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Teaching Sustainable Education and the Energy Conservation Ethic

Pia Charlotta Peterson
Faculty Sponsor: Thomas Husband, Natural Resources Science

As Rhode Island's landscape steadily changes and the human population and development expands, we as responsible inhabitants need to be more mindful of our actions and how our decisions impact our environment. This is an especially important value to pass on to our children, who will be around to see how the state and Narragansett Bay are affected by our actions long after we are gone. My project visits approximately 1,300 elementary school students in South Kingstown and spends some time interacting with them and teaching them about energy use in Rhode Island, in their daily lives, and how to live efficiently by conserving energy.

Being a History and Spanish student-major here at the University, concern for energy usage and conservation is not typical of my field, but is a personal pursuit that I am very passionate about. My experience studying civilizations that outgrew their means has helped me realize that our current crises with global warming, pollution, and destruction of nature will only escalate if not kept in check by an educated population. My wish is to teach Rhode Island students to recognize their responsibility to scale back their energy consumption to multiply the effort by having them impart their newfound knowledge to their communities.

In the past, I have worked closely with children and have had opportunities to speak to them about renewable energy in various forms in Rhode Island through my work at the Rose Island Lighthouse Foundation. This project, however, was my first opportunity to address specific topics that I feel are important for Rhode Island's youth to understand and participate in. Working with Dave Carey, the South Kingston school system's Energy Manager, and with my project Advisor, Natural Resources Science professor Tom Husband, I put together a presentation to give at the elementary school level on broad topics, such as how energy is produced and delivered, as well as talking specifically to the students about how they consume energy. The goal of my project was to educate the students on their energy consumption in their homes and classrooms and how they can reduce their impact in easy and healthy ways that will benefit themselves, others, and their surroundings.

*continued, next page.

*My project also includes a white paper, addressed to the Rhode Island school committees and state legislator's office, on the need for energy policy in Rhode Island public schools.

Keywords: Energy Savings, Education, RI Schools

1.1) Outline of Energy Presentation for South Kingstown Elementary Schools

Outline of Energy Presentation for Schools: South Kingstown Schools Energy Conservation
David Carey, South Kingstown School Department's Energy Manager
Pia Peterson, URI Honors student and energy educator

Energy usage and conservation is an important topic today, and one that affects each student, teacher, and classroom in the school system. We are going to take advantage of the time today to present the students with some energy saving concepts and ideas that they can use to conserve energy. Our goal is that the students walk away from our presentation with more knowledge on their involvement and impact on the topic, and what they can do to help save energy in their homes and classrooms. We will be addressing broad topics such as how energy is produced and delivered as well as talking specifically to the students about how they consume energy. We aim to educate the students on their energy consumption in their homes and classrooms and how they can reduce their impact in easy and healthy ways that will benefit themselves and their surroundings.

If you have any specific concerns about your school and energy consumption, or any items that you would like us to address, please contact us: David Carey at dcarey@skschools.net, 360-----; or piacharlotta@gmail.com

1.2) My script for the presentation, and schedule of schools

Matunuk Elementary School, April 28, 2009, 288 students
Peace Dale Elementary School, May 4, 2009, 439 students
West Kingston Elementary School, May 11, 2009, 289 students
Wakefield Elementary School, May 18, 2009, 296 students

Hello! My name is Pia (Ms. Peterson), this is Mr. Carey, and we are here today to talk to you about energy and how we can help save it every day.

How many of you think you use energy every day? (show of hands, all hands)

And how many of you think that you waste energy every day? (show of hands, less hands)

We're going to figure out the answer to that last question, and the best ways to conserve energy instead of wasting it. Now, what is energy that it is so important that we

use it every day? We use energy to (prompt the students) turn lights on, heat our homes and schools, cook our food, drive our cars…phew! A lot of things!

Now what is energy, and why is it important not to waste it? Energy (defined as the amount of work that can be done by a force) and electricity power many important things in our lives, but it is important not to use so much energy that we waste it, and exhaust our resources. How can we demonstrate that (wearing out energy)? Ourselves!

When I say 'go,' I would like everyone to do as I do and clap your hands together, and when I hold my hands up (thusly) we're going to stop and see how we feel. Start clapping your hands together…now as fast as you can! (encourage the students to clap excitedly for approximately 30 seconds, then make the signal for them to stop and quiet the room). Whew! Who feels a little drained? Do your hands or arms hurt? Congratulations- you just used up some of your own energy! Now, if you feel tired after 30 seconds of clapping, do you think that the parts in your computer get tired out after you use it all day, or leave it on all night? By turning it off, you are saving energy and giving your computers a rest, which allows them to live longer.

Before we see how we use energy in our daily lives, I'd like us to identify what uses energy, and how. I am going to need a volunteer or two to help me pull objects out of the Green Box, and then we're all going to figure out if they use energy or not. Green Box Exercise: Green recycling bin on stage, filled with household objects: plastic water bottle, stainless steel water bottle, CFL light bulb (sealed in package), battery-operated 'musical keyboard,' children's book, notebook, cell phone charger, computer keyboard, etc.)

Plastic and Stainless steel water bottle: Does this use energy? No, but how could one of these help us to be less wasteful? (One requires a trip to the recycling plant to be processed, the other one you can clean and refill at home.)

CFL Light bulb: Who can tell me what this is? Does this use energy? Who here uses these every day? Every hour? Wow! So that's a lot of energy going into that light bulb. We should try to turn them off to save electricity as much as possible. How could we have light during the day without using electricity or the light bulb? (Open the curtains, use natural light or sunlight.) If we use daylight during the day, we can cut down on the amount of electricity that the indoor lights have to do, and we save energy.

Musical Keyboard: Does this use energy? Yes! It is not plugged in, but it has a battery, and those can wear down, too, if their stored energy is wasted by leaving the toy on all the time. It's no fun to run out of batteries all the time and have to change them, and the fewer batteries you use up, the less waste is put back into the environment.

Children's Book: Who can tell me what this is? Does this use energy? No, not really, so it's a good alternative to the keyboard and other electrical/battery operated toys!

Notebook: Does this use energy? Do you use these in class most days? Every day? Who here writes on both sides of the paper? That's good! Even though it might not seem like much to skip a page and only write on one side, using both doubles the life of the notebook- so it's like having two notebooks instead of one! I know that a lot of you are just getting started, but it's a good thing to keep in mind. This notebook is paper, and it has a metal spiral. Can you recycle this? Yes, you can! At the recycling plant, the metal spiral is big enough to be caught and sorted out. You should always recycle these.

Cell phone charger: Who can tell me what this is? Does this use energy? Someone at home might use this to charge their cell-phone. However, just like the light bulb, you need to remember to unplug this when it is not in use, because even plugged into a wall unattached to a phone it is using electricity!

Now that we have a pretty good idea of what energy is, let's imagine a day in our lives with energy, and see how many times a day we use it. May I please have a volunteer to come and keep tally on the board? (Write 'Our Energy' at the top of the board, and then have chalk/a marker for a tally, and instruct the volunteer to mark a tally whenever she hears an answer that uses energy/electricity.) Thank you!

We are going to close our eyes and pretend we're waking up for school.

What wakes you up in the morning?

What's the first thing you do when you wake up?

Brushing teeth- using water, energy

Shower- uses five gallons of water a minute

Getting dressed- do you turn the light on in your room or your closet when you get dressed?

Making breakfast- This is important because it gives YOU energy. But do you use any other kinds of energy when making breakfast? What about cooking? (Stoves, microwaves, ovens, toasters) All of those kitchen appliances use energy. How could you save energy while making breakfast without having a cold breakfast? (Shut the refrigerator door, unplug (remind a parent have a parent unplug) the toaster/microwave when finished)

Going to school: How you get around makes a big difference. Does anyone walk to school? That's good, that's not using any energy but your own! If you and a parent could walk or bike without taking the car, you're saving energy and making yourself and the planet healthier. Does anyone take the bus? Wow, a lot of you! The bus uses energy, but is anyone ever alone on the bus? There are a lot of people around you. Because the school bus is just one vehicle and it takes so many people to the same destination, it is a lot better than everyone taking their own cars or vans.

Now you're at school!

Inside the classroom

Using less paper, using both sides.

Reporting it if a room is too hot or too cold, and adjusting the problem at the source as opposed to employing energy-wasting behavior (opening the window in an overheated room) in the classroom to adjust it themselves.

Turning off half the lights in the room, good use of daylight.

Using hallway doors instead of classroom doors, to prevent the room temperature from escaping drastically through many different doors as opposed to just one at the source.

Turning off computers to conserve energy, make the computer last longer.

Count up the tallys, and turn to Dave for some of the ways that he tracks student and school energy usage.

1.3) Conclusion of Assembly Presentations

I would venture to say that the presentations went rather well, as I got good reports from the principals and the organizer of the presentations. At first, I was

surprised by how much the kids responded when asked if they waste energy often. Some responded enthusiastically that they wasted energy daily, as if it was an affirmation of their status or activities. That is the kind of attitude that worries me, and that affects a lot of children and families, this idea that you are not a participating citizen if you don't consume as much as possible, when in reality that is not what is beneficial for our environment or economy. However, by the end of the presentation, I was pretty impressed with the amount of response I was getting as far as ways in their daily lives that they could conserve/save energy. Each school had basically the same ideas, with a few left-fielders, and while their intensity varied by school, I feel as if all were affected towards conservation by the end of the presentation.

2.1) Prologue to White Paper

This is the conclusion of my project, a compendium of the research I did and experiences I had with various people involved in the Rhode Island education system throughout the semester. My original goal had been to work with a specific school to evaluate their energy usage and expenditures, and do what I could with the information made available to me by the school and the literature available on energy conservation. I planned to assemble a fledgling energy policy, perform an energy audit (with the generous cooperation of an independent auditor), and try to work with the students and teachers to help instill an energy conservation ethic. The following paper attempts to briefly recount the resistance I met with, to share some of the unexpected information I learned about energy policies and Rhode Island education, in the hopes that more schools, districts, and individuals will be compelled to act.

2.2) White Paper. This has since been submitted to the 35 members of the Rhode Island Association of School Committees, and the State of Rhode Island General Assembly.

Energy efficiency may have entered this century as a buzz phrase, but it is a powerful tool for today's schools facing the daunting budget problems of this year. There is a way that schools can maintain their quality of education despite concerns about the budget; effectively, sustainably, and today.

There are 346 public and private schools in Rhode Island, servicing some 149,576 students and employing almost ten thousand teachers.[1] Out of these numbers, there are 317 public schools managed by the state of Rhode Island. Despite measures being taken by some school districts, only two schools in Rhode Island are considered 'high-performing schools' by LEED standards. There are currently eleven energy managers presiding over ten of the thirty-six school districts in Rhode Island. That means that a full seventy-two percent of Rhode Island's public schools are without any policy or regulations concerning their school's energy usage. The South Kingston school district, comprised of eight schools, has added over $3.3 million in energy savings back to the budget in eight and a half years. That's a savings of over $50,000 per school, per year, and is a 38% savings of their total expenditures.[i] If energy policies were implemented in Rhode Island with minimum savings of 20% of the state's budget for energy,

[1] http://www.localschooldirectory.com/state-schools/RI

$2,014,172,501 for the 2006-2007 school year, that gives us a total of over $200,000,000 *per year*
National average of energy cost per student is $181 per student (http://www.energystar.gov/ia/business/challenge/spread_word/InfoCardBusiness.pdf), and the RI public school system has 149,576 students, that makes average energy costs about 27,000,000, with a potential to save about $5.4 million per year through effective regulating of energy in Rhode Island's 317 public schools.

36,866 is the average starting salary (without benefits) of a first year kindergarten teacher in South Kingston.[ii] Schools cutting jobs because of budget worries could easily keep the teachers they need to provide and effective learning environment instead of letting them go this year because of excess funds that went into wasted energy.

Nationwide, public schools spend about $7.5 billion every year on energy to heat, cool, and light the schools. National averages of energy costs per student increased 20% between 2003 and 2005, and fossil fuels are not getting any more abundant nor cheaper.[iii] This is money that needs to be reconsidered and redirected towards education, raising aware and intelligent children, and bringing up Rhode Island's middling ratings on SATs and other standardized tests for K-12. There are only two schools in Rhode Island that meet NEEP efficiency standards, accounting for half of a percent (.5%) of the total public schools in the state.[iv]

In 2009, I spoke with various Rhode Island schools in the South County area to try to collaborate with an energy-minded school on a project for the University of Rhode Island. I proposed a partial energy audit and an informal report on the benefits and feasibility of "greening" the school, and what the school would gain, monetarily and otherwise. While all of the schools I talked with gave the impression of being eager to participate in the project, on an executional level I met with much disinterest. Most teachers, faculty and school (leaders) with whom I shared my intentions were quick to admit that their institution needed work, and almost everyone could identify a setting at their school where they saw energy wasted on a daily or weekly basis. However, the consensus of an established need stopped there, and I could not achieve a concrete partnership with any the schools. This was not, in my belief, due to indifference or rejection of the cause (a more efficient school). However, with no person or body responsible for administering or regulating the components of the school's energy savings, no one wanted to take the liability for its use and waste. If energy ends up being, for so many reasons, a passive issue inside a school; then the schools need to save money and cut the budget could be considered the need most actively rushing to be met. However, given some careful planning and the full cooperation of the school, one problem solved can aid the other.

A handful of local school districts have accomplished energy savings through a corporation that profits from showing them how to efficiently run their facility. I argue that while these corporations are helpful, a school or district looking to start with low- or no-cost amendments to their operation and policy has the potential to save comparably without employing the use of an intermediary.

The approach of one such corporation, Energy Education Incorporated (EEI) is to focus on "changing human behavior." Their website points out that (to cut energy costs) "no new equipment is needed, no more money needs to be budgeted, and that [by

changing habits] changes are sustainable for decades." EEI is iu Without the corporation directly enforcing a program and policy of energy savings, those simple tasks again become nobody's job, and consequently, nobody is held accountable for poor energy performance. EEI's policy drives the program, and therefore the savings. Without the corporation, a school needs collective action on the part of its employees to affect both building operation policy and an educational policy for energy. All aspects need to corporate and support the policies in a school district that aims to save money from their budget without cutting energy costs.

A written policy backed by the school committee and the superintendent is key to such a grassroots energy policy, catered to meet the specific requirements of the school (or school system) without an intercessor or middleman. Teachers, maintenance workers, and administrators are all incredibly knowledgeable about their own schools. These players themselves built the supportive communities that allow so many students to progress and flourish both within school walls and beyond. A tough, progressive energy policy, generated by concerned and ambitious members of a town council or school, committee can be easily achieved and would have far-reaching effects on the schools longevity and effectiveness as institutions of learning.

With a comprehensive energy program, the South Kingstown school district saved $180,000 in 2001 working with a large energy-savings company. These savings are remarkable, and are an example of what a school district can achieve by implementing low-cost or no-cost energy policies and by designating a motivated and qualified coordinator for the policy. Large energy companies push the school district to save as much as possible to fulfill their part of the contract and continue doing business with the school. However motivating this approach is, any determined member of the school's community could have achieved comparable savings by addressing simple, everyday issues, once that person knew how to look for and treat them. Regretably, the benefits for the school system alone are not going to inspire people to take this responsibility upon themselves (though it should, considering the amount of salaries saved by cutting energy costs in one year alone) without a degree of coordination within the school district and a support group for energy savings.

A policy that addresses specifics, such as who is responsible to enforce the policy, or appropriate temperature ranges and hours of operation for the buildings, can be developed by anyone who is properly trained. Sufficient training can be achieved through programs such as the locally-offered Building Operator's Certification, which teaches about the same information as EEI's Energy Manager's program. The Level 1 and Level 2 Building Operator's Certification is composed of two courses, each costing approximately $1,000. A school or district could select a candidate to be trained, and have a certified operator on staff quickly and inexpensively. Although the certification programs are not geared specifically toward energy concerns, if someone were to go into the program aiming to improve the efficiency of their building and asked the right questions, they would emerge from the training with the competency to be a successful energy manager. Current energy managers in Rhode Island have taken training at least up to Level 1. The Association of Energy Engineers also offers local courses on becoming a certified energy manager, again at a low cost to the participant or sponsoring school. The American Recovery and Reeinvestment Act of 2009 gives the Rhode Island school system ample opportunities to turn a one-time government fund into sustainable

improvements that can aid the school for decades, and produce class after class of efficiency-minded Rhode Islanders through energy management and education.

Building policy in Rhode Island schools already includes, on paper, the basics of energy saving. However, without rigorous enforcement or an incentive, a regularly staffed school maintenance department can easily overlook broken or mismanaged equipment that wastes energy. If trained person responsible for energy were introduced, they could work with a school's maintenance department to identify and resolve any wasteful equipment or practices. A trained, locally-elected energy manager who oversees and is held accountable for the enforcement of energy policy in the building can enforce positive habits when backed up by a comprehensive energy policy (and supported by the school committee and superintendent). The superintendent should advocate such a program because it saves money and makes his/her budget planning easier. An energy efficient stance needs to be cultivated not only regarding the maintenance of the building, but also with teachers, administrators, aides and volunteers within the school, and the students. Allowing bad habits to continue out of convenience or preference is equivalent to energy negligence, and akin to wittingly wasting school funds.

CONCLUSION

Students prosper in an environment where they are encouraged to look and think outside themselves. If students learn to interpret the world around them and relate their lives and impact to their own pedagogical path, they will earn much more than a degree, and will be privy to a truly conscious education. What better way to facilitate this than to introduce measures that will boost the school's efficiency and provide more money in the budget to support other educational endeavors? The energy conservation ethic is so important because it extends beyond fiscal concerns, and gives both faculty and students an investment in and responsibility for the quality of their own institutions.

Endnotes

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[i] Conversation with South Kingstown Energy Manager, David Carey, April 2009

[ii] "The Salaries," published by *RI Monthly*, accessible online at: http://www.rimonthly.com/Rhode-Island-Monthly/February-2009/Salary-Survey-2009/The-Salaries/ Accessed 4/20/2009, site updated daily.

[iii] http://www.energystar.gov/ia/business/challenge/learn_more/Schools.pdf

[iv] http://www.localschooldirectory.com/state-schools/RI

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Deslauriers, Michael. Energy Manager for the Smithfield School Department. Personal correspondence, April 23, 2009.

Cerio, Bob S. Energy Resource Management Consultant, Ocean State Energy Resources. Personal correspondence, November 14, 2008-present.

www.chps.net. The Collaborative for High Performance Schools encourages and rates high perfomance school buildings in the Unites States.

"The Salaries," published by *RI Monthly*, accessible online at: http://www.rimonthly.com/Rhode-Island-Monthly/February-2009/Salary-Survey-2009/The-Salaries/ Accessed 4/20/2009, site updated daily.

http://www.localschooldirectory.com/state-schools/RI
Most information on the general costs of Rhode Island schools was accessed here, on various dates through March and April. All information is from the National Center for Education Statistics, 2006-2007, and the Rhode Island Department of Education.

http://www.energystar.gov, various pages accessed between March 3, 2009 and April 27, 2009. See below for more details and links to key pages.

FOR MORE INFORMATION

A basic guide for a fledgling Energy Policy is available at http://wattwatchers.org/pages/activitiesenergypolicy.htm. This offers many examples of how to look at a schools' fixtures with an energy-mindset. To start by raising awareness of what employees can do to help is an excellent 'no-cost' way to begin an energy program (although they also recommend an energy audit, and fixing faulty or energy wasting equipment is often the next logical step after awareness).
www.neep.org The Northeast Energy Efficiency Partnerships is the New England subsidary of CHPS, The Collaborative for High Performance Schools. Their 'Northeast Evaluation, Measurement, and Verification Forum Three Year Plan' is available online at their website as on April 28, 2009.
The Model Energy Efficiency Program Impact Evaluation Guide is published by the Environmental Protection Agency and available through NEEP at http://www.epa.gov/cleanenergy/documents/evaluation_guide.pdf, is a detailed guide to effectively analyzing any energy program or energy saving measures already intact in a district or institution, and also aids identification and defining an energy program's goals, time frame, and budget.
http://www.neep.org/newsletter/2Q2005/initiatives.htm, an online quarterly publication from NEEP, is of particular interest to those looking to get certified to take on an energy

program in their district (page should read "NEEP Updates: *Regional Initiatives* and *Training and Education,"* scroll down to *"Training and Education"*).
http://www.chps.net/manual/CHPS-NE2007.pdf is 2007 CHPS publication that outlines the functions of the organization, as well as outlining the requirements for all aspects of high performing schools in New England. Rhode Island has adopted the criteria for the construction of new schools, however only two schools in Rhode Island currently meet the requirement. The criteria give information on material and specific requirements for the performance of energy using components already inside the school, and on specifics that an energy policy should require to ensure maximum effect on the school and on the environment.
http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index The government program Energy Star offers a plethora of information on installing an extensive and efficacious energy program in schools and districts, *with or without* a corporation. This is an incredibly informative site, and gives a complete breakdown of the steps needed to form an energy program and energy policy in the 'Energy Program Assistant Matrix.'
A shorter argument for energy policy, complete with case studies and an extensive bibliography, is available through Energy Star at
http://www.energystar.gov/ia/business/EPA_BUM_CH10_Schools.pdf, a 'building manual' for K-12 schools.
The US Department of Energy, Office of Energy Efficiency and Renewable Energy also offers a guide for a popular energy policy at
http://www.ncef.org/school%2Dmodernization/
Energy Education Incorporated in one of the *many* corporations out there that can provide a school with a standardized energy policy, more information available at
http://www.energyeducation.com/
The National Clearinghouse for Educational Facilities (NCEF) has been keeping track of and regularly updating a page on their website about the federal stimulus package's funding for education, available at http://www.ncef.org/school%2Dmodernization/
http://www.energy.ri.gov/programs/renewable.php This site is one of the most motivational for schools looking at energy policies and alternative energy. Most energy policies start from the ground up, reducing energy costs by affecting people's mindsets, and then resorting to large-scale measures. This site showcases some of the top-down variations on energy policy, and offers information as to the introduction of renewable energy into a school environment such as wind, solar, and geothermal power.

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