



COMMUNITIES FOR RESPONSIBLE ENERGY/ ENVIRONMENT DEMONSTRATION (CREED) PROJECT

**REPORT ON THE "DISCOVERING SCIENCE ON THE
RANGE IN THE FIELD OF ENERGY" COURSE DSRFE 6.
HELD AT THE LAURENTIAN ENVIRONMENTAL CENTER
JUNE 27-JULY 2 & JULY 18-23, 2010.**

DSRFE 6. was held at the Laurentian Environmental Center (LEC), north of Virginia MN, during the two weeks June 27 – July 2 and July 18 – 23, 2010. This year we presented Part 2. of our syllabus which covers the topics of hydro, wind, biomass, new energy technologies, energy entrepreneurship and energy policy. Unfortunately this year we could not find a person to discuss this latter subject, so were unable to include it in the syllabus.

Each course workshop consists of a series of lecture/discussions, demonstrations, labs, site visits, invited speakers, open forums, and prep. times. Since the LEC course/workshops are live-in events, we also include some free recreational time, although from teachers' comments they always would like more of the latter. Besides partnering with our hosts LEC who provide the board and lodging for teachers and instructors, we also partner with Hamline University's Center for Global Environmental Education. The latter provide the graduate credits for teacher professional development and lane changes and access to their online website facility, Blackboard (Bb). Each course/workshop successfully completed including assignments earns the teacher six graduate credits, so that for completion of both parts one and two offered in alternate years, a teacher can earn 12 credits. Successful completion of all 12 credits, earns a teacher Hamline/CREED's prestigious "Energy Education Certificate", which qualifies him/her to be an energy instructor in his/her school. To date seven people have reached this level, but there are a number more who will likely qualify in the next year out of the over 200 teachers now who have taken at least one of CREED's courses either at Hamline, MN West Granite Falls, or the LEC.

This year a total of 17 teachers registered. Of these there were four "no-shows" so for the first week we had 13 people. On the last day of the first week one participant had to leave on account of being notified that his father had broken his back and needed his sons help. This also kept him from returning for the second week. In addition a further participant had won a scholarship to attend Fermi Lab in Chicago during the second week so our numbers dropped to 11 for the second week. This compares with 16 teachers in 2004, 14 in 2005, 18 in 2006, 14 in 2008 and 16 in 2009. There was no course/workshop in 2007. The disciplines represented this year were physical, earth, life and environmental sciences, forestry, mathematics and technical education.

Participants heard about the course/workshop from a number of sources. However the most successful draw continues to be by word of mouth and especially from colleagues. What persuaded participants to register were; the topic, the graduate credits and all expenses paid, in that order. It is very gratifying to us that interest in the topic and a desire to boost their knowledge in this important field topped the list.

There was about an equal division of opinion between those who felt that the amount of work was about what they expected and those who felt it was more than expected. This is about the same division as has been expressed in previous years. You will find this division in any class that is being presented with challenging material. It is human nature to gain grades with the minimum amount of work possible.

A majority of the teachers felt that the level of instruction was about right. The minority complained about the level of the math incorporated and in particular the problem assignment. In facing up to the DSRFE 6. Web Report.

STEM challenge we expected this. Engineering tour guides invariably tells us that what their companies look for in their new hires is the ability to solve problems. So we are not likely to dumb down the level of math we present any time soon.

Site visits always top the list in terms of what the teachers value most from the class/workshops we present. This is where they see for themselves much of the materials we talk about in class. "Seeing is believing." Guest speakers came in a distant second. For our Energy Grand Tour Day we visited District Energy's CHP facility in Saint Paul followed by the Haubenschild farm's methane digester operation in Princeton, Bushmills ethanol plant at Atwater and finally Green Range Renewable Energy's biodiesel operation in Ironton. Other site visits were made to Minnesota Power's Taconite Ridge Wind Farm and their Thomson Hydro Plant, The Duluth Seaway Port Authority's Wind Terminal, and the Virginia biomass fueled district Heating Plant.

Participants mentioned increased knowledge, information and designs behind the R.E. technologies and the labs, as being the most useful items to take back to their classrooms. And we were successful in sending the participants off with more question than they had when they came, or as one person said many questions were answered but we left with a whole new raft of questions to research.

All participants were appreciative of industry sponsorship and were more than willing to write thank you letters.

Teachers were asked to rate a number of topics on a scale 1 to 5. Three topics received perfect ratings of 5.00, the Taconite Ridge Wind Farm and District Energy Saint Paul site visits and the turbine blade design experiment. Together, the eight site visits received a combined rating of 4.77, by far the highest of any of the activities demonstrating once again how important teachers feel these events are. The perfect rating for the turbine blade design experiment was boosted I believe by the presence of Clipper's John Reed who commented on the designs which the competing teams had constructed.

Next highest at 4.51 was the rating given to the invited speakers. This was followed by Lab experiments with 4.46. This was a big improvement over last year's 3.42 and even better than 2008's 4.35

An overall comparison of the ratings of this year, 2010, compared with last, and 2008 is very encouraging. Based on a rating of 1 = 0% to 5 = 100%, we have: -

Year	Average rating (1-5)	Percent Rating	Grade
2010	4.49	87.2%	A-
2009	3.89	72.2%	C+
2008	4.42	85.5%	B+

We were not at all satisfied with the drop of 13.3 percentage points from 2008 to 2009, since we had been steadily improving in previous years from 2004 through 2008. This year's result has reversed the drop and put us at a point even better than that of 2008.

Normally the probability distribution curves for survey ratings are single humped or peaked. Occasionally they are double humped. This phenomenon is called kurtosis and occurs when a marked cleavage of opinion arises between respondents with some responding favorably to the question and others unfavorably with very few in between. Responses to two evaluation questions both showed this phenomenon. A question related to the lectures and handout materials showed it quite strongly. Even though the majority rated them favorably a sizable minority of three participants did not. We probably did not make our expectations clear enough to these people that the lecture notes were for use as resource materials and we did not expect them to remember everything in them or even fully understand them. A second question related to the Wind Tower Erection experiment also showed kurtosis but more weakly. Two years ago the ratings for this experiment showed a more marked kurtosis than this year. We then remarked on the fact that this experiment was one that would appeal very strongly to Tech Ed. teachers, but not to science teachers and especially life science teachers who would probably see it as irrelevant to their discipline.

“Other Comments” from the teacher participants were very kind and complimentary. We as CREED instructors appreciate that. We put a lot of hard work and effort into making the course/workshops as valuable and enjoyable as possible. We admit that we expect a lot from participants, but those who follow through and get their grades can be justly proud of their achievements, and especially those who complete both years for 12 credits and gain their “Energy Education Certificates.”



Attendees at the Duluth Seaway Port Authority’s Wind Turbine storage facility. From left to right, Scott Olson, Roger Aiken, Randy Thielges, David Parent, Keyle McMartin, Jackie Kitchenhoff, Tim Velner, Eric Holmstrom, Mark Voight, Mark Gravelle, Carol Kreuger, Don Hanson, Mike Neuendorf, Keith Bloom, Stephanie Oeding, Ron Johnson (DSPA Tour Guide).



Discovering Science on the Range in the Field of Energy Participants and Instructors on the last day of class at the Laurentian Environmental Center: Back row, left to right: Michael Neuendorf, Mark Voigt, Keith Bloom, Eric Holmstrom, Tim Velner, Dave Parent, Don Hanson, Greg Pusch, Kyle McMartin. Front row, left to right: Scott Olson, Roger Aiken, Stephanie Oeding, Carol Kreuger, Randy Thielges.