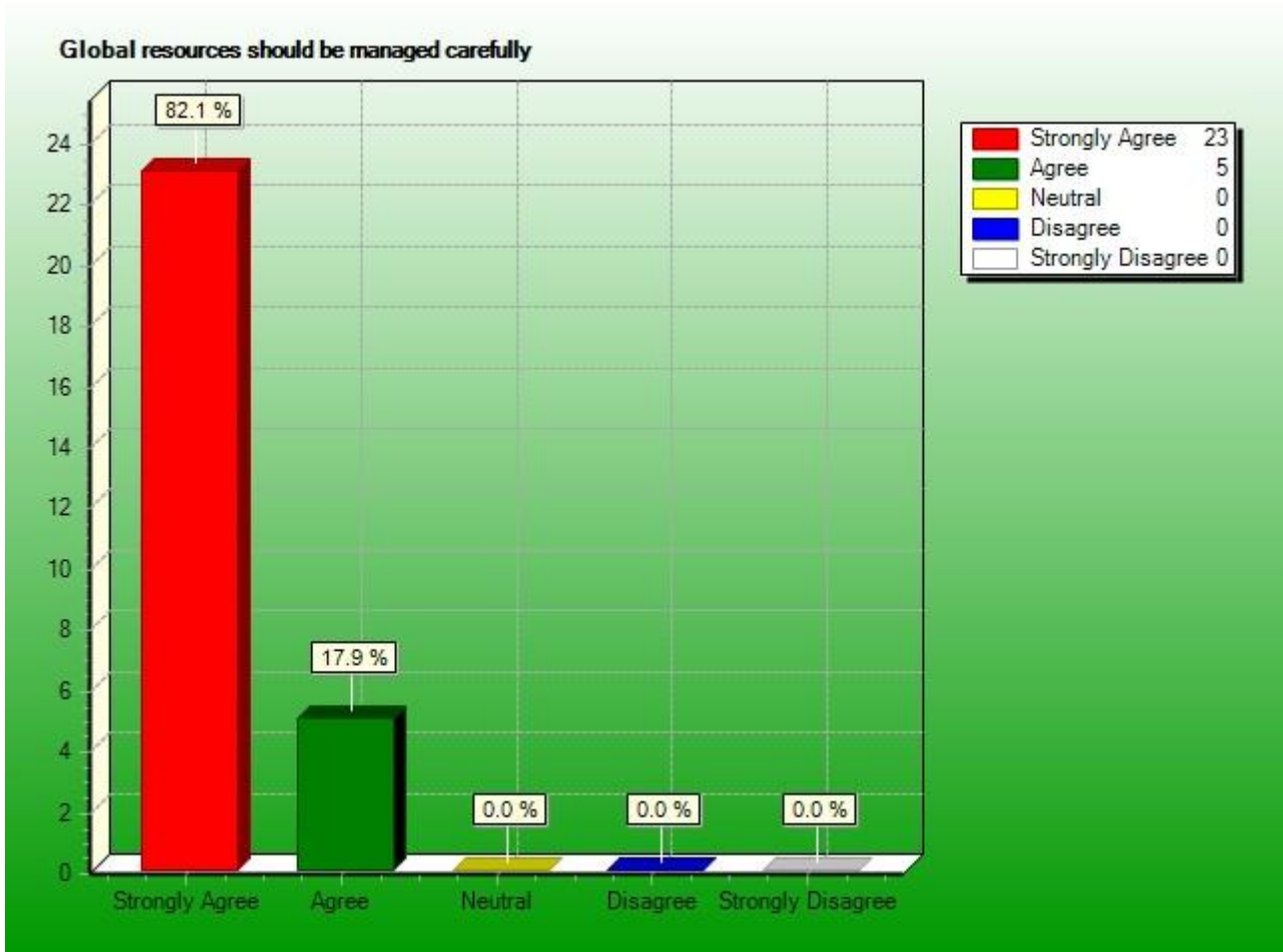
posted notice

n/a
n/a always people using
nothing
Knowing you were the last one there.
n/a
don't know
not sure
Nothing.
could do it if it helped
n/a
put a reminder
AS ABOVE
not applicable. still being used, remotely.
N.A
NA
do it from my pc, or shut down tied to power switch for main lights or security system
nothing
accountability
network printer/copier already goes into energy save mode after a period of inactivity
If I could know whether people were working or not.
It's not my responsibility
Nothing
We should leave it on for getting fax, but it goes save mode.
set to aultomatic shut off
tell me I can; give me instructions

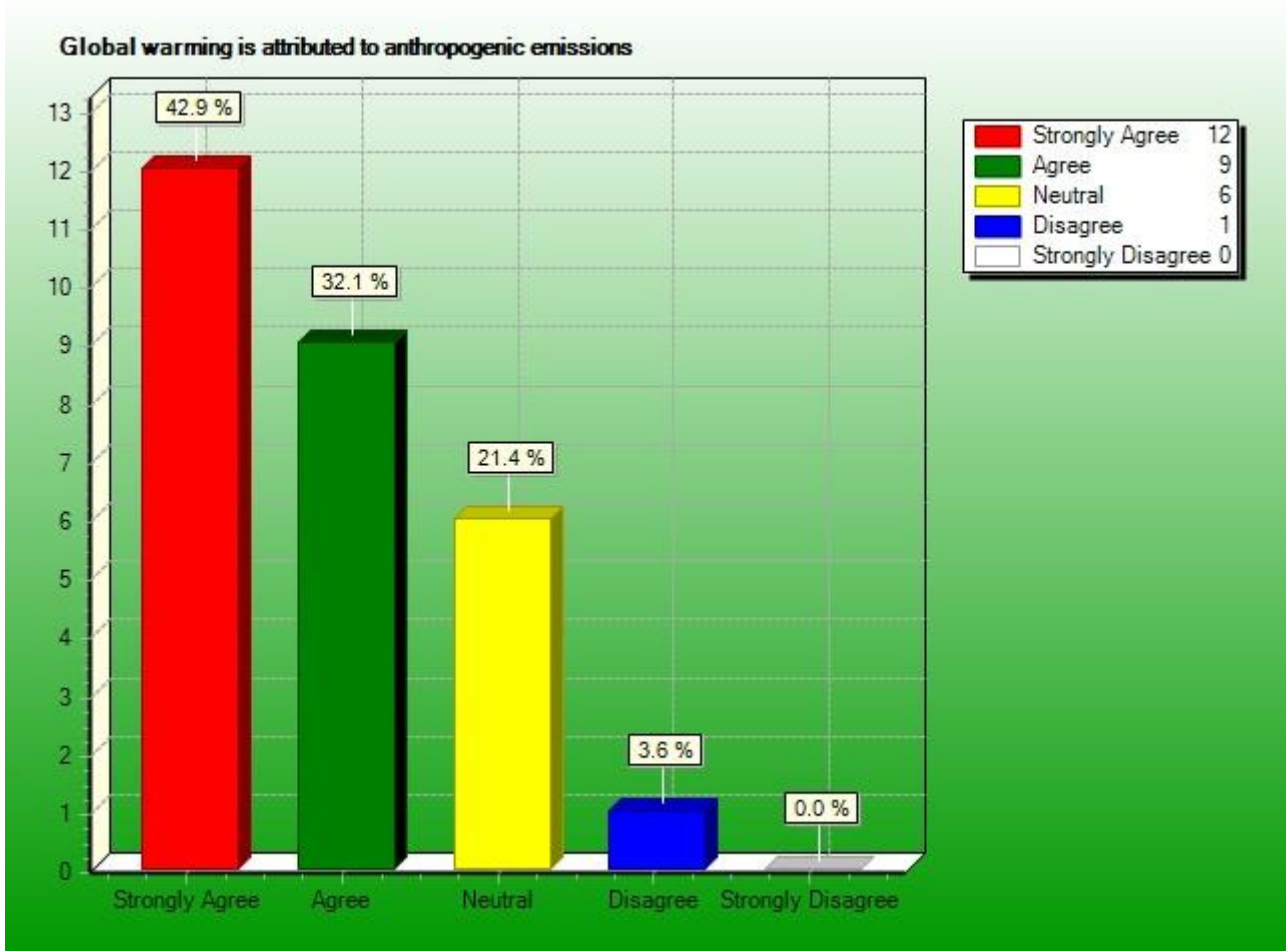
I would change my daily routine to conserve energy



Global resources should be managed carefully

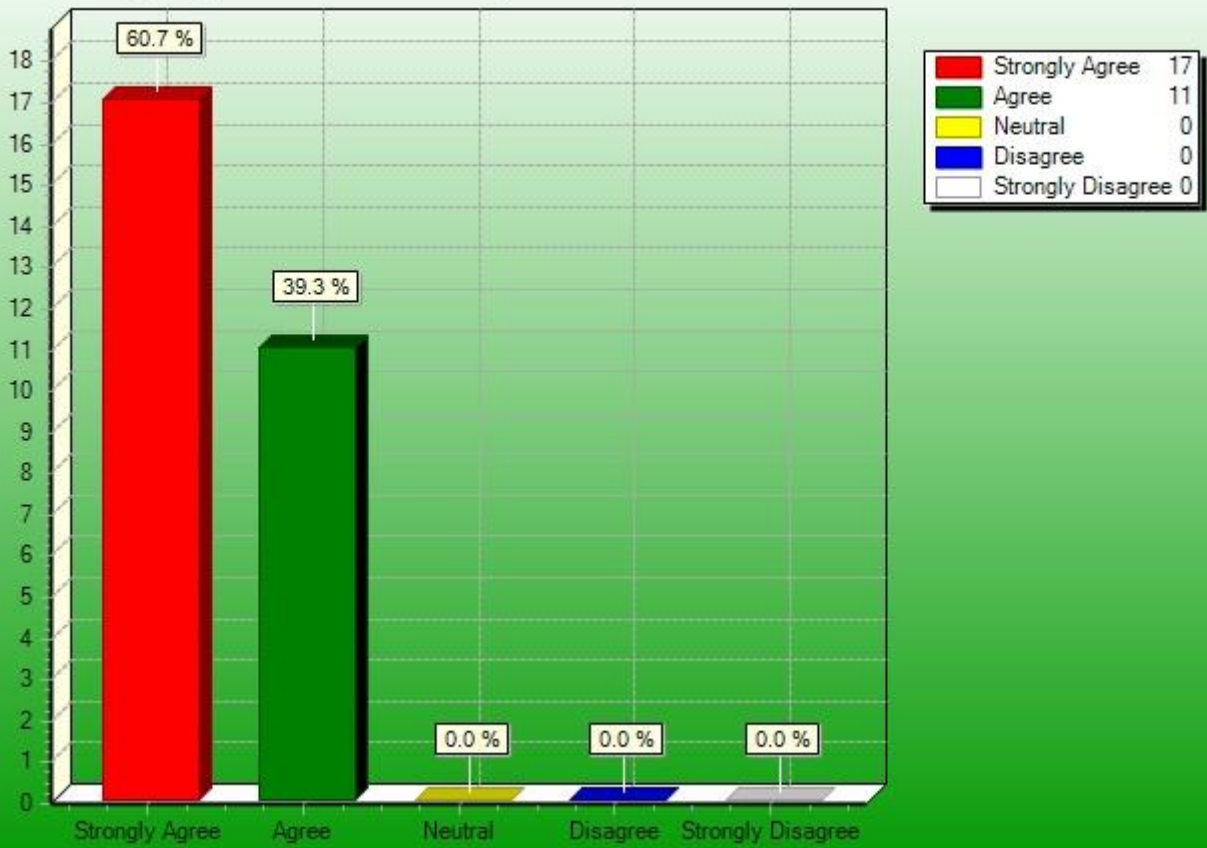


Global warming is attributed to anthropogenic emissions



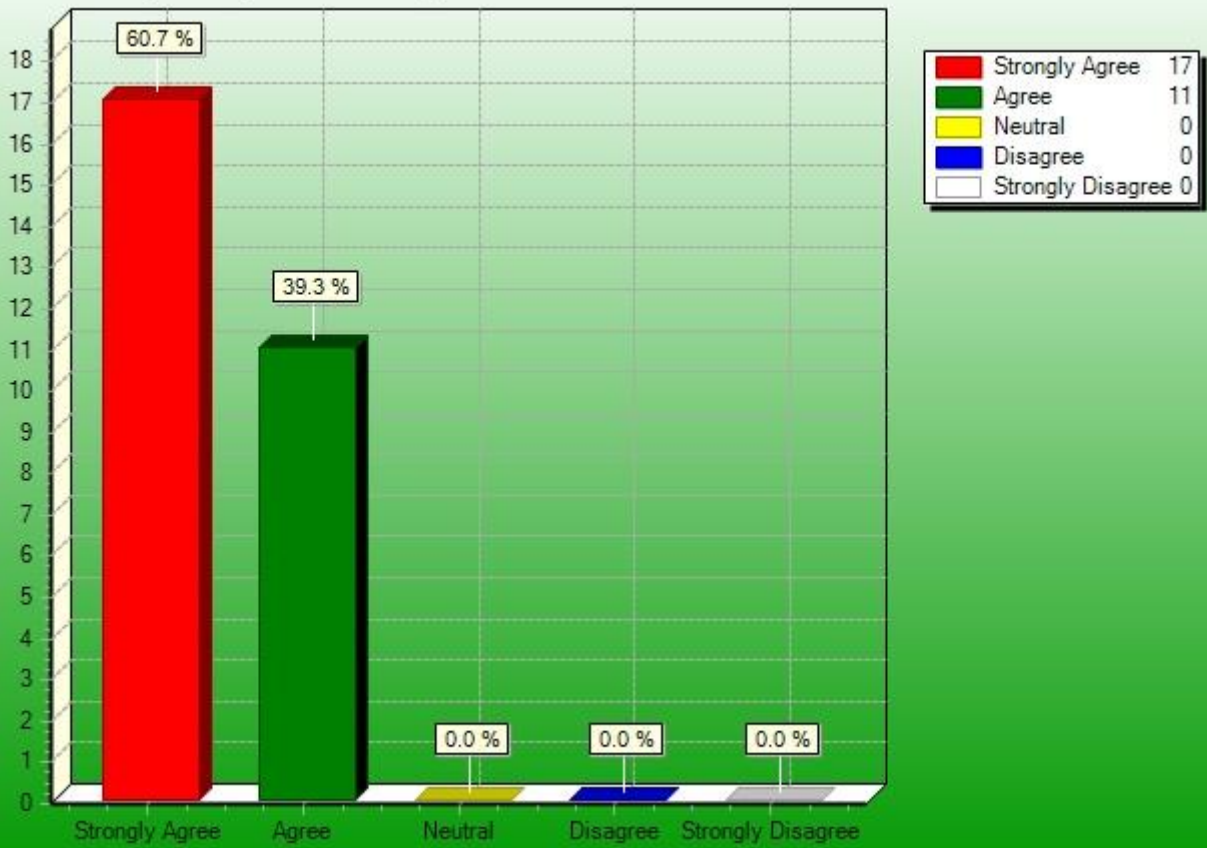
Conserving energy and natural resources is important to me

Conserving energy and natural resources is important to me



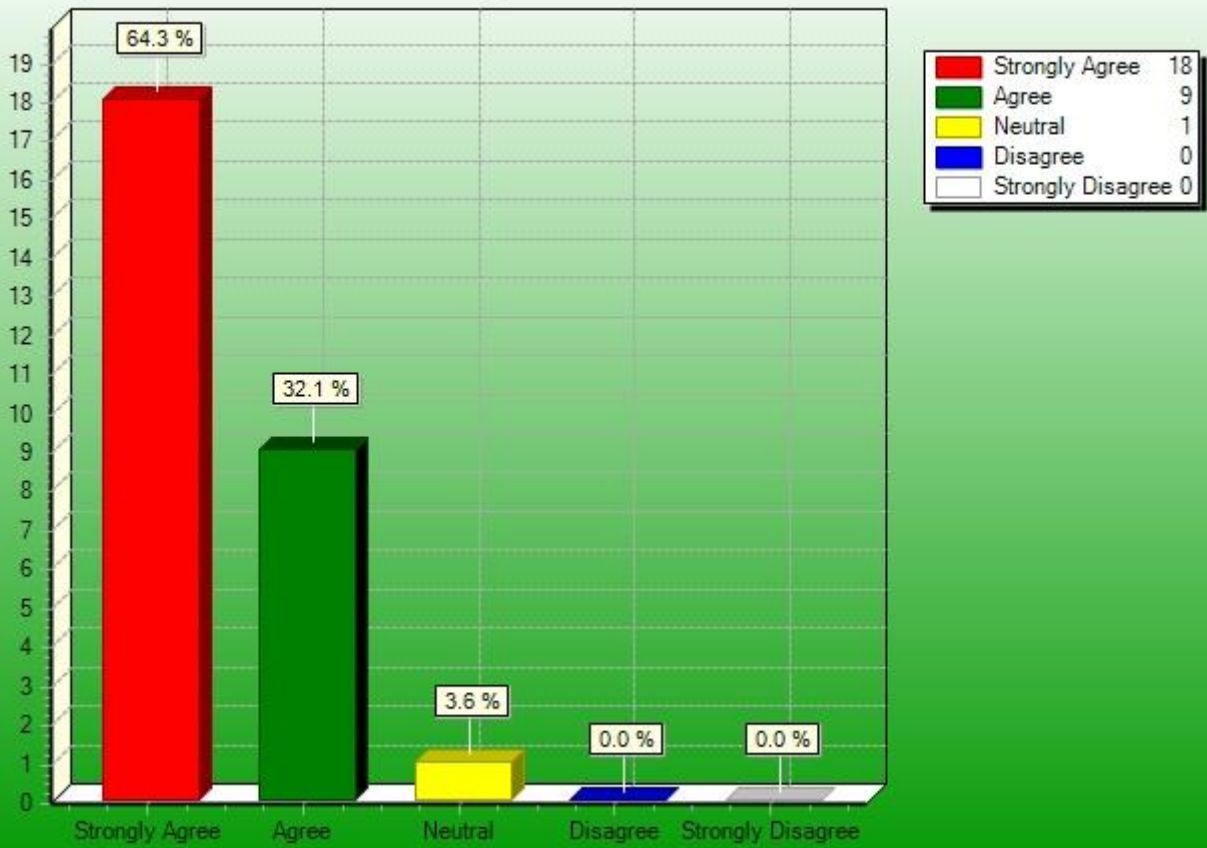
I have a responsibility to conserve energy and resources

I have a responsibility to conserve energy and resources



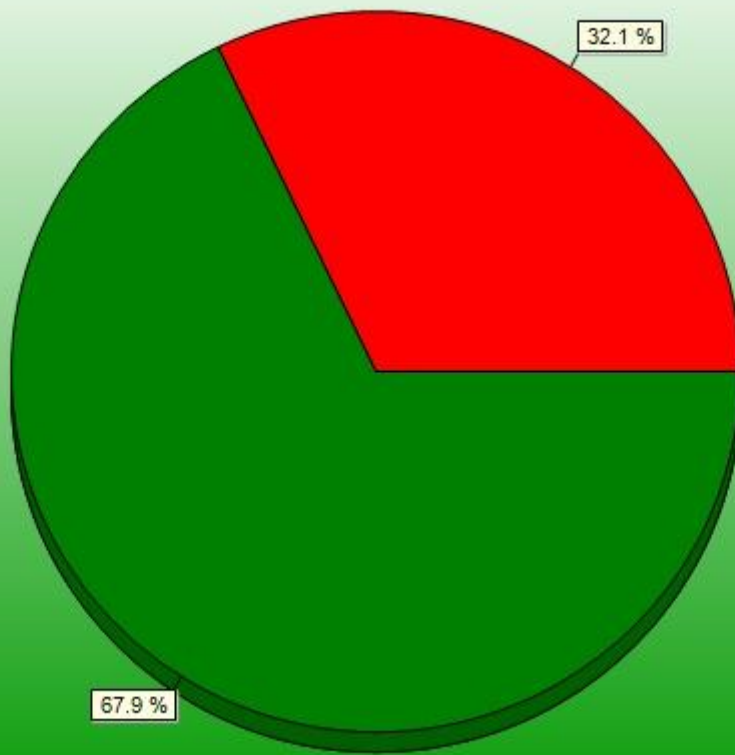
UBC should do more to conserve energy

UBC should do more to conserve energy



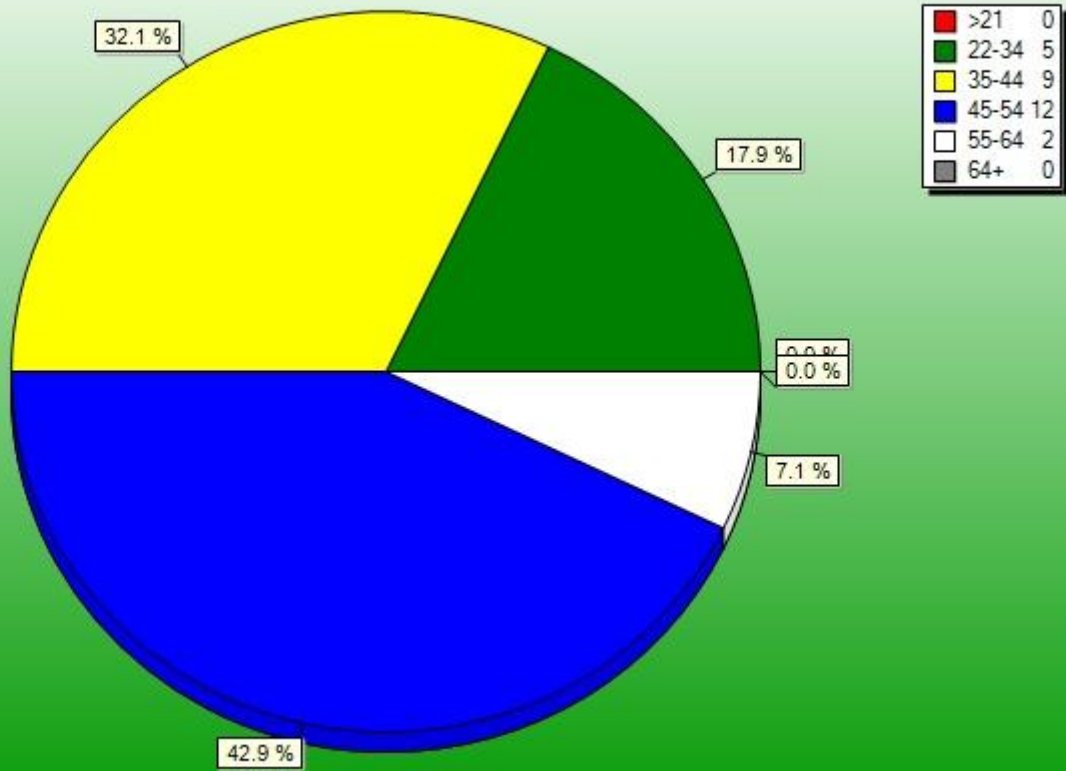
Sex

Sex



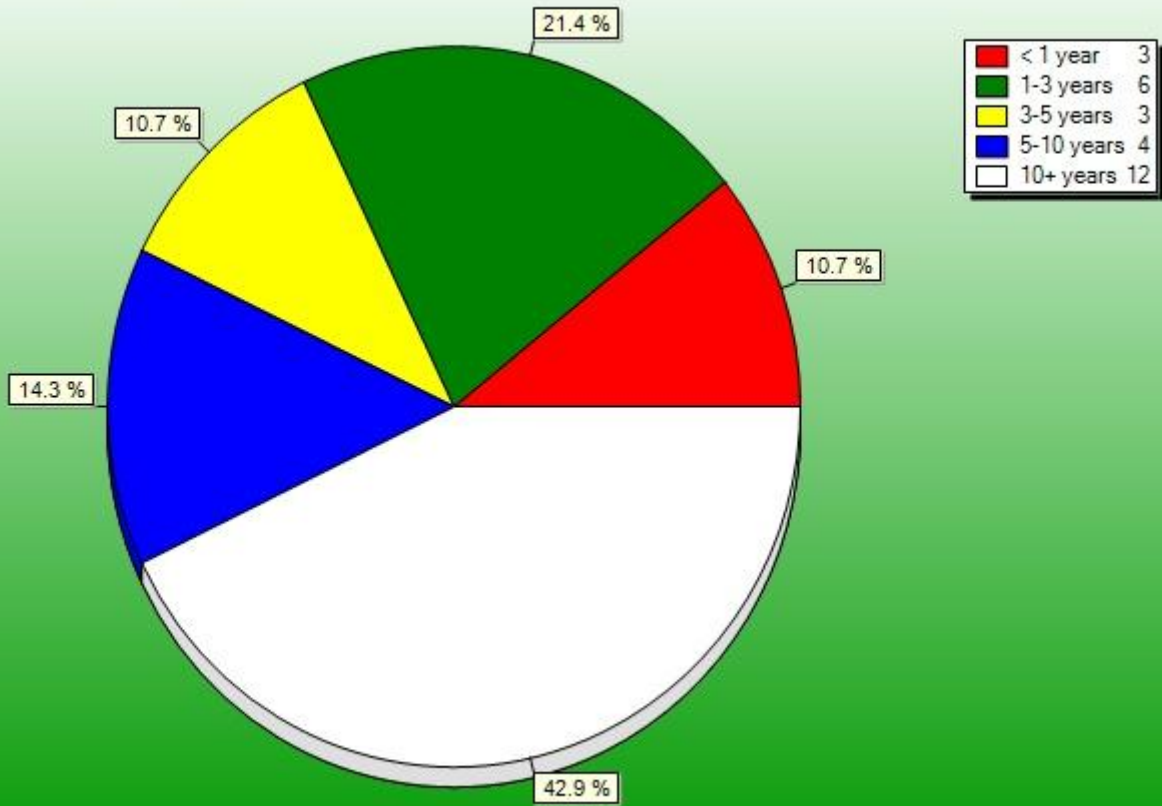
Age range

Age range



Number of years employed at UBC

Number of years employed at UBC



Faculty or Staff

Faculty or Staff



Part-time or Full-time

Part-time or Full-time

