



Energy Education

Kick-Off Event

Global Sustainability, Fall 2011

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PROBLEM DEFINITION

The Problem

In short, the world's population and energy dependence is increasing. Our energy supply is currently based on fossil fuels, which detrimentally impact the environment and foreign relations. The most viable renewable energy strategies currently use wind and solar sources to curb our dependence on foreign oil and power our growing energy need through sustainable technologies. Focusing on renewable energy sources will not only decrease the carbon output into the environment, but also create local jobs and promote a sustainable economic environment for the future.

The movement towards renewable energy solutions is growing and governments are beginning to join the trend. Locally, Henley Middle School has received a grant from Wind for Schools within the U.S. Department of Energy to install a wind turbine, a solar thermal water heater, and photovoltaic solar panels. The installation will help serve the energy load of the school and also educate the community about the benefits of renewable energy. Our section of UVA's Global Sustainability class is aiming to help with the education process at the school and community levels. Some groups from the section will be focusing on working directly with the students and the process will culminate with a kick-off event coinciding with the turbine's activation. Our group's objective is to plan a successful kickoff event that creates interest, excitement, and awareness about wind and solar energy for the students, parents, and community involved.

ADDRESSING THE PROBLEM

With the help of our community partners, Lindsay Snoddy and Remy Pangle, we chose to help organize a kick-off event for the greater Charlottesville community to spread awareness about wind and solar energy. The event's aim is to promote knowledge and excitement for the Wind for Schools project and the installation of a wind turbine and solar panels at Henley Middle School. Our task mainly involves planning the activities of the event and making sure students from all three school levels are addressed as well as the parents, faculty, and the community. The event has a wide spread of attendees as the overseers of the project from the Department of Energy and the Wind for Schools will be present as they provide the grant. We also want to have the other groups from the section involved since they have been working directly with the students at the three different schools. We need to look at past kick off events from the same project and work with our community partners and the school contact to evaluate the activities that we need to have and which would be most effective in achieving a knowledge and excitement for the clean energy project.

METHODS OF APPROACHING THE PROBLEM

A kick-off event's success is dependent on careful planning. Before planning everything for a kick-off event, it is important to keep your goals and those of your community partner in mind. To make sure you are prepared for the deadline, create a preliminary timeline outlining your steps and by when you need to complete them. Make sure deadlines are realistic and leave room for any unexpected delays along way. Steps must include talking to all parties involved in the event and letting them know your expectations for them. Coordination with other parties will include demonstration tables, presentation boards, and materials for the exhibitions.

CONSTRAINTS, BARRIERS AND STRATEGIES FOR OVERCOMING THEM

There are a couple possible constraints and barriers that may prevent a kick-off group from presenting the local community with a successful event. These include a lack of community interest, a lack of volunteers with knowledge about wind and solar energy, funding, and the date, time, and location of the event.

Lack of Community Interest

With the installation of a wind turbine and solar panels, the kick-off event is expected to have community members who are interested in learning more about sustainable energy practices. In order to prevent a lack of attendance at the event, our kick-off group will be sure to publicize widely around the Charlottesville community. Some measures that will be taken include handing out flyers at the Discovery Museum downtown, sending out a press release, and sending out an invitation to the middle school where the kick-off event is happening. Here is the flyer that we used at events leading up to the Kick-off Event such as the Discovery Museum event as well as at Henley Middle School:


J.T. Henley Middle School presents

A KICK-OFF EVENT
to celebrate the installment of a wind turbine & solar panels

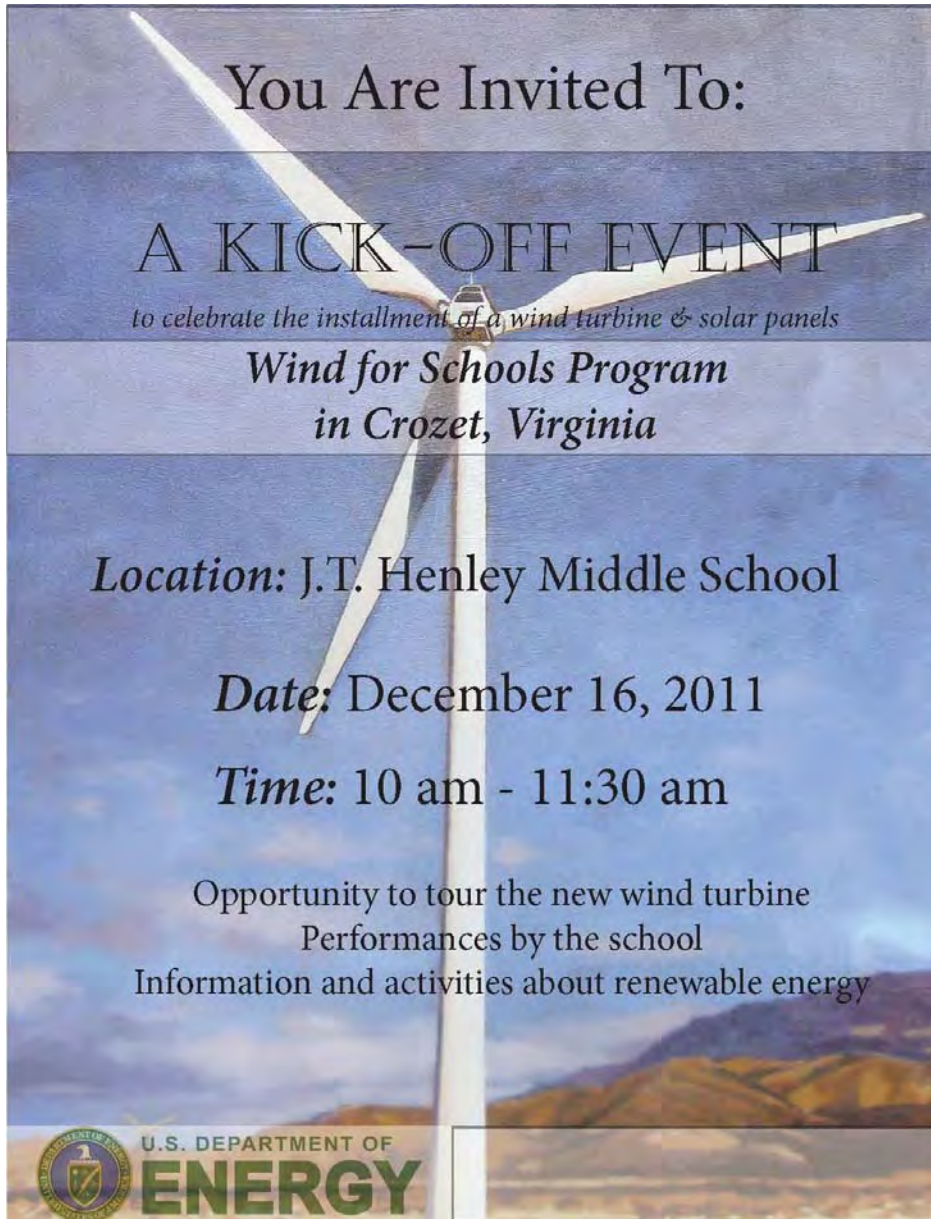
Wind for Schools Program
in Crozet, Virginia

DECEMBER 16TH, 2011
10 AM - 11:30 AM

Opportunity to tour the new wind turbine
Performances by the school
Information and activities about renewable energy

 U.S. DEPARTMENT OF
ENERGY

Here is the invitation that we used to formally invite the middle school and guest speakers:



Here are the two press releases we created to publicize the event. The first is more informative while the second one has specific details about the event.

Henley Middle School Hosts Kick-Off Event for Renewable Energy Resource Center

(ALBEMARLE COUNTY, Virginia) – Henley Middle School of the Albemarle County Public Schools system will host a kick-off event to culminate weeks of education about and the building of a Renewable Energy Resource Center, which includes wind and solar energy sources. A group of students from the University of Virginia has been working on educating elementary, middle, and high school students on renewable energy

sources in conjunction with the installation of the resource center. In addition to the in classroom instruction UVa students provided, they also held an educational event on the downtown mall at the discovery museum. Various instructional projects were open to the public to educate younger children on the benefits of renewable energy sources.

Henley Middle School Wind Turbine and Solar Panel Kick-Off Event

WHAT:

A wind turbine and solar panels have been installed at Henley Middle School. The system will be introduced to the students and the community. There will be speakers and demonstrations to educate students and the community about alternative energy resources.

WHEN:

Friday, December 16th, 2011
10:00am-11:30am

WHERE:

Henley Middle School

WHO:

Henley students and the surrounding community; the Environmental Compliance Manger for Albemarle County Public Schools, Lindsay Snoddy; the Director of James Madison University's Education for Virginia Wind Energy Center, Remy Luerssen; and students from the University of Virginia (U.Va.).

HOW:

Students from U.Va.'s Global Sustainability class along with students from Brownsville Elementary, Henley Middle, and Western Albemarle High, will demonstrate through a series of hands-on activities how wind and solar energy work and can be a viable alternative energy resources.

Lack of Volunteers with knowledge about wind and solar energy

In order to prevent the volunteers from knowing little about wind and solar energy, our kick-off group will be sure to educate volunteers in the days and weeks leading up to the event. The volunteers at the booths for the local schools will already be knowledgeable about sustainable energy because they will have to learn the information to teach to their students. The speakers who present information will be professionals in their specific fields and will therefore be able to answer questions posed to them.

Funding

Our kick-off group is not expecting to spend a lot of money. The only possible costs are the presentation boards and supplies for decorating these for the different booths. The kinetic art piece is funded by the local middle school. In addition, there is money from the grant that covers our small expenditures for the kick-off event.

Date, Time, and Location

For our event, the final date may make it difficult to achieve some of our proposed ideas. The date of the event is December 16, which means it is going to get dark early and be chilly outside. The guest speakers and the accompanying audience are best suited for outdoors (weather permitting) and the booths are best suited for indoors. It is the last day before winter break for Albemarle County Public Schools, so the teachers likely are not going to have a problem with letting the students out of class. The timing of the event, however, is an issue. If the kick-off event is during school hours, parents and community members who work will not be able to attend unless they are able to leave work early. Knowing we were working at a

school, we knew it was not feasible to invite the general public to attend the event. If the event is too late is after school, it may conflict with students' after extra-curricular activities and plans for those leaving town for winter vacation but more of the general public would have been able to attend. Finally, because the kick-off is planned for the last day of final exams at UVa, many of the group members are unable to attend the actual event. We are also having difficulty getting participation from the other groups in our section because they too have final exams or will already be gone. When organizing a kick-off event, it is important to make sure that the final location is easily accessible to all.

ORGANIZING TIMELINE

From the early planning stages of a kick-off event, it is extremely important to plan out a timeline for your process. This way, we can be sure to not fall behind and to make sure we have enough time to complete everything that must get done. A specific timeline of the actual event will need to be planned after speaking and coordinating with our community partner. Here is the timeline we used in planning our kick-off event:

October 5, 2011	Contact community partner, Lindsay Snoddy
October 27, 2011	Discuss ideas with Remy Pangle
November 1, 2011	Design flyer to advertise at discovery museum event
Early November	Acquire supplies to make demonstrations
Early November	Design QR Code to distribute at kick-off
Mid-November	Spread awareness through advertising Finalize Demonstrations
November 13th 1pm-4:30pm	Discovery Museum Event
December 10th	Finalize Schedule with Community Partners
December 12th	Send out Press Release
December 16 9am-11:30am	Kick-Off Event
Late December	Evaluate Event Success

RESOURCES/CONTACTS

When organizing a big event, it is helpful to have a list of all possible contacts that can aid you with your process. For us, the following resources are all important contacts because they have a wealth of knowledge to share:

Paxton Marshall: Professor of Electrical Engineering at the University of Virginia whose research interests include renewable energy, solar power, and sustainable design. Contact information: ppm5y@virginia.edu.

John Quale: Associate Professor of Architecture at the University of Virginia and serves as the Project Director for EcoMod. Contact information: jqd2d@virginia.edu.

Remy Pangle: The Director of Outreach and Education for the Virginia Center for Wind Energy. Contact information: luersrm@jmu.edu.

Lindsay Snoddy: The Environmental Compliance Manager for Albemarle County Public Schools and is our main community partner. Contact information: lcsnoddy@k12albemarle.org.

Susan Guerrant: Librarian at Henley Middle School. Contact information: sguerrant@k12albemarle.org.
Art teacher who is making kinetic art: Creating kinetic art piece for final installation of wind turbine.

Approaching First Contact

The first point of contact with our community partners is very important. The way we present ourselves the first time determined our relationship with them for the rest of the time we worked together. In our first email, we were conscious to be very welcoming, energetic yet professional, and express ideas and expectations for the project. We began by introducing ourselves, (name, occupation, background, etc.) and then continued by explaining how excited we were to work with them. It was very beneficial to attach our project definition in the email to our community partner so they have an idea of in what direction you see the project going. Finally, we closed it with a statement about how we looked forward to hearing back from them. We were very flexible in trying to plan a time and place to meet because we knew that it was likely that our partner will have a much busier schedule than us. We knew that if we were very friendly, the rest of the project will come along great!

DIVISION OF LABOR

It was important for everyone in the kick-off group to work together in making sure everything got accomplished on time. Our kick-off group delegated jobs based on special skills and access to materials. Molly was the leader in preparing the solar demonstrations. Brittany was in charge of the publicity flyer as well as contacting the other groups about their willingness to participate at the kick-off event. Tyler was responsible for the QR Code design and the presentation boards for the event. Meghan was the main contact to Lindsay Snoddy, our community partner, and relaying all information to the rest of the group. Phoebe was in charge of drafting a press release and advertising for the event.

EVALUATING THE APPROACHES

When planning an event, you must make sure to evaluate all possible approaches in creating a successful event. We have created the following criteria for deciding upon different approaches:

Criteria for Evaluating

Effectiveness in educating the public (interactivity, age appropriate, education effectiveness), time (time length, how many people can be involved at a time), topic relevance, cost (supplies needed), feasibility

We have ranked all the initial ideas for activities for the Kick-off Event on a scale from 1-5 for the subcategories and then an overall score for each category. This will help us determine which activities are most important to have if we want a successful event.

Criteria:	Topic:	Presentation Boards	Scale Model of Turbine	Solar Demonstration	Other Groups' Participation	Speakers	Kinetic Art Piece
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Effectiveness in educating:	11	15	13	13	10	11
Interactivity	2	5	4	3	2	5
Age Appropriate Education	5	5	5	5	4	4
Effectiveness	4	5	4	5	4	2
Time:	6	7	7	8	7	8
Time Length	3	5	5	5	2	5
Number of People Involved at a Time	3	2	2	3	5	3
Topic Relevance:	5	4	4	5	4	3
Cost:	3	2	3	5	5	5
Feasibility:	4	4	4	4	5	2
Total Score:	29	32	31	35	31	29

Explanation of Assessment

Our kick-off group uses the following explanations to reason through deciding on different possibilities for activities at the event:

Presentation Boards:

A presentation boards is a good way of displaying facts and information about alternative energy that is easily accessible at the event, and would be mostly appropriate for the adults. The problem with presentation boards is that they aren't very interactive and unfortunately, not a lot of people can stand around a single display board at once. It also might take people some time to read what's on the board and look at all the pictures. Luckily, the only cost would be materials needed to make board such as the board itself, paper, markers, and printing costs. It would be good to have a range of interactivity at the kick-off event to target both adult and kids; therefore, the presentation boards seem worthwhile.

Scale Model of Turbine:

A scale model of the wind turbine that has been installed would be a very interactive model to have at the event. It would be effective because the audience would have the opportunity to see a model of what the final installation will look like. Even though only a couple people can be involved at once, it wouldn't take long to look at the model so many people would have a chance to see the model. This would be one of the more costly options but would be very educational given it would actually be a scale model of the wind turbine the students will be learning from. It could even be a useful model for the school to keep.

Solar Demonstration:

We use different demonstrations to show how solar energy can power objects. These demonstrations may include solar powered bugs that walk when the solar panel harnesses solar energy, a solar panel that lights a light bulb and a solar battery charger. These activities introduce the idea that the sun can give us power,

and give real-world examples of how the energy can be used. The real-world application makes this demonstration highly interactive and effective. Molly has agreed to construct these demonstrations, which are feasible due to low cost and the amount of people that can cycle through to learn about solar energy.

Other Groups' Participation:

This is effective for parents to see what their children have learned and because students can get excited about the projects they have worked on. The students already have projects they are working on in class, and they are expected to be at the kickoff event so this is a very feasible activity. It is important to coordinate with the teachers and the other groups in our project.

Speakers:

Speakers are able to reach a large group all at once, but might not be extremely engaging. Depending on the speakers' areas of expertise, the talk might not be completely on subject. Another issue could be that the speech is too long. In terms of feasibility, having relevant, important speakers come to the event is an ambitious but plausible goal for us.

Kinetic Art Piece:

The kinetic art piece is going to look great and be very engaging. Because it will not have any sort of explanation, it won't necessarily provide any source of energy education; however, it will be a great addition to the kick-off event. Feasibility might be a potential issue because the piece might not be finished in time for the event since we have not been in touch with the art teacher.

EVENT EDUCATIONAL ITEMS

After discussing with Lindsay and Remy we have a more finalized idea of the activities for the Kick-Off Event. Remy has a scale model wind turbine and other activities that she will be bringing to the event. This is something we no longer have to build and now there will be experienced people with how the models are best operated and displayed to the audience.



Student Involvement

It is important to have all the students at the local schools be aware of and involved with the kick-off event. Students from the elementary, middle, and high school are attending, and they have already participated in

activities dealing with the project. The Henley Middle School choir is going to sing to start the event. The hands-on activities planned for the library during the event will get the students of all ages involved and give them a rewarding and exciting experience that promotes clean energy.

Solar Demonstrations

Some small solar demonstrations have been planned and here are the final kits we will have at the kick-off event:

[Elenco Solar Deluxe Educational Kit](#): This kit includes a solar panel that can be equipped with multiple accessories. The main accessory that would be used for the kick-off event would be the light bulb. There is also a fan, but there may be some confusion between a solar panel powering a fan and a wind turbine. Another option is a sound module that can be powered by the solar panel.

[Radiometer](#): In a Radiometer, the sun hits the vanes inside the globe and the reflection and absorption of the light causes the wings to spin. The greater the sun light, the faster the wings spin. This demonstration will be able to show the students that more sunlight means more solar power for electricity.

[Solar Science](#): This kit can be used to boil water or cook an egg in a "solar oven." This demonstration would show how the sun can be harnessed for heat. This kit does not seem to contain a solar panel and can be used to explain how solar panels capture the sun for power conversion just as a "solar oven" can capture it for heat.

[Solar Car Smallest Powered Educational](#) and [OWI Frightened Grasshopper Kit](#): These kits both use the power of the sun to make a small toy move. The first is a small car and the second is a small grasshopper. Both toys have solar panels mounted on top and move when the panel is hit by the sun. A light bulb is also said to work, so this option may be good if demonstrations are being conducted indoors or when there is no sunlight. The solar car can be used to explain other applications of solar panels.

These options were sent to Lindsay for her review and opinion. They were ordered with enough time to get them and experiment with them before the event.

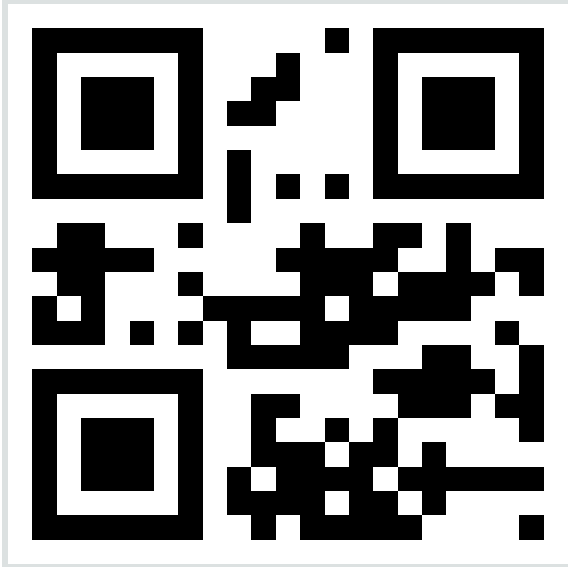
QR CODE

Publicity for the event will be very important in order to have a wide variety of attendees. With the increasing use of smart phones and after talking with our community partner Lindsay, we saw the need to generate a QR Code that we could hand out as stickers or have people directly scan at the event. The code would link smart phones directly to the website that tracks the energy being created through the renewable energies at Henley. Lindsay is under the impression that we can create a custom code and design the image to represent a wind turbine or sun for free. We have not gotten the link from her as of yet, but have looked into the design of the codes. Through some initial research we have seen two options for the codes. We can either get a free code generated but only control the URL and the color of the code, we can or get a custom image (the sun or a turbine) created for a fee. We can print the code on adhesive paper to create stickers ourselves.

Possible links that will be helpful in creating a QR code include the following:

Site with free generator and sticker layout: <http://www.qrstuff.com/generate>

Site to get a custom image created: <http://www.customqrcodes.com/>



This is an example of a custom QR Code from the first generator site.

For the final code, we wanted a custom code that incorporated exciting graphics dealing with clean energy. This is the final code that we came up with:



Presentation Boards

Presentation boards are a very effective way to portray information for groups of interested visitors and do not necessarily require people to work them. Therefore, it is important to make creative and informative presentation boards for one's kick-off event. The presentation does become more engaging with someone who can answer questions and explain the presented concepts more in depth. The boards need to be simple and effective but portray a good amount information without being cluttered or wordy. The boards will be aimed more at the older crowds i.e. the high schoolers, the faculty, and the parents as there will be more effective activities for the younger students. After discussing with Lindsay, we are planning on a board explaining the benefits of clean energy, a board explaining the types of solar power technologies at Henley, and a board explaining wind energy technology. We have funding from the grant for printing costs and plan on attaching the plotted prints to regular size presentation boards (a tri-fold that is 48" wide by 36" tall).

Clean Energy

Renewable Supply

- The reserves of fossil fuels are expected to run out in the next 150 years.
- Solar, wind, thermal, and tidal energy technologies rely on sources that are much more prevalent and do not take millions of years to produce in their raw form.

Less Invasive

- Clean energy technologies do not require digging and harvesting as fossil fuels do.



Problem Introduction

The world's energy supply is currently based upon fossil fuels: coal, oil, and natural gas. These fuels were discovered long ago and have become efficient and inexpensive ways to produce energy as our economies and infrastructures have continued to evolve around them. In recent years we have started to realize the implications of harvesting and using fossil fuels. Harvesting fossil fuels is often an environmentally intrusive process and as the finite supply has continued to diminish, the process is searching to further depths and measures to obtain these fuels. Once the fuels are produced, they burn harmful chemicals into the atmosphere which have started to have a dramatic impact on our environment. These fuels are concentrated in various regions but many are abroad and force our economies to rely on political relationships with other countries. Moving towards clean energy technologies could help curb these problems before we run out of energy sources completely.



Less Emissions

- Carbon Dioxide and Nitrous Oxide are chemicals released by burning fossil fuels and they contribute to global warming.
- Sulfur and Nitrogen Oxides from burning fossil fuels contribute to acid rain
- Hydrocarbons produced along with the Nitrogen Oxides create smog.
- The actual processes of using clean energies for power are named aptly because they do not release these harmful chemicals.



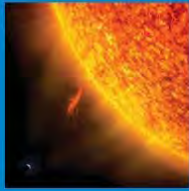
Local Jobs

- Installing infrastructures for clean technologies is something that must be done on site which would create local jobs.
- Our economy can be based locally and regionally with clean energy rather than relying on global supplies.

Solar Energy

The Power of the Sun

- Every second the sun produces 2 trillion times the amount of energy we get from power plants annually.
- The sun is constantly shining and provides a great source of energy each day depending on the cloud cover.
- Solar technologies are now becoming more efficient so that the use of them will become economically viable.



Solar Electric (Photovoltaic Panels)

How It Works



How Much It Produces

The array of panels at Henley will produce 44,000 kWh of electricity per year. That's the equivalent of the energy required to run 65 full-size refrigerators for the same time, saving Henley \$4,000.

x 65!

Solar Thermal (Water Heat)

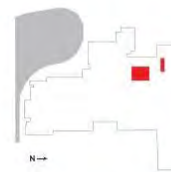
How It Works



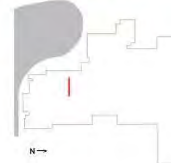
How Much It Produces

The Solar Thermal Cells at Henley will produce 774 MMBoU of energy per year. That's equivalent to 5,000 gallons of fuel or 60% of Henley's annual need for hot water.

Installation Areas



Installation Areas





FINAL EVENT

After ranking the potential activities for our kick-off event, we found that the participation of the elementary, middle, and high school students was ranked highest in all categories. While the presentation boards were ranked lowest, it is still important to have these at the event so that we have activities with varying levels of interactivity. The ranking system helped us prioritize which activities to spend our time and energy coordinating. It was also useful chart to show our contacts as we discuss and listen to their expectations for the event.

Final Schedule

Henley Middle School
Renewable Energy Resource Center Dedication Event
Date: December 16, 2011
Time: 10:00 am – 11:10 am

Setup & Preparation

8:00 am – 9:45 am: Set up of demonstration tables in Media Center

Dedication Event

10:00 am – 10:10 am: Students released to go outside (students go to gymnasium if weather is bad)

10:10 am – 10:25 am: Welcome and Ribbon Cutting
 Welcome by Dr. McLaughlin, Henley Principal (5 minutes)
 DMME Check presentation, ribbon cutting (5 minutes)
 Wind turbine operational and photos (5 minutes)

10:25 am – 10:35 am: Transition from outside to gymnasium

10:35 am – 11:10 am: Gymnasium songs and speakers
10:35 am – 10:45 am: Songs by Henley Chorus
10:45 am – 10:50 am: Department of Energy Representative (Tentative)
10:50 am – 10:55 am: Henley Student Presentation (Environmental Club)
10:55 am – 11:00 am: Wind for Schools Representative (Remy Pangle)
11:00 am – 11:05 am: Baker Renewable Energy (Richard Wright)

11:10 am: Dismissal of students to classrooms by Dr. McLaughlin

Media Center Informational Tables

Media Center information tables will be available following the speakers and throughout the day. Teachers can visit the media center with their students as their classroom time permits.

Table 1: Overview of lessons at Brownsville Elementary
Table 2: Overview of lessons at Henley Middle
Table 3: Overview of lessons at Western Albemarle High School
Table 4: Solar Demonstrations
Table 5: Solar Demonstrations
Table 6: Solar Demonstrations
Table 7: Poster presentation for each renewable energy system
Table 8: Poster presentation for each renewable energy system

Invitees

- Henley students & staff
- Albemarle County School Board
- Dr. Pam Moran & administration reps
- Albemarle County Board of Supervisors
- Community Development Representatives
- Media (lead: Lindsay - press release coordinated through Phil Giaramita)

CONCLUSION AND FUTURE WORK

The event should be a really big success given the variety of activities and speakers throughout the day. Tyler, Molly, and hopefully Brittany will be present at the event to man some of the informational tables in the media center throughout the afternoon portion of the school day. We will also be helping Remy and Lindsay set-up in the morning and make sure everything is organized and ready to go. We hope to have a great turn-out and gain enthusiasm from the students about alternative energy.

Lessons Learned

We have gained experience from the entire process of organizing a Kick-off event. Much of what we have learned will be beneficial for future event planning. The most important thing was to stay flexible through everything. Dealing with community partners was a difficult task but rather than getting frustrated, we had to continue to try and get in contact with them and plan as much as we could do at the moment.

Understanding what our task was and what the community partners were expecting us to complete was very important. We had to keep the event and the students in mind rather than focusing on completing the

tasks for our class and working solely with the community partners. Our planning went from very broad with many options to more specific and whittled down into what events were actually going to be incorporated into the event. This was a good way of working as we could see what plans worked from the groups working with the schools already and what the community partners had in mind.

Dissemination

We have created a how-to guide in order to teach future students assigned with the same task how we accomplished our event. The guide will be formatted and compiled with the guides from the other groups in the energy education workshop and then uploaded onto the Wind For Schools website. Now the guide will be available for all to view and we hope to continue wind and energy education for young students.