Gender Analysis on Showering Tendencies and Their Effect on Global Warming Through Energy Usage – Independent Lab data

I. ENVIRONMENTAL ISSUE

Global warming and energy usage – what is my contribution?

II. RESEARCH QUESTION

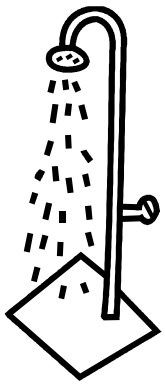
To what extent does gender play a role in energy usage (as measured by showering habits) and thus contribute to global warming?

III. BACKGROUND

My local electric supply is from a coal-fired power station – so my use of electricity contributes to global warming. I am choosing to look at one use of electricity: showers. Why gender? In an article titled "The Naked Truth" (1), a survey compared women's and men's showering tendencies. It claims that women tend to take longer showers because they "*like to take their time in the shower"* and have a number of shower procedures (soaping, shaving, etc). It also analyses the psychological factor, mentioning how *"taking a shower is a legitimate excuse for women to be alone, to check out and not be held accountable"*.

Two main showering factors that affect global warming: the treatment of water to clean, and the energy used to heat that water

In an article published in *Yahoo Voices* (2), it claims "*the average family's hot water can generate about two tons of greenhouse gas and cost up to $400 each year. Forty percent of electric hot water emissions are from bathing, while a further 30 percent are simply to keep the hot water tank hot" (Ridgeway)*. By using more energy we are burning fossil fuels, which releases carbon dioxide and other greenhouse gases into the air. The longer and hotter the showers, the more fossil fuels burned and therefore the larger the emissions of greenhouse gases into the air.



IV. VARIABLES

Experimental Variable	Named Variable	Equipment or Procedure for Measurement/Control
Independent variable	Gender	Tick a box in survey.
Dependant variables	• Shower frequency • Length of shower • Shower efficiency • Bath frequency • Turning off while cleaning • Temperature of water • Link to global warming awareness	An online survey asked questions regarding these factors.
Controlled variables	Number of guys and girls being surveyed (60 total)	The online survey was open to all of the secondary school.
	Social/economic class	Financial status of students vary but all students are economically stable and able to afford showering comfortably.
	Environment and residency	People surveyed come from school X and reside in Y.
	Range of age levels (11–18)	Available to different grade levels.

V. MATERIALS

- Computer/internet connection
- School community
- Online survey: http://www.surveymonkey.com/s/C5J2CS2

VI. METHOD

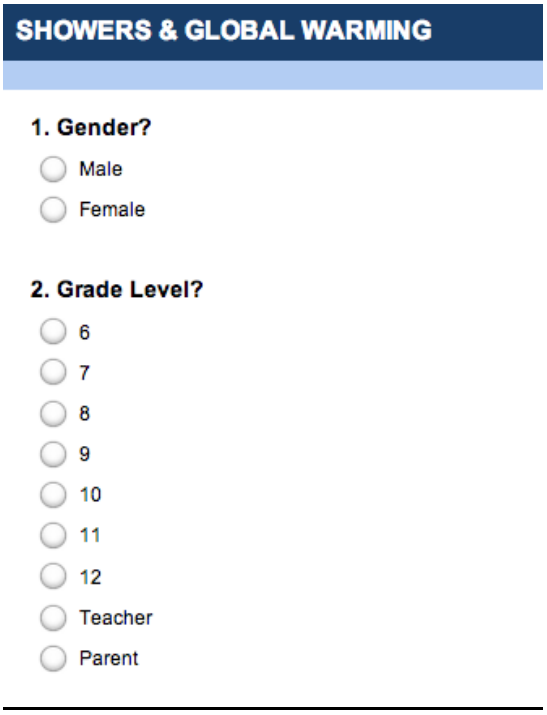
1. Safety/ethical considerations: No safety issues. Bias in who answers? Bias of questions? Level of honesty in the answers? Assume no bias and all were honest.

2. SurveyMonkey was used – quick and easy to set up, distribute and analyse. The survey consisted of the following 10 questions aimed at collecting open (but with categories) and closed answers:
   1) Gender?
   2) Grade Level?
   3) How often do you shower?
   4) How long are your showers?
   5) Do you turn off the water when applying shampoo/conditioner/soap?
   Yes/No/Sometimes
   6) How efficient would you say your shower time is?

7) How often do you bath?
8) How hot is your water? **Assume heat levels are similar for all.**
9) Are you aware of how long showers affect global warming? **Yes/No**
10) If you answered yes in the previous question, how is over-consumption of water linked to global warming? **Completely open – comment section.**

3. The survey was sent out, via school email, with a brief rationale and assurance that all answers would be confidential. Open for two days. Potential 300 answers, expectation was 25% reply.

SURVEY SCREENSHOT:



4. The survey should be repeated at four schools in the area.

VII. DATA COLLECTION AND PROCESSING

Table 1. The table displays the results of the participants' answers to each question. 67 answered the survey. Four were discounted as they were adults, leaving 33 females and 30 males. The first, middle and last female were discounted, so 30 of each gender.

QUESTION		Females: Purple; Males: Green				
How often do you shower?		**More than once a day**	**Once a day**	**Every other day**	**Twice a week**	**Less than twice a week**
	Number of students	5 7	23 21	2 1	0 1	0 0
	% (rounded)	17 23	77 70	7 3	0 3	0 0
How long are your showers?		**Less than 5 minutes**	**Approx 5 minutes**	**Approx 10 minutes**	**Approx 15 minutes**	**More than 15 minutes**
	Number of students	0 2	8 12	11 9	9 4	2 3
	% (rounded)	0 7	27 40	37 30	30 13	7 10
Do you turn off the water when applying shampoo/ conditioner/ soap?		**Yes**	**No**	**Sometimes**		
	Number of students	2 2	27 21	1 7		
	% (rounded)	7 7	90 70	3 23		
How efficient would you say your shower time is?		**Very efficient**	**Somewhat efficient**	**Not efficient**		
	Number of students	6 5	20 17	4 8		
	% (rounded)	20 17	67 57	13 27		
How often do you bath?		**Once or twice a week**	**Once or twice a month**	**Once or twice a year**	**I do not own/use a bathtub**	
	Number of students	1 3	5 2	8 8	16 17	
	% (rounded)	3 10	17 7	27 27	53 57	
How hot is your water?		**Very hot**	**Hot**	**Warm**	**Cold**	**Very cold**
	Number of students	4 12	19 11	7 7	0 0	0 0
	% (rounded)	13 40	63 27	23 23	0 0	0 0
Are you aware of how long showers affect global warming?		**Yes**	**No**			
	Number of students	11 8	19 22			
	% (rounded)	37 27	63 73			

See Appendix for the comments from the survey: Table 9 and Table 17.

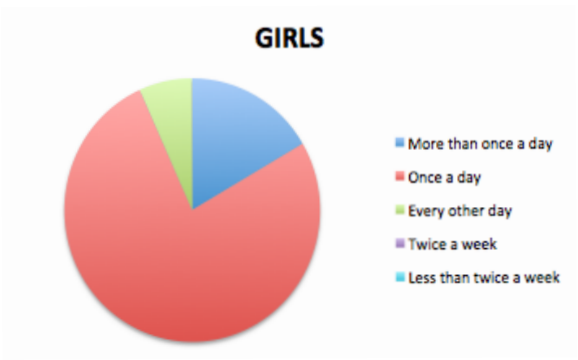
General trends from the table

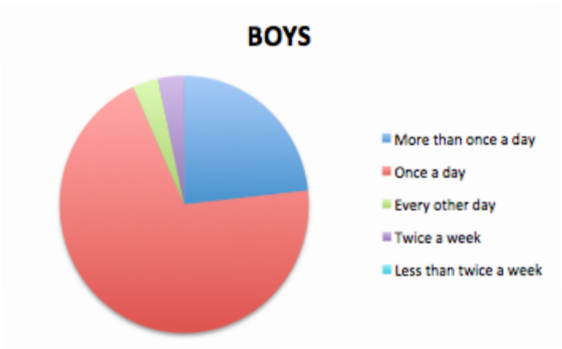
- The majority showers once a day.
- The majority showers for either 5 or 10 minutes.
- The majority does not turn off the water when conditioning/shampooing.
- The majority is somewhat efficient regarding their time in the shower.
- The majority does not bath or does not own a bathtub.
- The majority showers in hot water.
- The majority is not aware of how long showers affect global warming.

Percentages were all calculated by dividing the number of individuals that answered with a certain response by the number of individuals that answered the question and multiplying that answer by 100.
For example:
$7 \div 30$ boys showered more than once a day
$7 \div 30 = 0.23333$
$0.23333 \times 100 = 23.33 = 23\%$.

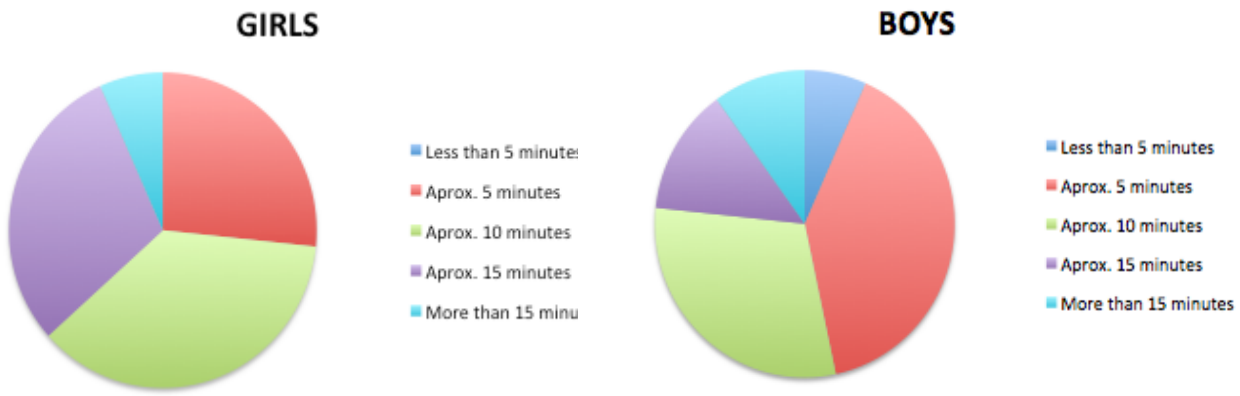
The following pie charts are organized per question of the survey.

Question: How often do you shower?

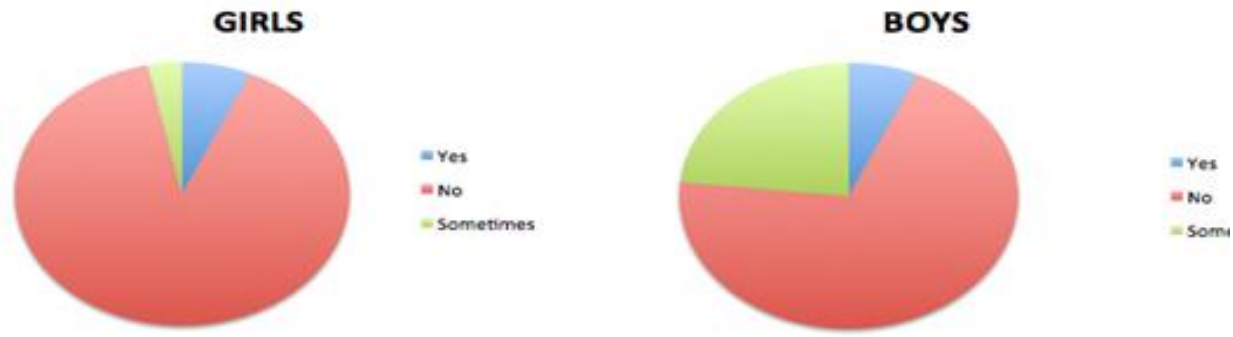




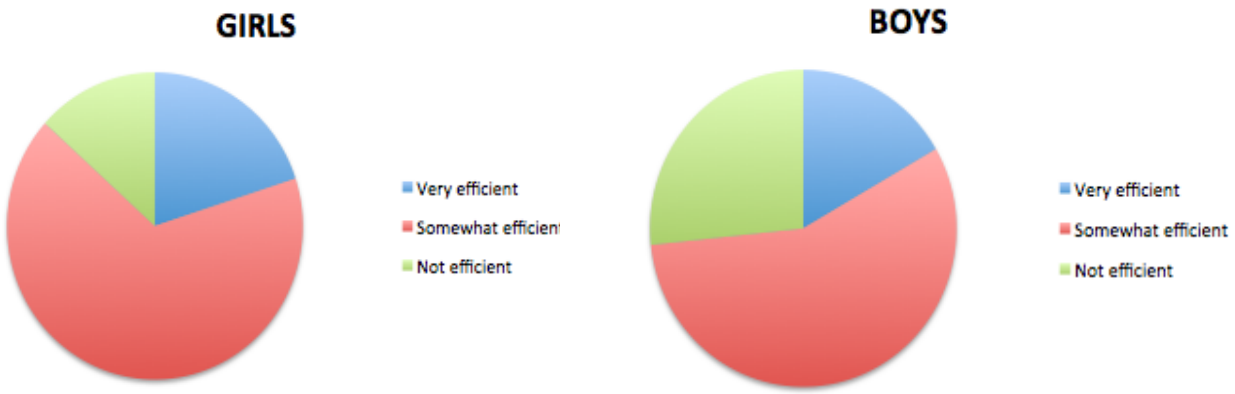
Question: How long are your showers?



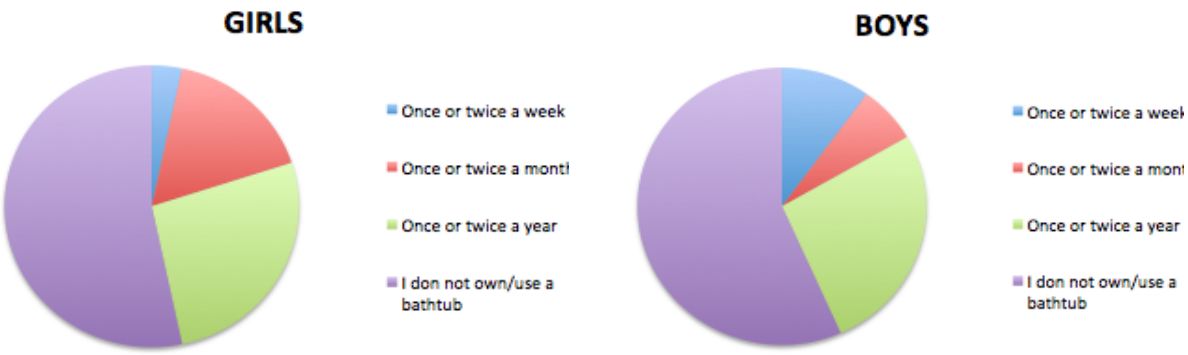
Question: Do you turn off the water when applying shampoo/conditioner/soap?



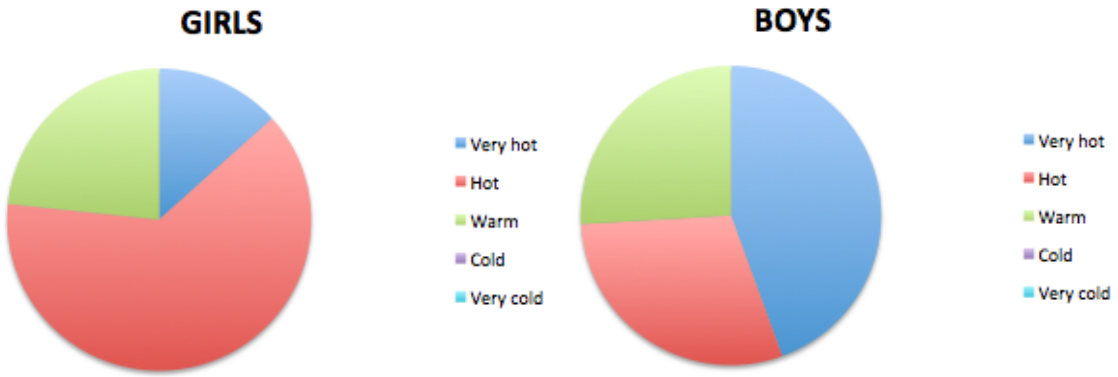
Question: How efficient would you say your shower time is?



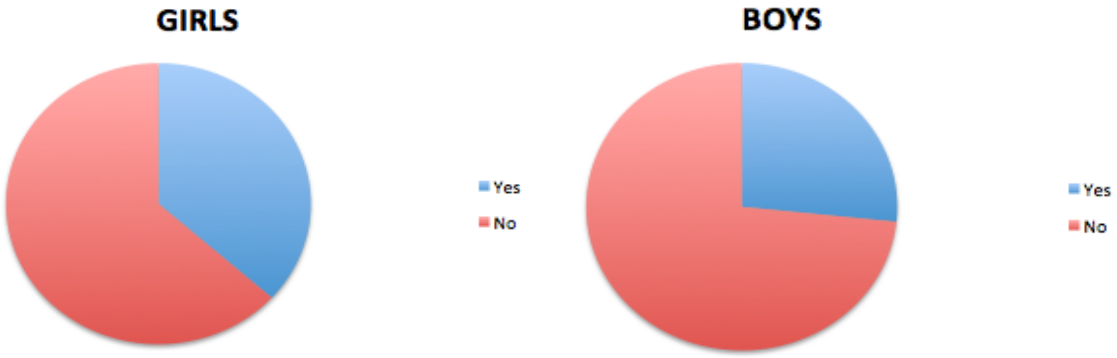
Question: How often do you bath?



Question: How hot is your water?



Question: Are you aware of how long showers affect global warming?



Trends according to gender

- Boys shower more than girls.
- Girls shower longer than boys.
- Boys are more likely to turn off the water while conditioning than girls.
- Girls consider their shower time more efficient.

- Most girls and boys do not own/use a bathtub.
- Boys prefer showering in hotter water than girls.
- Girls are more aware of how showering is related to global warming.

VIII. ANALYSIS AND CONCLUSION

To what extent does gender play a role in energy usage (as measured by showering habits) and thus contribute to global warming?

The girls do shower longer than boys (averaging at about 10–15 minutes) whereas boys shower for approximately 5–10 minutes. However, boys shower more frequently than girls (6% more boys shower more than once a day). So is it more wasteful to take more showers or longer showers? As the timing of the showers does not differ much, the more showers per day will end up using more energy – thus the boys will increase the electricity demand and global warming. This is supported in the efficiency of shower time where girls believe their showers are fast and every minute is efficient whereas boys are less sure (87% of girls saying they are efficient, 74% of boys). However, boys are more likely to turn off the shower when conditioning, so saving a lot of water and energy. So efficiency and turning water off may balance out in terms of energy usage. A bath is unpopular to both sexes however a half-filled bath uses about 75 l of water and a 10-minute shower uses about 110 l ("Shower vs bath usage calculator"(3)).The boys do prefer showering in hotter water than girls, as 40% of them answered very hot whereas only 13% of the girls did. Hotter water requires more energy and therefore more fossil fuels. In comparing the results, boys are considered to use more energy through their showering habits and so contribute more to global warming.

The question about how their showering affects global warming showed the girls are more aware. But the written responses indicate the boys gave more solid facts. The girls had more answers but they were vague, giving answers such as "this will create a water shortage but I don't know if this links to global warming" or "because our water is very important and water is running out". The few boys that did answer said "the real issue should be water treatment plants, and putting less CO_2 in the atmosphere to reduce climate change" or "water for consumption in households is a process that requires lots of energy, therefore, energy usage (exaggerated) is connected to global warming if energy comes from non-alternative sources". It could have been pure chance that the mentioned responses were the ones received in this survey (in other words, there may be more varied responses that weren't necessarily recorded); however, this survey indicates boys are more aware than girls.

Overall, gender does seem to play a role in shower habits, but a clear gender that impacts energy usage – and so global warming – the most is not seen from this data.

The strength of this survey is as an awareness-raising exercise. It is a good starting point for the topic but it does require the need for more research.

IX. EVALUATION

Errors/Limitations	Type of Error	Cause/Source of Error	Improvements
Questions vague or subjective	Random	Due to simplification. For example, although saying water is "very hot" is subjective, it is often easier to understand than saying it is "100 degrees".	Precision – by having examples of hot water to feel.
A larger population for greater accuracy	Systematic	Only 100 allowed on free SurveyMonkey. Keep survey open for longer.	Pay for subscription. Face-to-face survey.
Only school sampled. Not a diverse crowd. Few adult responses	Systematic	Due to a time/social constraint. Easy to send the survey to students. Sending the survey to a larger, more diverse group takes longer and is more complicated.	Select groups to send to. Allow more time. Do face-to-face surveys to ensure diversity.
Bias and honesty in the answers	Random	Perception of what is wanted – the person tries to please. Questions are worded to show expected answer.	Give directions to measure shower habits before answering. Assume they are truthful.

Factors for further analysis

- Should we take fewer showers or shorter showers? A precise experiment would need to be done to answer this, as well as a calculation of the energy used to heat the water.
    - Measure amount of water used per shower – by capturing the water in a measuring container for a period of time.
    - Showers are timed – over at least a week.
    - Measure water temperature. If a thermostat is available on the shower unit this will be easy, otherwise a thermometer will have to be used.
- How much water and energy does turning off the shower while conditioning save?
- Do the results vary when testing an older age group? A family with young children?
- Can a solar water heater produce enough hot water for showers? How much energy would this save? How much global warming would this offset?

With time and a broader testing group most of these questions could have been answered, indicating that there are definitely limitations to my lab. What is certain is that, as a whole, we should be more consciously aware of the impact our showering has on global warming and ways in which we can reduce the impact. Simply making our showers one or two minutes shorter, turning off the water when conditioning or lowering the temperature of our water are small actions that can be taken in order to save both energy and water.

X. DISCUSSION/SOLUTION

Global warming is a problem that the world's population is facing right now. Unless serious measures are taken soon, it may be too late to turn our actions around. Being aware of how showering affects global warming and taking the appropriate measures to regulate the amount of water wasted is crucial. This investigation allows me to determine which gender needs to be made more aware of energy conservation and efficiency via their showering habits. As seen from the conclusion both genders can make changes to their showering habits. Altering one's showering tendencies isn't very difficult; it simply takes a mental switch for one to start forming the right habits.

- A series of posters/cartoons/adverts during teen programmes and on social media could be enough.
- Offering trendy solar shower kits or low flow shower heads could work.
- Emphasizing how all these actions can save individuals money and save the world. Teens are very keen to follow a cause.
- Girls are targeted for shorter showers and to turn off the water while conditioning/shaving.
- Boys are targeted for taking fewer showers and at a cooler temperature.
- Ask teachers to mention the links between water usage and global warming.
- Have local celebrities head up the campaign.

As seen through the survey, regardless of whether people are wasting water, it is clear that many are unaware of how showering is related to global warming. So, emphasizing this in the media blitz would be key. Knowing this connection is the first step in changing one's ways and is important as it allows people to understand the weight of their simple, daily actions. Human nature will mean some will ignore this, but a drip-by-drip approach will change a lot of habits. This kind of campaign has worked before for smoking, littering and turning off lights.

Word count: 2031 (2351 −320 in pie charts and data table)

XI. BIBLIOGRAPHY

(1)"The Naked Truth: What America Does Behind the Shower Curtain." PR Newswire Association, 2005. Web. 21 Mar. 2013 <http://www.prnewswire.com/news-releases/the-naked-truth-what-america-does-behind-the-shower-curtain-55380637.html>.

(2)Ridgeway, Pepita. "Shorten Your Shower to Prevent Global Warming." Yahoo! Contributor Network. N.p. 9 June 2009. Web. 21 Mar. 2013. <http://voices.yahoo.com/shorten-shower-prevent-global-warming-3447072.html>.

(3)"Shower vs Bath Water Usage Calculator." *CalcuNation.* Web. 21 Mar. 2013. <http://www.calcunation.com/calculators/miscellaneous/shower-vs-bath.php>.

"How Many Gallons of Water Per Minute Does the Average Shower Use?" WikiAnswers. Answers. N.d. Web. 21 Mar. 2013. <http://wiki.answers.com/Q/How_many_gallons_of_water_per_minute_does_the_average_shower_use>.

XII. APPENDIX

SurveyMonkey data.

TABLE 1 All students					
QUESTION	**ANSWERS (%)**				
How often do you shower?	**More than once a day**	**Once a day**	**Every other day**	**Twice a week**	**Less than twice a week**
	20%	73.3%	5%	1.67%	0%
How long are your showers?	**Less than 5 minutes**	**Approx. 5 minutes**	**Approx. 10 minutes**	**Approx. 15 minutes**	**More than 15 minutes**
	3.33%	33.33%	33.33%	21.66	8.33%
Do you turn off the water when applying shampoo/ conditioner/soap?	**Yes**	**No**	**Sometimes**		
	6.66%	80%	13.33%		
How efficient would you say your shower time is?	**Very efficient**	**Somewhat efficient**	**Not efficient**		
	18.33%	61.66%	20%		
How often do you bath?	**Once or twice a week**	**Once or twice a month**	**Once or twice a year**	**I do not own/use a bathtub**	
	6.67%	11.67%	26.67%	55%	
How hot is your water?	**Very hot**	**Hot**	**Warm**	**Cold**	**Very cold**
	26.67%	50%	23.33%	0%	0%
Are you aware of how long showers affect global warming?	**Yes**	**No**			
	31.67%	68.33%			

Female responses

TABLE 2					
QUESTION: ***How often do you shower?***	**ANSWERS (measured in individuals)**				
	More than once a day	**Once a day**	**Every other day**	**Twice a week**	**Less than twice a week**
	5	23	2	0	0
PERCENTAGE:	16.67%	76.67%	6.67%	0%	0%

TABLE 3					
QUESTION: ***How long are your showers?***	**ANSWERS (measured in individuals)**				
	Less than 5 minutes	**Approx. 5 minutes**	**Approx. 10 minutes**	**Approx. 15 minutes**	**More than 15 minutes**
	0	8	11	9	2
PERCENTAGE:	0%	26.67%	36.67%	30%	6.67%

TABLE 4			
QUESTION: ***Do you turn off the water when applying shampoo/conditioner/ soap?***	**ANSWERS (measured in individuals)**		
	Yes	**No**	**Sometimes**
	2	27	1
PERCENTAGE:	6.67%	90%	3.33%

TABLE 5			
QUESTION: ***How efficient would you say your shower time is?***	**ANSWERS (measured in individuals)**		
	Very efficient ***(I quickly apply shampoo/conditioner/ soap and I'm done)***	**Somewhat efficient** ***(I take my time to cleanse my body)***	**Not efficient** ***(I waste a lot of time in the shower thinking/playing around/etc)***
	6	20	4
PERCENTAGE:	20%	66.67%	13.33%

TABLE 6				
QUESTION: ***How often do you bath?***	**ANSWERS (measured in individuals)**			
	Once or twice a week	**Once or twice a month**	**Once or twice a year**	**I do not own/use a bathtub**
	1	5	8	16
PERCENTAGE:	3.33%	16.67%	26.66%	53.33%

TABLE 7					
QUESTION: ***How hot is your water?***	**ANSWERS (measured in individuals)**				
	Very hot	**Hot**	**Warm**	**Cold**	**Very cold**
	4	19	7	0	0
PERCENTAGE:	13.33%	63.33%	23.33%	0%	0%

TABLE 8		
QUESTION:	**ANSWERS (measured in individuals)**	
	Yes	**No**
Are you aware of how long showers affect global warming?	11	19
PERCENTAGE:	36.67%	63.33%

TABLE 9	
QUESTION:	**Responses**
If you answered yes to the previous question, how is over-consumption of water linked to global warming?	*"Hotter showers/longer showers = more fossil fuels burning = gases sent into the air = global warming."*
	"I am wasting a lot of water! Every drop counts I know that pero qué puedo hacer, me quiero bañar."
	"We are using all of our fresh water up, we need this for the future. And the more we use the shower, the more energy we are using, and as a result, the more fossil fuels we must burn to attain that energy."
	"This will create a water shortage but I don't know if this links to global warming."
	"The water comes from mountains and before we use it, it is purified with chemicals such as chlorine. Many machines are involved in this process and using electricity contributes to global warming. Also, the water after we shower goes to the ocean and it is contaminated, and then contributes to acid rain which is a type of global warming."
	"Because our water is very important and water is running out."
	"It is linked because if people waste too much water then we are wasting water and in the future we won't have any. That would cause for everyone to die including plants. So we need to take care."
	"Wasting water – not much water in the world left, about 1% of water in the earth is freshwater and most of it is in glaciers."
	"Waste of energy!"
	"The glaciers are melting and there is little freshwater left which we are using up by taking long showers."
	"Showering is a waste of water and this causes global warming."

Male responses

TABLE 10					
QUESTION:	**ANSWERS (measured in individuals)**				
	More than once a day	**Once a day**	**Every other day**	**Twice a week**	**Less than twice a week**
How often do you shower?	7	21	1	1	0
PERCENTAGE:	23.33%	70%	3.33%	3.33%	0%

TABLE 11					
QUESTION:	**ANSWERS (measured in individuals)**				
	Less than 5 minutes	**Approx. 5 minutes**	**Approx. 10 minutes**	**Approx. 15 minutes**	**More than 15 minutes**
How long are your showers?	2	12	9	4	3
PERCENTAGE:	6.67%	40%	30%	13.33%	10%

TABLE 12			
QUESTION:	**ANSWERS (measured in individuals)**		
	Yes	**No**	**Sometimes**
Do you turn off the water when applying shampoo/conditioner/ soap?	2	21	7
PERCENTAGE:	6.67%	70%	23.33%

TABLE 13			
QUESTION:	**ANSWERS (measured in individuals)**		
	Very efficient ***(I quickly apply shampoo/conditioner/ soap and I'm done)***	**Somewhat efficient** ***(I take my time to cleanse my body)***	**Not efficient** ***(I waste a lot of time in the shower thinking/playing around/etc)***
How efficient would you say your shower time is?	5	17	8
PERCENTAGE:	16.67%	56.67%	26.67%

TABLE 14				
QUESTION:	**ANSWERS (measured in individuals)**			
	Once or twice a week	**Once or twice a month**	**Once or twice a year**	**I do not own/use a bathtub**
How often do you bath?	3	2	8	17
PERCENTAGE:	10%	6.67%	26.67%	56.67%

TABLE 15					
QUESTION:	**ANSWERS (measured in individuals)**				
	Very hot	**Hot**	**Warm**	**Cold**	**Very cold**
How hot is your water?	12	11	7	0	0
PERCENTAGE:	40%	26.66%	23.33%	0%	0%

TABLE 16		
QUESTION:	**ANSWERS (measured in individuals)**	
	Yes	**No**
Are you aware of how long showers affect global warming?	8	22
PERCENTAGE:	26.67%	73.33%

TABLE 17	
QUESTION: ***If you answered yes to the previous question, how is over-consumption of water linked to global warming?***	**Responses**
	"If the glaciers are melting then we do not have enough water, and if we waste the small amount of water that is left then we have no water left ... However, the real issue should be water treatment plants, and putting less CO_2 in the atmosphere to reduce climate change."
	"Depletion of natural resources."
	"Water for consumption in households is a process that requires lots of energy, therefore, energy usage (exaggerated) is connected to global warming if energy comes from non-alternative sources. Reducing water consumption will reduce effects on global warming."
	"It uses a lot of energy to heat up the water and also it wastes more litres of water."
	"Over-consumption of water, especially hot water can generate more carbon dioxide, and water is also simply wasted. The carbon dioxide is the primary cause for global warming, hence over-consumption of water does contribute to global warming."
	"The water from a shower is recycled into larger water supplies, now with added chemicals from soaps."
	"We are using up the fresh water we have (which is very little)."
	"Burning of fossil fuels wastes energy, which causes global warming."