

## **Measuring Awareness of Electrical Usage and Sources**

### **Introduction**

This project brought forth a complex paradox in regards to energy usage and public awareness of power sources. Chris Clark, a local of Cleveland, Ohio created a self made design of a portable, multi-position solar panel and started a company called Sunflower Solutions. He provides poorer communities, namely in Africa, with power which then empowers them and gives them a resource to share with other communities that might need their services. This creates jobs, opportunities for education and a responsibility for their resources (Clark 2011).

Anyone in the conservation field would argue for the many benefits of sustainable solar energy. Here is the paradox, while we here in the U.S. are using electricity for everything and conservationists are striving to not only find sustainable sources of this energy but to curb usage, at the same time we are creating another need for energy somewhere else. It seems we are creating dependency, granted it is sustainable and limited over in Africa, but eventually they will outgrow their usage and based on the law of supply and demand they would have to find other ways of creating that energy.

To aid in the curbing of energy usage here in the U.S., this project idea came from an event known as Earth Hour. This event happens every year in March where people are asked to shut off their lights for one hour (WWF, 2011). Contributing positively to the planet should be a daily occurrence and awareness and not a once a year occasion, that compared to the local communities in Africa with these solar panels, people here do not know how they get their energy. The goal of this study was to measure individuals' awareness of daily power usage and their knowledge of how their power companies produced that power. Another goal was to

ascertain what activities individuals did during that one hour and to measure ideas why it is important to conserve energy.

Several predictions were made about the outcome of the survey. First, the majority of individuals will find it easy to go without electricity for one hour based on the fact that as humans we have lived without electricity, as we know it now, for thousands of years before Thomas Alva Edison even invented the light bulb (The Franklin Institute 2011). Second, the majority of individuals do not know how their power company generates their power. Third, the majority of individuals will think conserving power is important. And lastly, reading is the main activity they did while not utilizing power. This last prediction is a personal opinion of what activity people would do the most.

## **Methods**

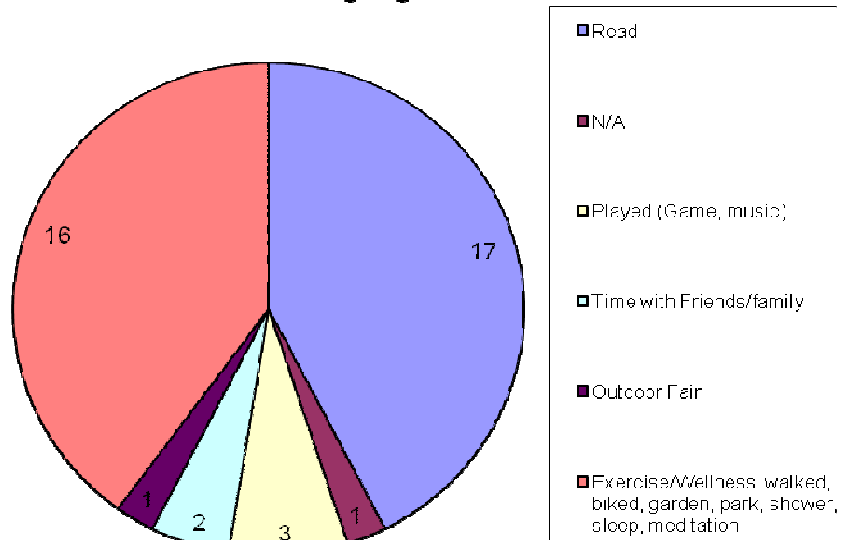
Two events were held on Sundays October 2<sup>nd</sup> and October 9<sup>th</sup>, 2011. Individuals were asked to go one hour without using electricity on either of these days and afterwards asked to take a survey about their experience. Rules of the event were 60 minutes without electricity, no computers, TVs or lights with the thermostat set at 68°F for continuity. The event was advertised solely by this researcher through social media sites such as Facebook, AIP Dragonfly Workshop students and a personal blog (Goinggoinggoinggreen, 2011). After individuals completed the one hour they were asked to voluntarily participate in a survey. The survey was created and distributed on Survey Monkey (Survey, 2011). Questions included demographic information as well as essay questions about conservation of energy resources. All questions required an answer and all participants completed each survey (See Appendix 1).

## Results

Of the 31 responses to this survey, there was a wide range of demographics such as age and geographical location. Ranges included Western United States including Texas and Arizona, Midwest United states in Ohio and Virginia and internationally in Mildenhall and Swindon, United Kingdom. Ages ranged from 15-58 and of the 31 responses, 6 identified as Male and 25 Female.

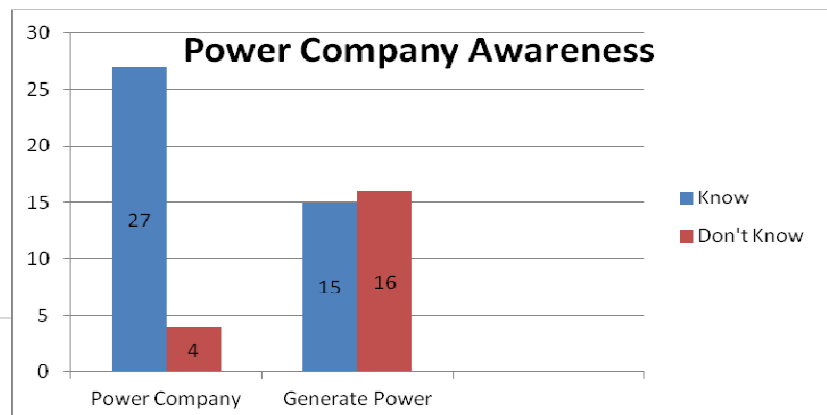
**Activities Performed During Lights Out**

Figure 1. Numbers were calculated using answers given to survey question number 3 (See Appendix B). Totals do not add up to 31 participants due to several individuals completing multiple activities.



Based on the predictions previously made several percentages were calculated on the results. 74% of individuals answered “Not at All” when asked if it was difficult to go without power for one hour. 52% of individuals answered “Don’t Know” when asked if they knew how their power company generated power. 87% of individuals answered “Yes or Sure” when asked if people should start restricting their use of electricity, thereby conserving natural resources. Finally, 52% of individuals read for their activity.

Figure 2. Totals were generated from Answers to survey questions 2 and 7 (See Appendix B).



## Reflections

All predictions were upheld with majority percentages. One interesting finding that was not a predicted outcome was that a higher percentage of individuals, 45%, did an activity outside and/or exercised. One participant went the one hour and then decided with their family to make it a weekly activity. This unexpected result showed that awareness of electrical usage through the survey was perceived and that conserving energy is important. Another aspect derived from Figure 2 was that many people knew who their power company was, probably because they pay a bill, but over half did not know how they generated their power. This shows that there is a clear disconnect between paying for a service and where the service comes from.

This is reminiscent of individuals trying to follow where their beef comes from. In one article chefs who are professionals who work with beef products did not know the process of turning a cow into a steak. This experience might not make them vegetarians but the education of the process can help them inform others (Latzke, 2005). The same can be said for electrical awareness. As long as this project brought a consciousness of electrical usage to people who might not have thought about it, stewardship is a secondary unconscious decision resulting from that awareness.

Most people who participated in this survey were already inclined to conserving natural resources either being an AIP Master's Student or environmental professional. One way to diversify results would be to get a broader view of the general public and their views on conserving energy instead of those already inclined to do so.

One step that is currently being studied is a business standpoint on conserving energy while business is closed. That study will look at the economic incentives a business would have

by saving energy costs and if that is enough to become more environmentally friendly by conserving energy. It will also measure a business's general perception of conserving energy and resources and their willingness to change.

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## Appendices

### Appendix A

1. Age? Gender? Location (City, State)?
2. Who is your energy company?
3. What did you do for the one (1) hour without using electricity?
4. How many people in your household participated with you in not using the electricity for one hour? (Include yourself as 1)
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6+
5. Did you find it hard to not use electricity for one hour?
  - Very
  - Somewhat
  - Not at All
6. Why do you think it is important for us to start restricting our use of electricity?
7. Do you know how your power plant creates the energy you use in your household?
  - Natural Gas
  - Coal
  - Solar
  - Wind
  - Water
  - Don't Know
  - Other (please specify)
8. Do you think about the environment on a daily basis?
9. Are you concerned for the future of our habitats and wildlife?
  - Very
  - Somewhat
  - Not at All
10. Do you think people should do things like this (not using electricity for an hour) more? Perhaps weekly or monthly? Do you think you would see a change in your electric bill if you did?

**Appendix B**  
**All 31 participant answers from Questions 1-5, 7 and 9.**

Age	M/F	Location	Energy Company	Activity	# People	Was it difficult?	Know how power is generated?	Are you concerned for the future?
23	F	UK	BT	Read/Walk	2	Not at All	Don't Know	Very
16	F	OH	Cleveland Electric, Illuminating Co.	Read /Studied	1	Somewhat	Don't know	Very
52	F	AZ	SRP	Read/ Napped	2	Not at All	Water	Somewhat
23	F	OH	Duke Energy	Read	1	Not at All	Natural Gas	Very
49	F	OH	Cleveland Electric, Illuminating Co.	Lay in bed, Shower	2	Not at All	Natural Gas	Very
22	F	OH	Don't know	Read by Candle	1	Somewhat	Don't Know	Somewhat
24	F		Illuminating Co.	Deep Breathing meditation, Nap	1	Not at All	Don't Know	Somewhat
41	M	OH	First Energy	NA	1	Somewhat	Don't Know	Very
42	F	OH	Illuminating Co.	Read outside, Walked Dog	2	Somewhat	Don't Know	Very
45	M	VA	Dominion Power	Read	2	Not at All	Nuclear	Not at All
25	F	OH	Ohio Edison/First Energy	Read to Daughter, Played, Napped	2	Somewhat	Coal	Very
28	F	OH	CPP	Read	3	Not at All	Don't Know	Very
58	M	OH	Illuminating Co.	Time with friends	1	Not at All	Coal	Very
20	F	OH	Unsure, Campus Housing	Outside to Read	6+	Not at All	Don't Know	Very
NA	F	OH	Illuminating Co.	Read outside	1	Somewhat	Don't Know	Somewhat
28	F	OH	AEP	Read	1	Not at All	Don't Know	Somewhat
20	M	OH	Don't know	Read	3	Not at All	Don't Know	Very
15	F	OH	Illuminating Co.	Biked, Read	2	Somewhat	Natural Gas	Somewhat
25	F	OH	First Energy	Read	2	Not at All	Natural Gas	Somewhat
26	F	OH	AEP	Weeded Flower Bed	1	Not at All	Coal	Very
36	F	OH	Illuminating Co.	Played Game	4	Not at All	Natural Gas	Somewhat
23	F	OH	AmeriGas	Renaissance Fair	1	Not at All	Don't Know	Somewhat
55	F	TX	TXU	Garden	2	Not at All	Natural Gas	Very
50	F	OH	CPP	Guitar	2	Not at All	Coal	Very
20	F	OH	Not Sure	Park	1	Not at All	Don't Know	Somewhat
25	F	OH	Illuminating Co./ First Energy	Walk	3	Very	Don't Know	Somewhat
19	F	OH	Illuminating Co.	Park	2	Not at All	Don't Know	Somewhat
23	F	OH	First Energy	Read, Run	2	Not at All	Natural Gas	Very
58	M	OH	Illuminating Co.	Read	1	Not at All	Coal	Very
23	F	OH	Illuminating Co.	Biked	2	Not at All	Don't Know	Very
31	M	UK	EDF	Talked	2	Not at All	Wind	Very



**Appendix C**

**All 31 participant answers from questions 6, 8 and 10.**

Age	Why is it important to conserve energy?	Do you think about the environment on a daily basis	Do you think people should do things like this (not using electricity for an hour) more? Perhaps weekly or monthly?
23	Using up Natural resources	Yes	I think it is highly important for people to limit their use of electricity. People in our society do not realize all the fun things to do without it, especially kids. We are very reliant on electricity and technology and if we do not watch our consumption it will be gone one day and no one will know what to do. We would see a major change in our electric bill just by doing small things like turning off lights when we leave rooms or not leaving things, such as out cell phone charger, plugged in when we are not using them.
16	It has become some thing that we take for granted but we need to realize that it is something we can use much less in everyday life	Yes	I think that having weekly or monthly times to set aside for no use of electricity could help people think about when they really need electricity and how they can reduce it in their everyday routine. This would be a starting point to the reduction of energy use. People should also be encouraged to use electricity only when or where it is needed For example, you should be sure to turn off lights when you leave a room and try to use natural light as much as Possible. This idea could also be used in schools because many smart boards and lights are left on all day even if They're not being used. If the reduction of electricity use became a steady habit, then there would probably be a Change in the overall cost of your electric bill.
52	We take too many things for granted and should get back to basics.	Yes	Yes, people should do this more. I do think there would be a change in the electric bill. It also brings people closer together! Great idea!
23	until we come up with better clean, and renewable energy sources, we are just polluting our air, and using up all of our coal, oil and natural gas.	Yes	Yes, and of course! Less energy equals a smaller bill.
49	I just think we should depend more on alternative energy sources. We should conserve when we can.	Yes	I would see a change in my electric bill, but I don't think I can go without electricity for an hour of my waking time regularly.
22	because it saps our planet of energy and is an energy source being used as a luxury and not a necessity, so we will use up the energy faster and eventually harm our planet.	Unfortunately, No	i think people should do things like this more often, maybe make an effort to do something small once a week, and I believe they would be rewarded with lower bills as well as the satisfaction that comes with doing a good deed.
24	Go green	No	Sure
41	Aside from the obvious answer of preserving our natural resources we can actually use the time without electricity to spend time with family, friends, take care of ourselves (ie...taking a nap)	Yes	unsure, but if everyone did, it might force the companies to lower rates
42	Reduce our carbon emissions. Also to be conscious of everything we have practically uses energy.	Yes	Yes, I'd hope to see a reduction in the electric bill, especially how expensive it is.
45	I do not think it is important to restrict use of electricity. This is a false form of environmentalism	No	This is a personal choice, not an issue that should be forced on people. This survey points to justification for taxing energy companies for use of "unpopular" energy sources, points to forced rolling brownouts, and threatens to punish those who do not agree with this philosophy.

	driven by a political agenda.		
25	It, unfortunately, goes back to the use of fossil fuels. Where I am, we do not use alternative energy resources for our electricity. Oil and coal are used instead.	I do. I love the environment. I consider my Footprint and that of my family (though I don't always put the Environment first).	Sure! I think if my family made a "lights out" pledge at least once every other week, we would be putting the environment first and would see some change in our electric bill (maybe not with that hour, but the ripple effect I put my lights out and was more aware of turning lights off when left a room). The reason I found it difficult to not use electricity for an hour is because my house was 60 degrees and I had a cold. I desperately wanted to put the heat on.
28	we consume too much and forget how easy it is to go without	Yes	Yes, I think I'd see a change in my electric bill. I also think we should think of alternatives to conventional electricity.
58	Coal-fired electric power plants are a prime contributor to climate change. Using less electricity and using it more efficiently results in less fossil fuel pollution.	Yes	I think they should and of course it would result in smaller electric bills.
20	A few reasons- 1. We're becoming too dependent on technology for interpersonal communication 2. Conservation of energy--until a better source of electricity is widespread, conservation will be our best bet to keep our environment safe and our resources plentiful.	No, perhaps Weekly.	yes, yes and yes
NA	So we can stop global warming and save the Earth!	Not Usually	yes, this should be done on a more common basis; and that it would definitely impact my electric bill
28	Restricting use of energy? I ... That just sounds negative. I'd rather it be couched in words like, "find alternative activities to unthinking energy consumption" or something. Because then I could answer that there are many activities out there (like going for a walk, reading a book, talking with friends over a hot beverage, etc) that use minimal or no energy, and are becoming lost activities. And that's really sad.	It's my job Literally	I would not see a change in my electrical bill because I already work to limit needless electrical consumption. I keep lights off unless I need them, only use heat/air conditioning when I find life oppressive otherwise, don't let my TV or computer run when I'm not using them, etc. And, no, I don't think that denying oneself of the ability to use electricity will help win people to a cause. I think challenging people to be creative in finding alternatives to sitting and staring at a television or other electricity consumption activities is a great idea, though. If nothing else, change the packaging of the message to make it more attractive to people/more relevant to their daily lives.
20	To reduce light pollution, stop overuse of energy,	Absolutely	Yes. Reduction of energy is a very important thing

	global warming		
15	it cost money, and so you can conserve energy.	Not really	Yes! I am going to try to do this more often. And I think it will help the electric bill a lot.
25	Because we will use less energy	Not really	There might be a slight change if we all cut back on our electricity usage. I'm not sure if everyone would be willing to go without power for an hour or more on a weekly or monthly basis.
26	The majority of our electricity comes from non-renewable resources and generates a large amount of waste. Until other technologies that do not cause as much environmental degradation are more widely utilized, the amt of electricity each person uses should be restricted.	Yes, career is Centered on Environmental science	Yes, people should be doing more things like this. If done on a weekly basis, I think you would see a slight change in the electric bill.
36	Cost. Environment. Family time together.	For the most part. Recycling. Turning off Lights and some Electronics. Choosing to Walk sometimes.	Sure. Any conscience decision like that should make a small dent. I know many people who will not based on the rise of rates when people decrease usage. They are not anti-environment - they just can't afford the rates to go up. That is hard pill to swallow when you need to choose between environment and money for your family.
23	preserve natural energy	No	Maybe like hr a day...I know in other country they have hr power downs randomly... but security and other issues can occur.
55	resources go down and prices go up	Yes	Yes I think everyone should restrict their power usage. I have been restricting usage and I have seen a difference.
50	We tend to waste energy	Yes	Yes. We decided to initiate "an hour without power" in our home each week.
20	People are too dependent on electricity/technology. Not only would it be good for the environment, but it could potentially encourage people to be more active, therefore having a less overweight country	Not on a daily Basis, but often	Yes, I think people should do this more, it's good to not be hooked in to technology 24/7. I don't think there would be too much of a change in the electric bill unless it was more of a daily thing.
25	Budget wise, I think restricting our use of electricity is a great idea as a way to save money in this economy. I think it is also important to become less reliant on electricity and more aware of how our energy usage affects our environment.	No	Sure. Simply being more aware of your electricity usage helps you use less. Doing something like this weekly would take a lot of effort but would definitely be worth it. I think, over time, we would see a difference in our electric bill, especially as we become more conscious of our usage
19	We are running out of resources	Most days, Normally I think about it while cleaning my room (recycling bottles	Yes, and weekly. I think there would be a slight decrease in bill price.

		And papers), and When brushing My teeth (thinking About water Supply)	
23	Resources are not unlimited and we don't "need" to use electricity every hour or every day but it has become a comfort to us that some can't live without. It's good practice to scale back the use of things such as electricity and our cars to lessen our impact on the Earth and challenge our daily lives by coming up with alternate things to do.	Usually yes. Especially anytime I come across something recyclable.	I think people should try to do what is comfortable for them so if its' one hour a week or a month, then that's still a step in the right direction. It wasn't hard at all to give up just one hour!!!! There's so many things to do that don't require energy just think outside of the box! And my electric bill will be less if I did this continuously for an hour a day.
58	The more we restrict our use of electricity, the less the demands on the power plants, which are by and large coal-fired and therefore release billions of tons of CO2 into the air each year, a major contributor to climate change.	Yes	There would doubtless be a change in our electric bills and we would be doing well by the environment.
23	to save energy	Yes, especially while teaching related science and social studies concepts to my students. This week we wrote letters about how to protect the earth.	It would be nice, but I'm not sure how much of a change in the electric bill it would cause.
31	yes	Yes	no, no change expected...