



Shelburne Power Awareness Program

Does providing 'real time' consumption information help households reduce their electricity use?



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Project Background

Phase 1

Reduce the Juice (RTJ) is a non-profit foundation dedicated to empowering youth to develop leadership on energy issues. Reduce the Juice ran a program in Shelburne in Summer 2005, and in Orangeville in Summer 2006, aimed at facilitating youth-led actions to increase uptake of personal and residential energy solutions. High school students were recruited to go door-to-door and attend community events to talk about energy issues with local residents. The program also involved students in the construction and installation of solar and wind power at their school. Results of the program can be found on the Foundation's website – www.reducethejuice.ca



Photo: RTJ students showing a local resident how their solar-powered sno-cone machine works.

Phase 2

In the winter of 2007, students from the Centre Dufferin District High School's Environment Club, led by teacher Kim Sayers, teamed up with RTJ, Hydro One and the University of Waterloo to work on the Shelburne Power Assessment Program. Students installed 30 Blue Line PowerCost™ monitors in Shelburne households. The study was designed to see if receiving immediate feedback about the consumption and cost of electricity would cause residents to reduce the amount of electricity they use. Results of the study were then analyzed by UW researchers in the Faculty of Environmental Studies.

What is a PowerCost Monitor™?

Blue Line Innovations, a Newfoundland-based company, focuses on creating real-time energy feedback technologies. The PowerCost Monitor™, is a display device for domestic electricity consumers and consists of two units:

1. A **detection unit**, known as the sensor unit, is affixed to an existing household utility meter with a simple ring clamp.

2. The **display unit**, located inside the home, receives a wireless signal from the transmitter and displays the consumption information to the end user in real time, either in kWh or dollars and cents mode. Other information is also displayed such as time and outside temperature.

In Collaboration With:

-Kim Sayers and the Centre Dufferin District High School Environment Club (CDDHS)
- Randy Dryburgh and the Reduce the Juice Foundation

Student Researchers:

This project would not have been possible without the hard work of the following members of the CDDHS Environment Club: Brooke, Jessi, Nancy, Rebecca, Sarah and Steve

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- Ontario Conservation Bureau
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Research Approach



Photo: Former RTJ students (currently Environmental Studies students at UW) with Prof. Lynes examining data from a PowerCost Monitor

Recruitment

Residents were recruited in Shelburne through newspaper ads, word of mouth, and a targeted letter to members of city council. 30 households agreed to participate in the study.

Stage 1

Two high school students visited participants in their home to install the monitor and conduct a preliminary survey to provide background information about participating households.

Stage 2

On a weekly basis, the high school students returned to each household to record the meter reading for that household. This data was collected for 3 months to track the amount of electricity used on a weekly basis.

Stage 3

Students returned to each household to conduct an interview investigating how participants used the monitor and how it affected their household energy use.

Results of the Study

Who took part?

Results of the initial survey revealed that participating households were predominantly single-family dwellings less than 2000 square feet ranging in age from those built before 1965 to those built after 1998. The majority of houses in the study used natural gas as their main heating source and 71% reported that they had central air conditioning. 70% of participating households had at least one university graduate, and were generally well-off, with 42% reporting an annual household income of greater than \$100,000.

Key Findings

1. In both pre- and post-study interviews, participants identified financial savings as the primary reason for conserving energy. 77% of participants reported using the monitor in financial report mode rather than looking at the number of kilowatts used.
2. Participants were still mainly focused on the "low-hanging fruit" of energy conservation, identifying the use of compact florescent light bulbs as an important behaviour they had taken, and intended to continue, in their energy conservation efforts.
3. While only 50% of participants felt that use of the monitor had caused a change in their behaviour, 92% said that they would recommend the use of a monitor to a neighbour. All participants were able to link energy use to specific appliances using the monitor data.
4. 89% of participants reported checking the monitor at least once per day.

Next Steps

1. **Extend the time of the study to include at least two seasons and, preferably, a full year.** One limiting factor of this study was the short period of observation. Electricity use can vary greatly over the four seasons in Ontario, and in order to fully compare energy usage before and after monitor installation it would be necessary to make comparisons month-on-month. Furthermore, it would be interesting to analyze if changes are consistent over time.
2. **Analyze the effects of monitor operation assistance and energy efficiency advice on electricity use.** The efficacy of a large scale PowerCost™ monitor distribution program would rest on whether households would be likely to use the monitor without installation and assistance and whether they would be likely to undertake energy efficiency behaviours without guidance from an outside body. A study comparing a group of residents who are sent the monitor in the mail, and a group who have the monitor installed and explained to them would shed light on the question of how much guidance people require for the monitor to impact their electricity use.

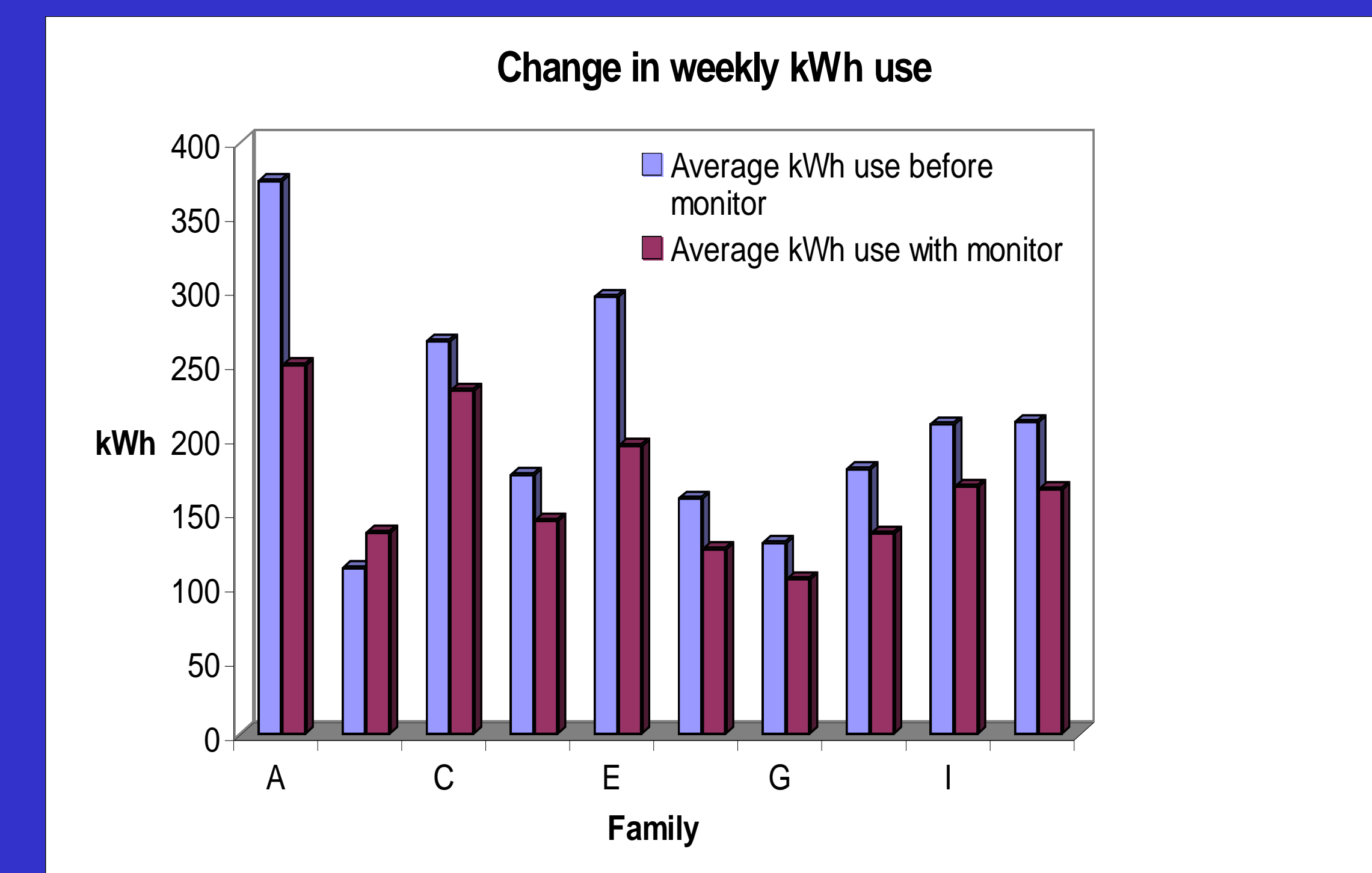


Figure 1. A comparison of 9 participants' estimated average weekly kWh use to the measured use for the duration of the study shows a clear decrease in energy consumption for all but one of the households.

