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Virginia Association of Counties

2014 Achievement Awards

Call for Entries

2014 VACo Achievement Awards

Deadline: June 2, 2014

Application Form

All applications must include the following information. Separate applications must be submitted for each eligible program. **Deadline: June 2, 2014.**

Program Information

Locality Chesterfield County

Program Title Whack-A-Watt

Program Category Environmental

Contact Information

Name Julia Reynolds

Title Energy Analyst

Department General Services

Complete Mailing Address 6751 Mimms Loop
Chesterfield, Va 23832

Telephone # (804)796-7025 Fax # (804)748-3032

E-mail reynoldsjb@chesterfield.gov

Signature of county administrator or chief administrative officer

Name Jay Stegmaier

Title County Administrator

Signature James J. L. Stegmaier

Whack-A-Watt

1. Overview:

"Buildings don't use energy, people do" that philosophy was the driving force behind the development of a real-time energy monitoring dashboard project. The project identified a software/kiosk dashboard system provided by Lucid Design that was installed in all Chesterfield County middle schools and monitors electric and gas use of those buildings. The installation of the dashboard has enhanced the County's energy management program by increasing awareness and educational opportunities while setting the stage for dollar savings. The project was implemented with County grant funds by a joint energy management team comprised of County and Schools employees. The dashboard served as the foundation to run energy reduction competitions; the first of which occurred October 2013. The contest was titled "Whack-A-Watt" and results were tracked and displayed live on the energy dashboard. The contest lasted three weeks and reduced electric use by 116,677 kWh; thereby, reducing energy costs by $10,267.

2. The Need for the Program:

Utility costs are one of the highest controllable costs for any county. Chesterfield County, being responsible stewards of the environment and our funding, has made a concerted effort to reduce costs and environmental impact through a reduction of energy consumption. Research shows awareness and training as one of the most cost effective measures that can be used to control and reduce energy consumption. These factors led the Energy Management Team of Chesterfield County to create Whack-A-Watt as a way of enhancing the energy management program in the areas of awareness and training.

3. Description:

Whack-A-Watt is an annual energy reduction competition. The inaugural competition took place from October 14th, to November 3rd, 2013. The contest was the culminating event of a very long and intensive process. The entire process started the pervious November when our energy dashboard was placed into

service for all Chesterfield County middle school buildings. Fine tuning and adjustments were made and numerous meetings and training sessions were conducted with teachers and administrators to equip them with the knowledge and ability to utilize the dashboard in their schools and in their lesson plans. The planning for the annual contest began in June of 2013. The timeframe and rules for the contest were set, sponsors were solicited, and posters and literature were designed and printed

As the school year started, each school was given the opportunity to identify a contest master to be the central point of contact for that school. The master was responsible for planning site based energy related events. Contest masters were equipped with school audit forms they could use with their students to help them learn about energy efficiency and identify areas for improvement within their own school buildings. The Energy Management Team was offered as a resource to the schools upon request, but did not pro-actively approach any schools with energy saving ideas during the contest period in order to maintain a fair playing field. Several schools did request help in the form of borrowing logging equipment or having Energy Management Team members give presentations to students about energy.

The two weeks before the contest started were used as the baseline period against which to measure energy use. This baseline was not announced so as to not inadvertently encourage increased energy use during the baseline period. In the weeks before the contest start date, contest posters were distributed to the schools, and each energy kiosk was loaded with a cryptic message designed to increase curiosity in the dashboard and get students and staff to keep an eye on the kiosks.

The start of the contest was kicked off with a morning announcement and an energy tip of the day. A new tip of the day was shared over the morning announcements each day of the contest. The energy audit forms were shared with students and many teachers increased participation in the audit form by performing the audit as a class or offering extra credit to do them during the day.

The contest could be tracked live using the energy dashboard from any computer, anywhere, or from the centrally located kiosk in each building. Results were updated on a constant basis. The real-time data and corresponding visible competition standings increased active participation as students and staff were able to see the results of their individual efforts to reduce energy consumption in their building as well as how they compared to other middle schools. One school even went so far as to identify a 30 minute period on Friday where they were going to turn off all lights and computers in the building and then monitor the effect of those actions live on the kiosk. They saw a dramatic decrease in their energy use instantaneously, which invigorated everyone in that building, and helped them to understand that they really can make a difference through their actions. This created a great learning opportunity as students were able to dig into the results that they saw and learn about how those results were achieved.

The contest was very well received by all participants. Much of the feedback from the schools was that the contest was a lot of fun and that they learned many simple actions which they could implement on a daily basis in order to reduce their energy reduction on an ongoing basis. Additionally, there was positive coverage of the contest with articles written in many local papers and coverage from Chesterfield County Public Schools' Face book page and an interview on their YouTube channel.

By the conclusion of the three week contest, the 13 middle school buildings had generated a combined financial savings of $10,267. Those savings were generated by reducing electrical consumption by 116,677 kWh which kept 141,296 pounds of CO2 from being released into the atmosphere. It is believed that some of these savings will continue throughout the year as awareness of energy efficiency has been increased in all 13 buildings and the occupants have learned simple actions they can individually take to reduce consumption.

Final results showed that the top 5 schools were separated by less than 1%. The winning school was able to reduce their energy consumption by 15.4%. That school, Manchester Middle, had a particularly

effective contest master who did a great job of communicating about the contest and also coming up with innovative ways to save energy with the students. They also did an outstanding job of creating a team environment where students, teachers, custodians, maintenance employees and administrators worked together to not only identify issues, but also implement fixes to those issues.

To date, we believe that Whack-A-Watt is the largest and most successful energy reduction competition of any K-12 school system using the Lucid Design dashboard.

5. Use of Technology:

The energy dashboard project is heavily reliant on the use of technology. The technology starts at the utility meter and circles the United States before delivering the final product to the end user. The electric and gas utility providers worked with the Energy Management Team to provide and install pulse output meters which create an electric signal each time a specified amount of energy passes through the meter. That pulse is carried to a Siemens building automation system (BAS) field panel where it is internally logged and translated into a communication protocol that can be sent over the network infrastructure to a centrally located server where our BAS is managed. On the server, the pulses are converted into usable data, such as kWh. Once the raw pulse data is converted, it is translated using BACnet protocol and sent out of the network onto the internet by way of a JACE. The internet data is sent out to California, where Lucid's servers reside. Once the data is received by their servers, they create a database and populate the dashboard with all of the use data and graphs and a multitude of conversions to things like unit equivalents and time period comparisons. Once the data is populated onto the dashboard, it is made available via the web for any computer around the world to access. Students in schools or at home can view the dashboard at http://buildingdashboard.net/chesterfield/#/chesterfield. Additionally, each school has a centrally located kiosk where students and staff can view the dashboard as they go about their school day. This kiosk consists of a pedestal mount that was custom made by Chesterfield employees in order to make

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the kiosk fully ADA compliant. On the mount sits a 32" touch screen monitor which allows people to interact with the data on the display. Built into the screen is a small computer module which accesses the internet via Wi-Fi and process the dashboard for display.

This enormous amount of data integration between disparate systems and between systems and humans happens from East Coast to West Coast and it happens on a constant basis, with each site updating data at least every 60 seconds.

6. Cost:

Whack-A-Watt was a very cost effective program; producing immediate savings far greater than the cost of the contest to the county. Outside of the time employees invested in preparing and running the contest, the only direct costs were $120 in printing costs to have flyers made and audit sheets printed for all students. Additionally, a trophy was custom made by our Buildings and Grounds team. The cost of materials was less than $100. The printing costs will be required to run the contest again next year, but the trophy was a one time cost as it will be passed from winning school to winning school each year. Additional contest costs were covered by community partners. One community partner has pledged $4,000 to throw a pizza party for the entire winning school. A second community partner provided $2,250 in gift card prizes for the top three schools and random drawings for students who had completed the audit. They additionally provided an iPad as a prize.

Several capital investments were made from ARRA grant funding that put into place the infrastructure that made Whack-A-Watt possible. These are not direct costs of the Whack-A-Watt contest, but are indirect costs that were incurred placing the dashboard system into service. These costs included:

1. $52,500 for development of the software and dashboard layouts for every middle school.
2. $68,000 for 16 interactive 32" touch screen kiosks.
3. $3,675/year service contract for dashboard and kiosks.
4. $3,950 for a JACE controller that communicates between BAS and Lucid servers.

5. $640 for Wi-Fi dongles to connect kiosks wirelessly to network.
6. $840 for metal to fabricate custom made, ADA compliant kiosk mounts.
7. $8,000 approximately for special metering on electric and gas accounts.

7. Success:

By the conclusion of the three week contest, the 13 middle school buildings had generated a combined financial savings of $10,267. Those savings were generated by reducing electrical consumption by 116,677 kWh which kept 141,296 pounds of CO2 from being released into the atmosphere. Furthermore, classroom instruction in the fields of math and science were enhanced and understanding of the interaction between individual decisions/actions and the environmental impact was increased. Those results are yet to be quantified.

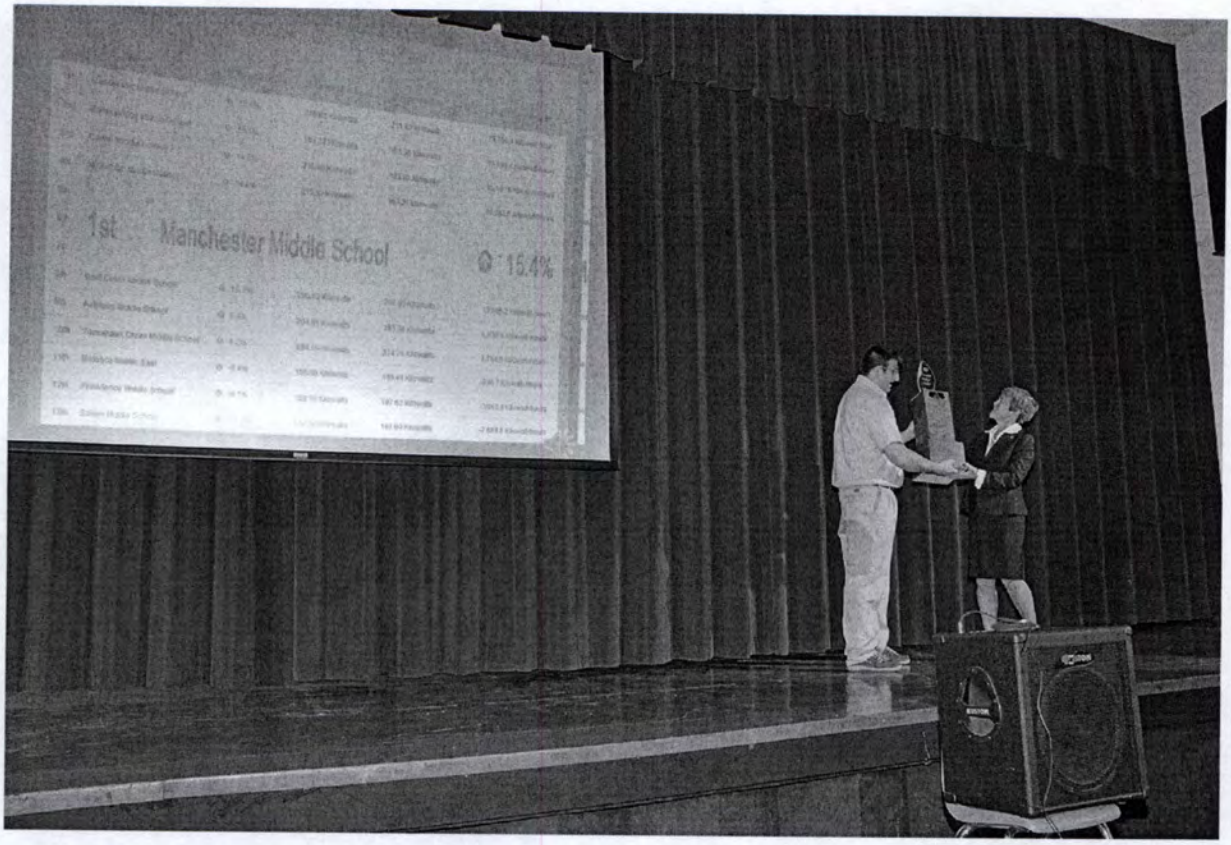
8. Worthiness of an Award:

Whack-A-Watt has been a tremendously successful program because it fills a need and it connects governmental agencies with one another and with the community. The contest has enhanced the county's Energy Management Program, which consists of a joint team of county and school employees coordinating efforts to reduce energy use across the board. The contest has given the program valuable usage data which further enhances the efforts of the team going forward. Additionally, the contest was an effective way of training staff on the importance of, and their ability to, save energy. The contest was also widely publicized and features both a publicly accessible web based dashboard that is accessible by anybody with internet access in addition to a prominently displayed kiosk which displays contest and energy data in a way that is engaging for both students and visitors to a school building. This very public side of the contest helped the county to share the message that Chesterfield is a good steward of their funds and their environment. This positive message was beneficial in the days leading up to a public vote on a bond referendum to fund school improvements because it exhibited in a real and engaging

way that the current funding was being spent in a responsible manner.

Whack-A-Watt is a truly innovative way to approach energy management. Energy reduction contests are not new and innovative in themselves, but the use of technology to automate the collection and sharing of use information on this scale is very innovative. This is believed to be the largest and most successful contest in a k-12 school division of any customer on the Lucid platform. In addition to the technological innovation, the approach was innovative. The awards were designed in a way that engaged all students to individually take an interest in participating in the school energy audit, the use of site based contest masters was an effective strategy, and the use of the contest as a teaching tool to support classroom lessons were all innovative ways to approach an energy reduction contest.

9. Supplemental Information:


1st
Manchester Middle School
15.4%

Chesterfield Observer, October 30, 2013

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