

Minnesota Campus Energy Challenge 2009

Analysis and Recommendations

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Executive Summary

The Minnesota Campus Energy Challenge (MCEC) is a competition designed to engage college campuses in energy reduction. The competition is an enjoyable way for individuals and institutions to examine and creatively reduce their impact in context of the global overconsumption and unequal distribution of energy draw. This year's 2008-2009 energy competition was initiated by students at Macalester College in St. Paul, MN who worked closely with statewide organizers from several other colleges in Minnesota. The coordinators based their efforts on the organizational efforts of previous years. MCEC was first run in the 2005-2006 academic year when schools across Minnesota competed to reduce their colleges' energy use during the month of February. The following year students at Macalester College working with others from peer institutions in Minnesota attempted to organize a national competition. However the coordinators were overwhelmed by the amount of work necessary for such an undertaking. Recognizing the need to develop, test, and refine a competition model on a smaller scale, the 2008-2009 Macalester organizers limited the energy challenge to Minnesota schools. The results of the 2009 competition are mixed. Eight colleges across the state participated; only 2 reduced their heating energy consumption while five reduced their electrical energy consumption. The MCEC idea does, however, have huge potential for bringing Minnesota students together to reduce campus energy use and examine personal and institutional strategies for energy reduction. There are several strategies that Minnesota and especially Macalester organizers can implement to improve the statewide and on-campus systems for increasing participation, improving data collection, and reducing energy consumption. This report is an analysis of the MCEC 2009 from the point of view of the principal state organizer, Arielle Miwa

Oseki Robbins, the principal Macalester College campus organizer, Liz Foster, and the data and calculation expert, Dominika Seblova.

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MCEC 2009 Analysis and Recommendations from Arielle Miwa Oseki Robbins,

State organizer and point person for The Minnesota Campus Energy Challenge, February 2009

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1.1 Why I Became Involved

I first heard about campus energy wars and Macalester's past involvement in them at Minnesota Powershift in early fall 2008, which quickly led to me finding out more from Macalester sophomore, Matt Kazinka. Kazinka told me that last year Macalester had, for the first time, tried to run a National Campus Energy Challenge (NCEC). For a few years before that Macalester played a key role in organizing smaller scale energy challenges with nearby schools. Last year's NCEC resulted in a few dedicated students at Macalester feeling overwhelmed and

burnt out by the responsibilities and burdens of trying to run a national competition. For this reason many of those involved in past years did not want to play a major role in organizing an energy challenge this year.

To me, such an energy challenge seemed like a great idea for which a lot of groundwork had already been set, and therefore it would be a shame to completely turn our back on such an idea. The energy challenge also reminded me of something I had done at my high school: a campaign to reduce the use of paper and plastic goods by promoting a total switch to ceramic and silverware. I did this by organizing a competition similar to the MCEC within my high school. Having some experience, I felt organizing an energy challenge would be a great next step for me.

So I talked more to Kazinka and decided I would try to create some interest and organize an energy challenge on the state level. We felt that this would allow us to be more effective with the limited time, resources, and people we had. As part of the planning process, we discussed an ultimate goal of creating an easily replicable model that could be adopted in other states or regions.

The rest of this paper summarizes and analyzes the 2009 process and makes recommendations for the future based on my experience. I served as the state coordinator and overall point person in 2009. This meant I delegated tasks and kept other group members accountable and kept us on schedule to make sure the competition progressed smoothly.

1.2 Minnesota Campus Energy Challenge: February 2009

By mid to late October a core group of seven Macalester students (Miwa Oseki Robbins, Elizabeth Foster, Dominika Seblova, Matt Kazinka, Olivia Posner, Allison Kappeyne, and Natalie Locke) had come together and decided to work on the Minnesota Campus Energy

Challenge 2009. This group would later draw in a few more key students, including Robert Hemphill and Meridith Richmond. Oseki Robbins, as state coordinator, had also connected with two students at St. Olaf College, John Vanderlinden and Emily-Rose Pfaltzgraff, who had agreed to help organize at the state Level.

The wheels were set in motion and an enthusiastic, committed group of students was involved. It was a group of mostly freshmen with a few sophomores, Matt Kazinka, Dominika (Nika) Seblova and John Vandrlinden, who had been involved in last year's National Campus Energy Challenge.

Work was more or less split up into state level and campus level organizing with Oseki Robbins serving as the main liaison between the Macalester campus and state level organizing. Among campus organizers different leadership roles also emerged, which will be addressed later.

State organizers Oseki Robbins, Pfaltzgraff, and Vanderlinden worked first to connect with as many schools as possible to obtain a commitment to participate. Here arose the first obstacle: how were state organizers to get the word out to schools across the state that Macalester was once again organizing the energy challenge? In the end eight schools, including Macalester, participated in this year's Minnesota Campus Energy Challenge. This number is lower than organizers hoped and the issue of obtaining wider school participation should be addressed for future years.

Once organizers had done their best to reach out to schools across Minnesota, they sought to establish a few point people at each school to simplify communication. They then moved towards obtaining baseline energy use data from the past three Februaries from each school. In terms of obtaining baseline information, what was needed was already determined from past years so an online survey was easily created to collect data. All participating schools were

required to submit baseline data by the start of the competition, February 1st. The survey was created using Google surveys and posted on the TEAM Minnesota website.

Meanwhile, back on the Macalester campus, organizers divided the month of February into 4 broad themes and appointed point people for each of these themed weeks. Richmond and Oseki Robbins worked closely to organize the first week of events that centered around The National Teach-In on Global Warming. The National Teach-In on Global Warming was a nationally coordinated day focused on global warming and policy recommendations for the new Obama administration. It is also a remaking of an event called Focus the Nation that was a big success on the Macalester Campus in 2008. Due to the timing of the National Teach-In, organizers decided it would be a fitting way to start off MCEC because it related the energy challenge to a broader context of global climate issues.

Foster was in charge of the 2nd week, which concentrated on environmental justice; Hemphill and Kappeyne took the 3rd week, which focused on environmental politics and policy. The 4th week was Kazinka's and led up to Powershift by focusing on continuing community action. Foster emerged as a de facto campus organizing leader. Kappeyne and Posner emerged as the two most visually and creatively talented group members; they became the go-to people for making posters and publicity materials. Seblova served as a valuable resource and leader because she had been involved in last year's NCEC and was the technical expert on the collection and analysis of the energy data. She computed our numbers using a complicated spreadsheet. Kazinka and Locke served as the two people who were the most familiar with Macalester communication networks and so were very helpful guides to those of the group who knew little about whom to talk to order to get things done.

The division of roles and delegation of responsibility for the campus organizing was effective in many ways but could still be improved. Certain things such as the enthusiasm of members, voluntary participation, and the relatively small size of the group led to group cohesion and trust between group members. The delegating of tasks worked well to make all members feel that they had an integral role; it inspired them to take ownership of the competition as a whole. But the on-campus organizing lacked a clear goal or direction for all the great ideas and events that the Committee organized. Essentially what was needed was a better strategic plan that outlined our objectives so that organizers could structure their events and actions to meet these goals. The lack of such a strategic plan resulted in somewhat of an inability to evaluate the effectiveness of the organization. As a result there was neither closure nor a sense of accomplishment at the end of all the hard work. This is the second big issue that should be addressed for future years.

Once February was over state organizers proceeded to collect final data from the participating schools by creating another online survey. The survey included questions to help organizers evaluate other schools' opinions about the success of MCEC '09. As of May 2009, this process was not completed for the 2009 MCEC because the data from one school was still not correct. Without the final data set, the final standings for 2009 could not be computed. But for the seven schools for which results were calculated, overall schools reduced their electrical energy use but were less successful in reducing their heating energy use. Five out of seven schools were able to reduce their electrical energy use with decreases ranging from 2 to 16%. Only two schools were successful in reducing heating energy use (both by 8%) while the rest of the schools had increases of as much as 8%. It is hard to say exactly why schools had a difficult time reducing heating energy use, but one hypothesis is that most heating in school buildings are

not controlled by individuals but by building managers or facility departments. Unless institutional changes were made it was hard to change the energy used for heating. In order to make the actual energy reductions more dramatic in upcoming years, schools should be advised on effective ways to cut back on energy use. A section on a future website could address effective individual and institutional energy reduction strategies such as listing the most energy efficient appliances and lowering building thermostats by several degrees.

In terms of publicizing results, this year an individual email was sent to each school informing them of their individual percent reductions (or in some cases increases) and their current standing among other schools. A disclaimer was included to explain the competition standings because there was still one school with incorrect data. It would be helpful in the future to have a website where the final results could be published along with a press release or some other kind of publicity information that schools could use for school newspapers and potentially local, regional, or even national news sources. An archive of these results would also help to give schools a sense of what has been done in the past and a foundation for setting future goals. It will also serve as a way to track schools' progress over multiple years.

Looking over the whole process, including the two already identified areas of needed improvement (increased communication and a better sense of closure on Macalester campus), two more areas of improvement can be identified. First of all, on the state level, organizers would have greater success and enjoy the process more if better group cohesion and trust were achieved between the individuals. The lack of trust and cohesion was largely due to the fact that there was little to no personal contact. Secondly, MCEC would attract more participation if competing schools had a more concrete way to measure their success and therefore experience a

sense of accomplishment. This would require a systematic and clear method to provide benchmark feedback to schools and students. **1.3 Areas of Needed Improvement**

Area 1: Effectively Involving a Wide Range of Campuses Across the State The primary goal of MCEC is involving and engaging a diverse variety of campus communities while reducing energy. It seeks to involve especially those who are not usually involved in environmental issues to raise awareness and start conversations about energy conservation and behavior changes. Part of reaching this goal is involving a wide range of schools that are not just the small, private liberal arts schools of Minnesota.

The larger mainstream environmental movement has struggled with being a predominantly white, privileged movement. This classification must be actively challenged by an intentional effort to reach out to those who do not fit this stereotype. Organizers of MCEC must find ways to make energy conservation relevant to all in order to reach the goal of engaging a diverse array of campuses. This means reaching out to and striving for a wide participation base for MCEC. The first step in doing this is finding effective ways to disseminate information about MCEC so that a broader range of schools hear about the competition. The second step is looking at what will motivate different schools to participate. The 2009 MCEC outreach process was sporadic and not well organized. Not knowing where to start, state organizers obtained a TEAM MN contact list that contained over 500 individual student contacts. From this list organizers tried to find and contact a few people at each school who they knew had been recently active in some kind of sustainability work. State organizers also obtained a list of colleges, universities and high schools in Minnesota by using Wikipedia. However this comprehensive list was too long to be useful without a method to contact students from each school. Organizers attempted to engage schools by emailing an Environmental Studies professor in hopes of getting

a reply. This was done for a number of schools but did not recruit a significant number of schools. The result was participation of eight schools: Macalester College, Saint Olaf College, College of Saint Benedict, Saint John's University, Winona State University, Gustavus Adolphus College, Bemidji State University, and Carleton College. Of these eight schools only one, Bemidji State University, had not participated before in the energy challenge; they heard about it from both e-mail and the Upper Midwest Association for Campus Sustainability list serve. Also the original goal of ten to fifteen participating schools was not met.

Recommendation for Following Years Based on this outreach experience, a few key questions should be answered to make MCEC outreach more effective:

- **Credibility:** will an informal e-mail from an unknown student acting as the state coordinator be taken seriously?
 - Who do we choose to target? What kind of schools do we want?
 - How do organizers effectively message to catch people's interest?

On the first front, in order for people to be willing to consider participating, they need to feel that our invitation to join the competition is legitimate. There are a couple key ways to do this:

- Have a website of our own or some tangible place to which organizers can direct people who want more information
 - Recycle mania's website, <http://www.recyclemania.org>, is a useful model that has all the key components that would make a successful website. These include:
 - A general overview of the competition, including its history and purpose
 - Rules of the competition and any eligibility restrictions
 - A list of participating schools with ability to see data for all competitors as accumulated over many years of participation

- Forms needed for submitting data and signing up for the competition
 - A results page where not only the results of the current year are posted but past years as well
 - A tool kit with sample events, planning strategies, and publicity/press materials, etc.
 - A photo gallery or blog allowing schools to share their experiences
- Build partnerships and attempt to receive sponsorship and/or help in advertising from already established networks and organizations
 - Some networks and organizations that should be utilized:
 - TEAM MN (The Transcampus Energy Action Movement)
 - YEAH MN
 - UMACS (Upper Midwest Association for Campus Sustainability)
 - CERTS (Clean Energy Resource Teams)
 - Minnesota Energy Challenge
 - MNSCU (Minnesota State Colleges and Universities)
 - Will Steger Foundation
 - Clean Water Action Coalition
 - ClimateCulture.com / America's Greenest Campus
 - Macalester Sustainability office contact list
 - Macalester Civic Engagement Center outreach list
 - Many of these recommendations come from feedback from participating schools in response to the question “what do you think would be the most effective way to get the word out about MCEC in future years?”

- Of these networks and organizations only TEAM MN and UMACS were used for MCEC '09. An attempt was made to use YEAH MN and America's Greenest Campus, but these were not used effectively because of communication break downs and lack of time to organize.
- Build a database of individuals, list serves, etc. from all participating schools
 - This could be done using a google group which would have the advantage of members being able to easily edit and update information, which is especially important as organizers graduate and new students take their place.

On the second front of deciding who to target, clear goals should be set. Setting and being aware of such goals will help organizers reach them as well as guide them in effective messaging and framing that will resonate with the groups we are targeting. Based on the experience of MCEC '09, a reasonable goal for next year would be to have 15 participating schools.

- At least five of these schools should be schools that have never participated before and colleges that are not small liberal arts schools but state or community schools.
 - To achieve this goal outreach done through the already established networks should be followed up with individual e-mails to the targeted schools.
 - Effective framing and messaging should be used that resonates with the groups being targeted.
 - One theme that might appeal is the economic or community building advantageous of MCEC as well as the environmental benefits of the competition.

Thirdly, as touched upon in the second point of setting goals of targeting specific kinds of schools, messaging and communication techniques must be used that motivate and catch community member's attention. This means a couple of things:

- Combining the use of established networks to give MCEC credibility and visibility while balancing such communication methods with personalized e mails and/or phone calls to individuals
 - The more personalized communication should specifically explain why it would be beneficial for the individual or school to participate
- Have a prize for the wining school. An ideal prize will have some key qualities:
 - It should be visible
 - It should catch the interest of a wide range of people, not just those who care about “the environment,” but it should still be something that is sustainable because it does not create waste or use energy.
 - It should be financially self-sustaining so that there can be a consistent guarantee of a prize.

The best prize idea is a bike-powered blender. The bike-powered blender would spend the year at the winning school and could be used to advertise MCEC, increase interest, and raise money. The money raised by selling smoothies would be used to keep the bike in good condition and pay for the smoothie ingredients, making it financially self sustaining. Some of the profits made from selling smoothies could also go to maintaining the MCEC website or other small annual fees. This prize would be a fun, visible way to advertise MCEC, would appeal to more than just those who generally consider themselves environmentalists, and would raise money allowing it to be financially self-sustaining. **Area 2: Creating a Comprehensive and Clear Strategic Plan for**

On-Campus Organizing This area of needed improvement will be addressed more thoroughly by Liz Foster in the following section. But from the perspective of the overall point person the first thing that must be done is the establishment of a clear campus goal, whether that be a certain percentage of energy reduction or a specific turnout at events. Some measurable and clear goals should be established to help direct the actions of organizers. Once a goal is established, the creation of a “power map” showing the diverse groups and individuals on campus and how they connect to each other would help organizers target their efforts and involve more people on campus.

Area 3: Improving Group Cohesion Among State Level Organizers

At the state level there was a lack of group cohesion. There was little personal contact and therefore little trust or ownership over the work. Addressing this is important because it will help organizers be more effective and stay motivated if they feel a sense of commitment to themselves, their schools, and to the other participants. **Recommendation for Following Years**

A step in the right direction would be to create an opportunity for state organizers to meet, ideally by holding a weekend retreat. This retreat would be held in the fall to serve several purposes:

- It would be an opportunity for state organizers to meet and talk so that they know the people they are organizing with in order to develop group cohesion.
 - It would also serve as an opportunity for point people from participating schools to meet, share ideas, and motivate each other before the start of the competition.
 - A retreat could also include some non-students, perhaps facilities or sustainability office staff, so that organizers can work more effectively to build on-campus relationships with these bodies. It could also be very interesting to get someone

from, for instance, the Minnesota Energy Challenge (a state wide organization that helps households monitor and reduce their energy consumption) to talk with organizers and give his/her perspective on what works and does not work to reduce energy consumption.

Funding and space need to be secured in order to pull off a successful retreat. It is likely that some organization, like the Will Steger Foundation, would be willing to donate a space. The attending individuals would be in charge of finding their own transportation (with ride sharing and carpooling encouraged) and contributing to a fund that would pay for food. In order to make sure that such a retreat was open to all, which would be consistent with creating a competition that involves a wide range of people, a type of scholarship or financial aid mechanism should be put in place so that any individual wanting to attend would be able.

The atmosphere of the retreat could be very casual. The organizers could bond with cook-out style meals and perhaps overnight camping if the space is available. Hopefully everyone would leave the retreat feeling committed to and excited about the upcoming competition. The overall aim of the retreat would be to build a community working towards a common goal. **Area 4: Providing Tangible Feedback to Participating Schools and Student Bodies on Energy Reduction Progress**

The energy challenge has also greatly lacked concrete and timely feedback that would allow schools and individuals to feel as though they have made progress. This kind of feedback is important in motivating further action and participation and in giving people a sense of accomplishment. Providing such feedback can be difficult for several reasons.

First, the competition is only a month long and results are often not known until mid to late April as demonstrated by this year's competition for which final results are still not

complete. Obtaining accurate feedback for smaller time increments is difficult since bills are received on a monthly basis. Macalester attempted to obtain weekly data by reading the meters each week. However organizers found the numbers hard to interpret or unreasonable and so the weekly meter-read data was not used.**Recommendation for Future Years**

One way of giving feedback that seems like it would be beneficial and feasible is to create online accounts so each participating school can track their progress from year to year. Such a system would be forgiving to time delays in the delivery of monthly bills and would give incentives to schools to continue to participate year after year.

Such a system could also lead to an expansion of the competition where schools could enter data for every month of the year rather than just February. The system would allow schools to track their energy use and conservation efforts consistently over many months and years. Such a tool could be very valuable for sustainability offices, administrators, staff and students in making long-term decisions that would affect energy use and campus sustainability.

1.4 Moving forward

Even though the MCEC has great potential for energy reduction and network building, there is still a lot of room for improvement. The groundwork is in place for the Minnesota Campus Energy Challenge to become a valuable competition that can help foster a culture that promotes and values sustainable practices. For these reasons it is worth the effort to continue building on the foundation already in place. To achieve this goal outreach done through the already established networks should be followed up with individual emails to the targeted schools. The most effective way to do this would be to give students the ability to devote the time and energy necessary to create a successful energy challenge by having a sustainability student worker position or an independent study that could be devoted to organizing MCEC. If

all recommendations are implemented, initial implementation of them could take a substantial amount of effort. Such a position would be most valuable during J-term right before the start of the competition but could be valuable at all times of the year.

In conclusion, the first key action steps that should be taken in order to have a more effective Minnesota Campus Energy Challenge are:

- Create a comprehensive website that includes a tool kit and/or manual, the history and purpose of MCEC and a way to track data
 - Update the manual from last year's NCEC. Although the manual is comprehensive, it is also very dense. An accompanying, user-friendly, action-based tool kit would also be valuable.
- Compile a database of contacts and list serves, including networks and organizations that can be used for outreach.
- Decide the logistics and system that will be used for a competition prize.
 - The process for this has already begun with the securing of \$1000 of grant money and investigation into a bike powered blender.
- Organize the logistics of a MCEC retreat for the fall, the first of which should be in the fall of the 2009-2010 academic year before the 2010 MCEC competition.

Macalester Campus MCEC Organizing Structure and Activities

Analysis and Recommendations from

Liz Foster, Macalester College organizer and point person for The Minnesota Campus Energy

Challenge, February 2009

2.1 Overview

2.2 Structure

2.3 Process

2.4 Activities

2.5 Data Collection and Monitoring

2.6 Recommendations

2.1 Overview

Macalester College has participated in the Minnesota Campus Energy Challenge (MCEC) for four years. Beginning in 2005, students at the college helped organize the on- and off-campus competitions. The level of participation and energy consumption from this competition are disappointing but provide a standard for future goals. Macalester placed third in the heating energy reduction and seventh in the electricity reduction category. Overall the energy draw on campus actually increased, by 3% for heating and 6% for electricity. In order to improve the energy reduction and long lasting impact at Macalester, there are strategies that MCEC organizers can and should apply in subsequent years.

2.2 Structure The Minnesota Campus Energy Challenge 2009 was organized by a core group of students at Macalester College whose structure and approach could be very effective if it were more formally organized. The MCEC Coordinating Committee was informally led by one student who took responsibility for assembling a team and beginning state-wide outreach. The Macalester core team consisted of eight students, three of whom had been involved with the 2008 MCEC competition. Although the role of the initial leader was the most formally acknowledged and was never disputed, the roles of the rest of the team were more equal and the level and focus of work was determined by personal interest. Committee members voluntarily took responsibility for planning events oriented around sustainability/energy reduction themes such as the Politics and Policy of Energy and Environmental Justice. The non-hierarchical structure allowed considerable creativity and networking with the larger Macalester community during the planning of the competition. The MCEC team requested and received valuable assistance from students, professors, and administration in the form of ideas, logistical support,

and information gathering. The loose organizational structure, while adequate, should be more formalized in a way that preserves the camaraderie and non-hierarchical structure while also formalizing positions and creating accountability. **2.3 Process**

The MCEC Committee met once a week as an entire group (all eight members) to update each other on specific projects and to discuss further work. The creation of this space reflected the loose organization of the group, which is also a model for how an effective decision-making process can be created. Each meeting had a loose agenda set by the leader of the team that was augmented as necessary by the other members of the group. Meetings typically began with a quick go-around during which members would share their progress since the last meeting and list priorities, questions, and/or topics of discussion for the group.

The MCEC team meeting was used most effectively as a way to update members, to brainstorm new ideas, and to problem solve. It was not used as a work space for the completion of individual or group projects. This was an effective structure for completing work except when general initiatives that related to the success of the entire campus competition overlapped with the realm of responsibility taken on by an individual organizer. The overlap of responsibility occurred most often with general MCEC publicizing or energy reduction research and could be remedied by the designation of more formal roles (see Recommendations section). Overall, however, an hour-long weekly meeting with individual updates, team collaboration, and problem solving is an effective organizing space that fits well with typical student schedules.

Outside of the weekly team meetings, Macalester organizers communicated by email. In general this was an appropriate and effective means of communication for the scale of planning. Email facilitated document sharing and established an informal method of record keeping. It was also a communication strategy that lent itself to quick responses and the inclusion of all

organizers with access to the internet. Some organizers, however, were frustrated by the amount of mail received. They found the number of emails, approximately 25 each day, overwhelming and unnecessary. While the MCEC Committee members were active and careful to check and respond to emails, this method of communication depends upon technology and personal motivation. Email functioned as a continuation, not a substitution, of the face-to-face Committee meetings. Reflecting the loose non-hierarchical structure of the Committee, a formal system of decision making was not established. Individual Committee members took responsibility for specific events or projects and assumed control of those activities. The group decided as a whole entity, through the process of brainstorming, collaboration, and debate, the priorities of the Committee. Even though no major disputes evolved, the goals of the MCEC competition were never specifically discussed. The Committee, for example, did not set a target for energy reduction. In a similar oversight, the Committee did not discuss recruitment or inclusion of multiple campus groups in a systematic way. The committee informally acknowledged the importance and mutual desire to include a large portion of the campus population and to expand the reach of MCEC beyond the circle of students involved in campus environmental work, but the Committee did not specifically define these goals or implement policies to reach them. **2.4**

Activities The Coordinating Committee organized many events through the month to celebrate and promote MCEC with mixed success. There were three broad stages of events: opening day, combined activities with National Teach-In, and weekly themed occasions. The different events varied in success because of varying levels of participation, perceived lasting impact, specificity, creativity, and clarity of purpose. Almost all of the events were educational in nature and lecture-formatted. The attendance and impact of the events can best be improved with earlier advertising and creatively-structured, energy-reduction-specific events.

The opening day celebration was one of the most successful because it was a creative activity that highlighted the purpose of MCEC. On February 1, one of the Committee members arranged for bluegrass singer Charlie Parr to perform on campus. The event supported the mission of MCEC because it was an acoustic concert, and because the venue (Kagin Commons) was used as a place to promote MCEC and to collect signatures from students who pledged to practice energy-saving behaviors. The opening event was one of the most well-attended events of the 2009 competition. The attendance was probably not the result of extensive advertising, which began only several days before the competition because of the confirmation of the performance date. Attendance was probably high because of the unusual, partly entertainment-oriented nature of the event. An acoustic concert is an example of an even that exemplifies one way that activities can be improved in the future: imaginative events that are outside the realm of usual student organization events (such as lectures) draw in more participants and provide the opportunity for students to connect more positively with environmental goals. The Macalester MCEC Committee also recruited and worked closely with another student and the Sustainability Office to plan events that combined the kickoff of MCEC with the National Teach-In (NTI). NTI took place on February 5 to promote sustainability work at the beginning of the Obama Administration's first 100 days in office. The night of the 4th, the President of Macalester College spoke and introduced a webcast that was provided through NTI. This event was unfortunately under attended despite significant efforts on the part of the NTI Macalester organizer. There might have been some confusion in the student body concerning the relationship of NTI to MCEC; they are not officially affiliated but were co-sponsored events at Macalester. Beginning at 9 am on February 5th, there were back-to-back lectures about a multitude of topics all including some aspect of sustainability. The lecture series was unusual

because it included student presentations, talks by faculty from multiple departments on campus, as well as appearances by experts and activists from off campus.

Despite the low attendance at the NTI events, the coordination between it and MCEC has significant potential as a space for discussion and learning at Macalester. One way to expand participation would be to more creatively advertise by making use of chalking, internet, or unusual promotional techniques. It would also be helpful to post a list of events and information on the Sustainability Office website. While the diversity of speakers and topics on February 5th was the strongest aspect of the combined NTI/MCEC events, the MCEC was not discussed at any of the lectures. In future years, the wider vision of sustainability discussed from Twin Cities, national, and international perspectives during the NTI events could also include a workshop or lecture pertaining to the competition. Overall the NTI has the most potential as an education-oriented MCEC co-sponsored event because it provides space for creative presentations, diverse topics, and MCEC representation.

One creative idea of the Coordinating Committee that was new in 2009 that could be better incorporated into future years was the organization of events around weekly themes. Each week in February was assigned a theme around which events and speakers were organized. 2009 topics included Energy in All Its Forms, Energy and Politics, and Environmental Justice. The purpose of the weekly themes was to maintain motivation during the competition through an interesting series of connected events focusing on environmental education. From an organizer's perspective, the creation of weekly themes provided space around which to organize and delegate work. However the scope of the lectures was too broad to effectively convey the message of the energy challenge. When the Committee informally solicited feedback from the Macalester community, several students who responded remained unclear about the relationship

between the series of weekly events and the ultimate energy reduction goal of MCEC. The weekly themes would have more impact and connection to the competition if the topics more closely pertained to energy. Workshops, lectures, home or dorm audits, and other activities as well as the themes should be more narrowly focused on energy use so that the organizing framework of events directly supports the purpose of the competition.

The events planned in response to the themes were also not as effective as they could have been because of limited advertising and similar structure. The publicity of the events was usually complete in the sense that many established venues of promotion (The Daily Piper, posters, a mural in the Campus Center, and table tents for example) were used. However publicity for most of the events was not obvious until several days before the event. In terms of the actual events, the number and structure of them were limited by the Committee's timeline and by the Committee's underestimation of the work required to arrange discussion panels. During its planning meetings, the Committee had envisioned twice-weekly events of a diverse type. Brainstormed ideas included webcasts, movie screenings, poetry slams, and speakers. Unfortunately only one event per week was organized and all of them were panel discussions or lectures. Weekly themes with multiple events have the potential to sustain interest in the competition and support its purpose if the events are specific, well-advertised, and imaginative.

This formula for success (publicity, creativity, specificity) is a simple framework within which future MCEC Committees can plan events. One area not explored in the 2009 competition for which this formula might have to be modified is events organized specifically to involve faculty and staff in the competition. During the 2008-2009 academic year, faculty have significantly contributed (in partnership with the Sustainability Office) to designing a Sustainability Plan for Macalester. As a part of the planning process, faculty members have

suggested multiple strategies to mitigate Macalester's environmental impact and to improve its social and fiscal sustainability. Faculty members have also raised specific concerns about the negative environmental impacts of some office, department, or campus wide practices. Especially because the Macalester faculty is already so invested in the sustainability of the college, the energy challenge Committee should seek to engage them. Faculty could be involved in "Department Wars," a competition to reduce energy between offices (the administrative equivalent of Dorm Wars), as speakers or workshop facilitators, organizing partners, or in other roles. The first step toward involving the staff at Macalester would be for students to learn about and acknowledge their current efforts. Bon Appétit and the Macalester Facilities Department in particular have implemented a number of environmental programs that are not well known. Macalester would see a greater reduction of energy and a greater adherence to the broader tenets of sustainability if the whole campus was more involved in the competition. **2.5 Data Collection**

and Monitoring One of the challenges that the Committee faced during the 2009 competition was data collection and monitoring. Receiving accurate information in a timely manner is a logistical problem that needs to be resolved for the success of the energy challenge. The MCEC Committee tried to obtain data at several points during the competition. With the intention of publicizing the information and modeling the data collection that would be necessary to organize dorm or office energy reduction competitions, the Committee attempted to collect weekly data. However the information only reached the Committee for the first week of the competition and could not be used because of significant potential errors that indicated illogical energy use. The Committee also had difficulty obtaining energy data information for February 2009. The lag in data collection made it impossible to publicize the results or encourage reflection while the competition was a topic of discussion on campus.

In order to run a successful campus energy completion in the 2009-2010 academic year, a process of data monitoring and collection needs to be researched and established. Establishing a relationship with the Facilities Department is the fundamental first step. MCEC organizers will need to better understand the different ways the college monitors and records energy use. Topics to discuss with the Facilities Department include:

- If energy use is or can be monitored building by building or office by office
- If there is a real time monitoring system
- How and when Macalester College receives its energy bills
- The best strategies for data collection

The relationship with the Facilities Department will be simplified in the 2009-2010 academic year by the creation of a student worker position responsible for coordinating and collecting data. This position has been created within the Facilities Department and will be filled early in fall 2009. MCEC coordinators should plan to establish a connection with this student who can serve as a liaison and coordinating partner.

2.6 Recommendations

The MCEC could have a larger impact on campus in terms of energy reduction and participation if the organization of the competition was better defined. The recommendations outlined in this section are intended to provide structure to subsequent Coordinating Committees so that they can better articulate and achieve the purpose of the Minnesota Campus Energy Challenge.

•Set Goals

- A discussion of the Coordinating Committee's objectives should take place at the beginning of the planning process to orient the committee members and help them

determine their priorities. When setting energy reduction goals, it would be useful to consider the results of the past competitions and to consider the environmental work of other groups on campus.

- The Committee should not limit itself to goals of energy reduction. While the MCEC is specifically an opportunity for energy awareness and does not directly address the more broad phenomena of sustainability, the different tenets of sustainability (participation and fiscal responsibility for example) are important to the success of the competition. Committee members might want to include fundraising or participation goals.
- Increasing and diversifying participation is one of the areas in which the MCEC could be most improved. Future Committees should consider ways to include and engage more of the student body as well as faculty, staff, and administration.
- Develop a Timeline
 - After developing and prioritizing the goals, the creation of a planning timeline would provide structure for the Committee meetings and for the organizational process. The Committee might want to add deadlines for event and competition advertising or contacting important parties.
- Define and Fill Formal Roles
 - Publicity Coordinator
 - Responsible for representing and communicating the goals of the Minnesota Campus Energy Challenge
 - Ensures that campus events are advertised in a timely, visible, and creative manner

- Point Person (people)/Project
 - Assumes responsibility for either a category of events or a specific occasion
 - Scope of responsibilities determined by the nature of the project
 - Reports progress to Committee at weekly meetings
 - Although the Point Person (people) may be in charge of a project, he/she/they do not work completely independently from the Committee and may recruit help from fellow Committee members, other students, or interested parties.

- State Organizers
 - At least 1 Macalester Committee member is in charge of representing Macalester's participation within the state wide challenge.
 - Works with the Publicity Coordinator to share the work, energy reductions, and strategies of competing schools.
 - Coordinates with the state wide organizers from other schools to facilitate data sharing, energy research, organizing strategies, and a potential MCEC organizers summit.

- Data Collector
 - Communicates with the Facilities Department and the Sustainability Office to obtain energy use data.
 - Analyzes the college's February energy use by comparing it to February data from other years, energy use in other months, and to the energy use of other competing schools for the month of February.

- Calculates and determines what participating school had the largest reduction of energy use in February (the winner of the MCEC).
- Start organizing at the beginning of the semester
 - The ideal time for the MCEC Committee to have its first meeting would be during September several weeks after the beginning of school. The increased planning period would allow for the time to set goals, brainstorm energy reduction projects, coordinate with other campus groups, contact campus speakers, etc. Beginning the planning early in the semester would also provide first year students an immediate chance to become involved with a campus activity. The increased planning time has advantages for the competition as well as auxiliary benefits such as increased student involvement in campus environmental organizations.
- Collaborate with Campus Groups
 - Sustainability Office
 - The Sustainability Office, although still a relatively new campus office, is a valuable place Committee members can ask for ideas, help, and support. The office was especially helpful during the 08-09 competition with data collection.
 - The Sustainability Office is also developing a Sustainability Report and Plan for the Macalester campus. Although the plan will be in draft form for the fall 09 semester, there might be opportunities for coordination between the MCEC Committee and the parties involved

with implementing the energy reduction goals of the Sustainability Report.

- Facilities
 - The Facilities Department should be included in campus wide energy reduction plans and be engaged in student/staff/administration dialogue about potential projects to reduce energy use.
 - The department is the provider for obtaining Macalester's energy use bills.
- Student organizations
 - The opportunities to collaborate with Macalester student organizations are numerous. There are several environmental organization on campus that could creatively participate in energy reduction.
 - MCEC at Macalester would benefit if the organizing Committee was able to involve members from numerous campus organizations not directly related to environmental work. In particular the MCEC Committee could partner with the organizers of the Black History Month celebrations, which also is during the month of February, in order to arrange environmental/energy justice oriented events.
- Residential Life
 - The Residential Life office is critical for organizing and accomplishing Dorm Wars if that is a goal of the Coordinating committee.
 - The Residential Life department can also be a significant resource for ideas and project collaboration. The department is especially important

as a channel through which to communicate with Resident Assistants and Resident Hall Directors.

Data Collection and Monitoring: The Collection, Calculations, and Rationale Behind Them

Analysis and Recommendations from Dominika Seblova Data and calculations expert for The
Minnesota Campus Energy Challenge, February 2009

3.1 Overview: The Data Collection and Calculations Form a Central Part of the MCEC

3.2 Obtaining Data from the Schools

Sample Calculation

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Rationale Behind Calculations

3.4 Evaluation of Reporting of the Data

3.5 Recommendations

3.1 Overview: The Data Collection and Calculations Form a Central Part of the MCEC

This section will explain the process of data collection, the calculations, and the rationale behind them. The calculations were originally set up four years ago when a similar competition began. They were set up by Timothy DenHerder-Thomas, a current Macalester College student. The schools are required to report the data for four years before the competition year so that a baseline can be calculated. Therefore the school is compared to itself in the past, rather than to other schools. Both heating and electricity are included in the energy reduction calculations. Water savings and waste reduction are not included in order to keep the competition manageable.

3.2 Getting Data from the Schools

Every participating school needs to submit a series of data, which will be used for the calculations. In order to set up the baseline we generally asked the competing schools to submit the information for the past three years prior to the beginning of the competition. This is beneficial because it forces the students to make initial contact with their facilities departments when retrieving the data. It also gives them time to understand what type of data they will need to submit and why. We have used the <http://teammn.org/mcec.html> website as a way of collecting the data by creating an online questionnaire and asking the schools to fill it in. The final data has been collected in a similar manner. The questionnaire to collect final data for the 2009 competition also included several other questions looking at the perceived success of the competition, its organization, and possible improvements for the future. All the data is downloaded and the calculations are done using a Microsoft Excel Spreadsheet that includes all the formulas presented in the following section. In order to be able to create the baseline and calculate the reduction, each school needs to submit the following data for the calculation:

- The total amount of electricity used measured in kilowatt hours (kWh)

- The number of billing days for electricity.
- The total amount of British Thermal Units (BTU) the whole campus consumed.
The amount of fuel oil, natural gas, or other fuel should be converted to BTUs according to appropriate conversion factors.
- The number of billing days for heating fuel.
- The number of Heating Degree Days (HDDs) reported.
- The number of students enrolled in each February/appropriate semester.

There are 6 main steps in the calculations:

- **Step 1:** Normalization of electrical and heating data to 28-day billing period
- **Step 2:** Calculating average number of Heating Degree Days (HDD)
- **Step 3:** Adjusting the electrical and heating data using the average enrolment
- **Step 4:** Combining the electrical and heating baseline data for specific years to obtain 3-year baseline
- **Step 5:** Adjusting the data for the year of the competition
- **Step 6:** Calculating the reduction

Example Calculation

To make the further discussion of the calculations understandable the following example goes through the process step by step. Table 1 presents data for Macalester College in the years 2005-2008. The years 2005-2007 will be used to calculate the baseline to which the year 2008 will be compared.

Table 1 showing the sample data for Macalester College

	Electricity in kWh	# of billing days for electricity	heating represented by total BTU	# of billing days for heating	# of Heating Degree days	Enrolment
Feb 2005	1196023	30	12066350000	28	1013	1865
Feb 2006	1140243	29	13390150000	28	1226	1841
Feb 2007	1048800	29	14988550000	28	1432	1895
Feb 2008	1083939	29	15904758000	29	1437	1867

Step 1: Normalization of electrical and heating data to 28-day billing period

In order to be able to compare between different years the data is normalized to 28-day billing period since February has 28 days. This compensates for the effect of diverse billing periods.

This is done as:

$$\frac{(\text{Electricity in kWh}) * 28}{(\# \text{ of billing days for electricity})}$$

Therefore using the data for February 2005 we get:

$$\frac{1196023 * 28}{30} = 1116288$$

Applying this formula to the numbers from Table 1 this gives the following set of normalized data:

Table 2 showing month-length normalized heating and electrical data

	month-length normalized electrical data (kWh)	month-length normalized heating data (BTU)
Feb 2005	1116288	12066350000
Feb 2006	1100924	13390150000
Feb 2007	1012634	14988550000
Feb 2008	1046562	15356318070

Step 2: Calculating average number of Heating Degree Days (HDD)

In order to normalize the heating baseline to differently cold winters, the average of the heating degrees days over the period of the 3 years of baseline is taken, and every year data is adjusted using this average. The calculation goes as:

$$\frac{\text{HDD for Feb 05} + \text{HDD for Feb 06} + \text{HDD for Feb 07}}{3} = \text{average HDD}$$

Applying this formula to the numbers from Table 1:

$$\frac{1013 + 1226 + 1432}{3} = \frac{3671}{3} = 1224$$

This average is further used to adjust the heating data for every year in the following manner:

$$\frac{\text{Month-length normalized heating data Feb 05} * \text{average HDD}}{\text{HDD for Feb 05}}$$

Taking as an example, the data for February 2005:

$$\frac{12066350000 \text{ BTU} * 1224}{1013} = 1457967660 \text{ BTU}$$

Table 3 showing HDD normalized heating

	month-length normalized heating data (BTU)	HDD normalized heating data (BTU)
Feb 2005	12066350000	14579676600
Feb 2006	13390150000	13368306360
Feb 2007	14988550000	12811442118

Step 3: Adjusting the electrical and heating data using the average enrolment

The premise behind these calculations is that a campus is run for its students. Even though other people, like staff and faculty are using the space, they are ultimately there to teach or keep the educational institution running for the students. Therefore all the data for the baseline, electrical and heating is adjusted using the average enrolment over the period of 3 years. The calculations go as:

$$\frac{\text{Enrolment for Feb 05} + \text{Enrolment for Feb 06} + \text{Enrolment for Feb 07}}{3} = \text{average enrolment}$$

$$\frac{1865 + 1841 + 1895}{3} = 1867$$

For heating data the adjustment is:

$$\frac{\text{HDD normalized heating Feb 05} * \text{average enrolment}}{\text{Enrolment Feb 05}} = \text{HDD-enrolment normalized heating data}$$

Plugging in the sample data:

$$\frac{14579676600 \text{ BTU} * 1867}{1865} = 1459531164 \text{ BTU}$$

And for the electrical data the adjustment uses the following formula:

$$\frac{\text{Month-length normalized electrical Feb 05} * \text{average enrolment}}{\text{Enrolment Feb 05}} = \text{Month-length-enrolment normalized electrical data}$$

Using the formula for sample data for February 2005:

$$\frac{1116288 \text{ kWh} * 1867}{1865} = 1117485$$

Table 4 showing HDD-enrolment normalized heating data and month-length-enrolment normalized electrical sample data

	month-length-enrolment (MLE) normalized electrical	HDD-enrolment (HDD-E) normalized heating data
Feb 2005	1117485	14595311640
Feb 2006	1116472	13557103730
Feb 2007	997672	12622143760

The data presented in table 4 gives the baseline for electrical and heating usage for the particular years.

Step 4: Combining the electrical and heating baseline data for specific years to obtain 3-year baseline

In order to compare the year of the competition to the baseline, take the average of the adjusted data. Therefore the electrical 3-year baseline is:

$$\frac{\text{MLE electrical Feb 05} + \text{MLE electrical Feb 06} + \text{MLE electrical Feb 07}}{3}$$

Using the MLE (Month-length normalized electrical) data:

$$\frac{1117485 + 1116472 + 997672}{3} = 1077210$$

In a similar manner, use the HDD-E normalized heating data to get the heating 3-year baseline:

$$\frac{\text{HDD-E heating Feb 05} + \text{HDD-E heating Feb 06} + \text{HDD-E heating Feb 07}}{3}$$

Using the HDD-E data:

$$\frac{14595311640 + 13557103730 + 12622143760}{3} = 13591519710$$

Step 5: Adjusting the data for the year of the competition

In order to be able to compare the data from the year of competition to the baseline data, they need to be adjusted in the similar manner. The first step in this process is the same as for the

baseline: the normalization of electrical and heating data to 28-day billing period. This was shown in Step 1. Then the heating needs to be adjusted to average heating degrees days as:

$$\frac{\text{Month-length normalized heating data Feb 08} * \text{average HDD}}{\text{HDD Feb 08}}$$

Using the sample data this gives HDD normalized heating for Feb 08:

$$\frac{15356318070 * 1224}{1437} = 13080120610$$

This then needs to be adjusted for the enrolment, therefore giving HDD-E, during the year of the competition:

$$\frac{\text{HDD normalized heating for Feb 08} * \text{average enrolment}}{\text{Enrolment Feb 08}}$$

Using the sample data:

$$\frac{13080120610 * 1867}{1867} = 13080120610$$

Adjust the electrical data to the current enrolment (MLE):

$$\frac{\text{Month-length normalized electrical Feb 08} * \text{average enrolment}}{\text{Enrolment Feb 08}}$$

Using the sample data:

$$\frac{1046562 * 1867}{1867} = 1046562$$

Step 6: Calculating the reduction

In order to calculate the reductions, first find the difference between the baseline and the competition data:

$$\text{Difference} = 3 \text{ year baseline heating} - \text{HDD-E normalized heating Feb 08}$$

Using the sample data:

$$13591519710 - 13080120610 = 511399100$$

The same calculation with the electrical data:

$$\text{Difference} = 3 \text{ year baseline electrical} - \text{MLE normalized electrical Feb 08}$$

Using the sample data:

$$1077210 - 1046562 = 30648$$

To calculate the percentage reduction, use the 3 year baseline average and the difference between the baseline and the year of competition. This gives heating data the following formula:

$$\frac{\text{The difference} * 100}{3\text{-year baseline heating}} = \% \text{ reduction heating}$$

Using the sample data:

$$\frac{511399100 * 100}{13591519710} = 3.76 \%$$

Use a similar formula for the electrical data:

$$\frac{\text{The difference} * 100}{3\text{-year baseline electrical}} = \% \text{ reduction electrical}$$

And once more plug in the sample data:

$$\frac{30648 * 100}{1077210} = 2.84\%$$

Finally combine the two percentage reductions to get the overall reduction:

$$\frac{\% \text{ reduction heating} + \% \text{ reduction electrical}}{2} = \text{overall \% reduction}$$

In this case:

$$\frac{3.76 \% + 2.84 \%}{2} = 3.3 \%$$

In previous years, units have been converted from BTU's to Kilowatt Hours. But calculations have been simplified because final results are percent reductions so the units should not influence the final answer. The advantages of simplifying these calculations are simplicity and ease of calculations for the organizers.

3.3 Evaluation of the Calculations

The following section explains the rationale behind the calculations and also the assumptions and related problems.

Assumptions

There are several general assumptions that should be mentioned. The first one is that each schools heating plant uses different kinds of fuel for producing heat. There are diverse types of fuel that can be used, each with different units, but the energy produced can be converted to BTUs. The BTU is a unit of energy commonly used in North America. It describes the amount of heat energy needed to raise the temperature of one pound of water by 1degree Fahrenheit. Different types of combustibles have different BTU ratings, which are used by the energy providers in calculating the BTU used for utility bills. Most of the bills provide the heating

energy usage in MMBTUs or therms. The MMBTU represents one million BTU and one therm represents 100,000 BTUs. In the MCEC there has not been a case so far when the school has used alternative forms of heating like geothermal. The current calculations do not include a method for dealing with these atypical systems.

The second general assumption is that the schools buy their electricity from off-campus sources. The calculations do not take into consideration that some campuses may produce their own energy. In this case, the energy produced by the campus would need to be taken into account. The precise inclusion into the calculation will depend on the method of energy generation.

Based on the locality of the schools and the time of the competition, the calculations do not consider air conditioning systems, which would further complicate the calculations. The Cooling Degree Days are excluded because of this assumption. Nevertheless it is important to realize this omission in case the competition is replicated in different areas or extended to different times of the year.

Rationale Behind Calculations

There are several aspects of the calculations, which need further explanation, because they link to the ideology of energy reduction taken on by the organizers.

First and most importantly the calculations make relative comparisons in which the schools are compared to themselves, rather than to each other. The absolute comparison of one school to another is an extremely complex process; diverse methods of calculations can lead to different and contradictory results. The results are influenced by diverse factors such as the size of the school, location, kind of facilities etc. The most important factor of MCEC is the continuous reduction of energy consumption. The focus on continuous improvement can serve as

motivation for finding creative solutions and alternative ways of energy generation and reduction.

While effective and representative of the goals of the competition, comparing schools against themselves has disadvantages. The main issue is that every year it is increasingly difficult for schools to achieve percent energy reductions because changes have already been implemented. Along with this, school communities become more engaged in energy-reducing behaviors. This puts the schools that have participated for multiple years at a disadvantage. Nevertheless the main idea is that MCEC is the catalyst for action and discussions regarding the energy use of schools. In this sense the competition stays beneficial for schools participating for multiple years, even if their chances of winning are lowered. This has not become an issue thus far because the competition is young. Nevertheless if participation continues to grow, this aspect of the calculations should be reexamined. Possible solutions would be to create subgroups of schools that started participating within a span of 2-3 years and let them compete against each other. If the numbers of participating schools remains small, this would not be practical. It might be useful to find alternative ways of honoring long-term participants to balance out the disadvantage.

Another major factor that influenced the way the calculations were set up is the potential for schools to simultaneously experience a net increase in energy use *and* efficiency. This is reflected in the calculations because they use enrollment rather than square footage. The calculations focus on the increased efficiency per student not the increased efficiency per square foot. If the calculations used energy usage per square foot, they would not penalize schools that increased their square footage as long as they maintained high efficiency.

3.4 Evaluation of Reporting of the Data

Since energy reduction is the purpose of the competition, it is important to analyze how the process of reporting data went in this year's MCEC. As mentioned previously, the schools are required to submit the baseline data before the beginning of the February. In addition to helping students establish relationships with different campus departments, the early deadline for baseline data is beneficial for several other reasons. First, the schools' organizing team is forced to decide how to collect the necessary information. Second, by undertaking this amount of work the schools show their commitment to the competition. The work functions instead of a monetary deposit or other formal commitment to the competition.

Data collection was, however, challenging during the 2008-2009 competition. The largest problem was timely collection of the data from the energy providers. This is problematic because organizers use the utility bills as the primary resource of data. The majority of the college campuses have central energy monitoring systems. If the campus coordinators were able to access data from these systems, they would be able to report back in a faster manner. Depending on the type of system, the reporting might require more work because organizers would need to combine data for individual buildings. The second major problem coordinators faced was an inability to find precise data for the HDD. This problem has an easier solution because most of the HDDs are available at <http://www.degreedays.net/>. This information should be included in a manual provided to the organizers.

During the 2009 competition, the organizers had a good understanding of data even though they frequently submitted data in the wrong units. This became an issue and required a lot of sorting out during the calculations. Data was submitted in inconsistent units even though the questionnaire always specifies the standard units. One possible way to resolve this would be to

have the schools submit the data in the units in which they receive them. This would make the calculations more difficult for those computing the final results, but the advantage would be consistency. The consistency would ensure correct conversions, acknowledgment of the source of the data, and simplified problems solving.

Organizers have focused on trying to find the simplest way to carry out the calculations. Online questionnaires seem to work effectively for data submission; however a lot of communication and clarification was needed to uncover problems in the overall calculations. On a basis of these observations, it would be beneficial to include several new questions such as a question asking for a description of how the data was obtained.

3.5 Recommendations

- Include the website for retrieving HDDs in the manual
- Encourage schools to retrieve data from energy monitoring systems rather than waiting for utility bills
- Request descriptive information about the way the data was collected on campus
- Consider having schools submit the data in the units they receive them

Conclusion

This analysis has addressed the strengths and weaknesses of the Minnesota Campus Energy Challenge 2009. The analysis is from three different perspectives: that of the main state organizer, Arielle Miwa Oseki Robbins, that of the main Macalester College campus organizer, Liz Foster, and that of the main data collector and expert, Dominika Seblova. The coordinators have suggested many recommendations for how to improve MCEC. Action steps for achieving the main recommendations are summarized below:

- Reorganize the overall MCEC model to improve the organization of the competition. Key action steps include:
 - Creating a comprehensive website with a history of MCEC, tool kit, manual, and data tracking system
 - Compiling a database of contacts
 - Obtaining and setting up a system for a competition prize
 - Organizing an MCEC retreat for early fall
- Focus on-campus organizing at Macalester to improve campus participation and energy reduction. Key action steps include:
 - Establishing specific goals
 - Appointing on-campus leaders
 - Broadening the scope of partnerships with students, faculty, staff, and administration
 - Continuing and strengthening collaboration with other schools

- Increase organizers' understanding of calculations and simplify data collection. Key action steps include:
 - Providing a step by step explanation of the calculations at the organizers retreat
 - Including the website for retrieving HDDs in the manual
 - Encouraging schools to retrieve data from energy monitoring systems rather than waiting for utility bills
 - Requesting descriptive information about the way the data was collected on campus