



(Technical tools and Hands-on help for Education re a Solar Theme to Renew the Environment Across Minnesota)



www.creedproject.org

www.mres-solar.org

Combined Newsletter of the Communities for Responsible Energy/Environment Demonstration (CREED) Project & the Minnesota Renewable Energy Society (MRES)



MINNESOTA'S EERE INDUSTRY NO.1 WHAT IS IT? WHO ARE THE PLAYERS?

FIRST IN A SERIES

We want to educate our citizens and in particular our teachers and legislators about the part that the growing Energy Efficiency and Renewable Energy (EERE) Industry in Minnesota will play in meeting our future energy needs. The next few issues of "THE STREAM" will describe the vision of some of the players, and what they are doing to make Minnesota's energy infrastructure more efficient, user friendly, clean and secure.

DISTRICT ENERGY CELEBRATES 20 YEARS OF COMFORT BY DEGREES!

Anders Rydaker & Trudy Sherwood

District Energy's district heating system started out as a demonstration project in the early '80s. With energy prices skyrocketing nationwide, the City of Saint Paul, State of Minnesota, and U.S. De-

ENERGY SERVICES GROUP

Mike Eckhardt

ESG is a progressive company that has achieved significant success by providing clients with fresh ideas and innovative strategies for today's complex facility management issues. ESG is unique in the facility improvement and facility

DISTRICT ENERGY Cont. on p.7.

E.S. GROUP Cont. on p.8.

CONTENTS

1. **FIRST IN A SERIES:** p.1.
2. **DISTRICT ENERGY CELEBRATES 20 YEARS OF COMFORT BY DEGREES:** Anders Rydaker & Trudy Sherwood. p.1.
3. **ENERGY SERVICES GROUP:** Mike Eckhardt. p.1.
4. **FEEDBACK:** p.3.
5. **EDITORIAL:** p.3.
6. **UPCOMING MEETINGS AND EVENTS:** p.5.
7. **NEWS ITEMS:** p.6.
9. **BILL BUTLER'S EDGE ACADEMY COLUMN "REPORT ON MRES'S SOLAR BOAT REGATTA"** p.10.



Fig.1. District Energy Saint Paul customers are now heating and cooling their buildings with "green energy" produced at a new CHP plant adjacent to the company's downtown facility. Photograph credit: Nancy Toohey.

THE STREAM

Vol. 6. #3. SPRING II, 2003

Combined Newsletter of the Communities for Responsible Energy/Environment Demonstration (CREED) Project and the Minnesota Renewable Energy Society (MRES).

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The views expressed in articles and letters in this publication are not necessarily those of the editors or of the Boards of Directors of the CREED Project and/or MRES. All correspondence, letters to the editors, requests for copies and other matters should be addressed to:-

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Comments, letters and contributory articles are encouraged. **The annual subscription is \$15, (students \$10) for six issues. Back copies of the "THE STREAM" are available from the above address for \$3 a copy.**

RECENT BACK ISSUE TOPICS:-

Vol./#	Date	Topic
4/1	Winter 01	E. Eff. Appliances Part 3.
4/2	Spring I 01	E. Eff. Appliances Part 4.
4/3	Spring II 01	Global Warming for Real?
4/4	Summer 01	Xcel E's Biomass Mandate.
4/5	Fall I. 01	Ann. Reps. CREED/MRES.
4/6	Fall II 01	Energy Edn. in Minnesota.
5/1	Winter 02	Laws of Thermodynamics.
5/2	Spring I 02	Renewable Projects in MN.
5/3	Spring II 02	Shortage of Tech. Grads.
5/4	Summer 02	Ren. Projects in MN Part 2.
5/5-6	Fall I/II 02	Efficient Envir Friendly Trnspn.
6/1	Winter 03	Ren. Projects in MN Part 3.
6/2	Spring I 03	Teacher Assocns. on E. Edn.

MEETINGS

CREED Board meetings are held on the **second Monday** of each month at **1600 hours** (4:00 p.m.). During Summer they are held at either the **East or West Visitor Centers** of the **Coon Rapids Dam Regional Park**; and in Winter at **Anoka Ramsey Community College**. For more information, call Chair **Bob Swanson**, 763-424-4945, Secretary/Treasurer, **Valdi Stefanson**, 651-762-4015 or Executive Director, **Roger Aiken**, 651-644-8318.

MRES Board Meetings are on the **second Thursday** of each month at **1900 hours** (7:00 p.m.) at **Whole Builders Cooperative**, 2928 5th Ave. S., Minneapolis, MN 55408. For more information call Chair, **David Boyce**, 952-445-7270, or Treasurer, **Ralph Jacobson**, 612-623-3246.

Our meetings are open to the general public and visitors are welcome.



SPONSOR/MEMBERSHIPS

CREED and MRES are two independent organizations with their own separate Boards of Directors. They pool their resources and expertise to publish this bimonthly newsletter. For people who wish to support either of our organizations beyond just merely a newsletter subscription, CREED has several levels of sponsorship and MRES several levels of membership.

CREED SPONSORSHIP:

CREED is a Minnesota based 501(c) (3) nonprofit organization whose mission is to educate Minnesotans about the impact of energy supply, conversion and use on our environment/economic prosperity through 3E (Energy, Environment, Economy) materials and demonstration of sustainable technologies and life-styles. We gratefully acknowledge the support of the following who have sponsored us during the past year:-

Global Sponsors:

Great River Energy.
Mark LaLiberte-Shelter Supply Inc.
Minnesota Power.
Xcel Energy.

Continental Sponsors:

Bill Butler-Edge Academy.
Anders Rydaker-District Energy St Paul.

Regional Sponsors:

Chuck Koestler, Gary Nelson, The Energy Conservatory, Michael Noble, ME3, Greg Schmidt & Nancy Hone, Ann Stewart-Stewardship, Aaron Tovo, Gina Vermilyea.

State Sponsors:

Mike Eckhardt, Mark & Lorraine Francis, Mark Gable, Keith Harris, Jim Harrison, Bruce Odegaard, David Pogany, Curt Pratt, Mike Rivard, Steve Rhude, Ed Turner, Jeff Ylinen.

Community Sponsors:

David Boyce & Lee Olson, Robert & Suzannah Ciernia, Sam Garst, Tom Griffin, Richard Gronning, Ann Haase, Jerry Lijverd, Bob & Lee McLane, Carl McNally, Dr. Stephan Peter, Pat Richards, Thomas Roman, Marvin Rothfus, Kathleen Sekhon, Joel Weisberg.

If you would like to renew your sponsorship from a previous year, or join this special group of people who care about our environment and our economy

and especially want to support our efforts to bring 3E Education to our citizens, we would love to have you do so. Our sponsorship levels are:-

Community:	\$25 and above.
State:	\$50 and above.
Regional:	\$100 and above.
Continental:	\$250 and above.
Global:	\$500 and above.

All CREED sponsors receive a free subscription to the newsletter. In addition at the State level a CREED logo button, at the Regional level a T-shirt, and at the Continental & Global levels a framed certificate of sponsorship recognition. T-shirts are also available for \$10.

MRES MEMBERSHIP:

MRES is the Minnesota chapter of the American Solar Energy Society (ASES). MRES local chapter memberships are as follows:-

Individual:	\$30
Student & Senior:	\$15
Family:	\$45
Businesses:	\$100
Corporate:	\$500

All MRES members receive a free subscription to the newsletter.

MAILING LABEL CODES:

After your name on the mailing label or e-mail address you may find one of these codes:

- CN = CREED/MRES N/L Subs.
- CS = CREED Sponsor.
- CE = CREED Exchange of N/Ls.
- MI = MRES Individual Membership.
- MS = MRES Student Membership.
- MSe = MRES Senior Membership.
- MF = MRES Family Membership.
- MB = MRES Business Membership
- MC = MRES Corporate Membership.

The two digits following the code represent the last year for which your subscription, sponsorship or membership was current. 03 represents current membership. If there is no code after your name then you are also in arrears.



FEEDBACK

(fēd´bak´), the process of returning part of the output of a system to the input, either to oppose the input (**negative feedback**) or to aid the input (**positive feedback**)

This is the second issue of our newsletter that you are receiving electronically. 600 of you received the last issue in that format and 700 will receive this issue. If you are still receiving a hard copy of "THE STREAM" by post and would like to receive the electronic version (**in color by the way!**) then send your e-mail address to me at <rogeraiken@creedproject.org>. Also if your e-mail address changes and you would like to continue receiving the newsletter please be sure to let us know. Getting our e-mail data base up and running has been a monumental job and we are still working on it.

We have had very positive comments so far about the new format, and we are still looking for ways in which to improve it. One request from several people has been to return to a one column format, which makes the electronic version much easier to read. Apart from the first two pages, this we have done with apologies to the hard copy readers. Remember you are now in the minority!

Ed Hessler writes: "I wonder whether you will consider two versions: your paper one stored electronically and a shorter version that can be scanned quickly with the highlights, etc. The photographs are elegant and I'm always surprised by how well this technology transfers them."

Ed Hessler wrote again later: "I hope you know how easy it is for me to make this kind of suggestion and how much I appreciate your considerate comments about it. You could have yelled at me! I have some feeling for what it means to pull it off. Easier said than done and all that stuff. And aren't e-mail address updates something to keep up with, much less in front of! Again, thanks for the prompt which made me recheck the site. It worked and that is enough. Way to go Roger."

Anne Wiegand writes: "The electronic version of the newsletter is wonderful. It is especially nice because I can share the link with others I think would be interested."

Kelly Eldien writes: "Roger, as long as there is no additional cost to us, we may as well remain on the subscription as it may come in handing if/when you apply for future requests. Thank you."

Alan Carlson writes: "I can see the newsletter site just fine. It is a great improvement over the paper version and should allow for a better layout, now that paper costs don't need to be minimized."

Knucks Chessick writes: "Copy to the CREED organization in Minnesota. Do you want to see their latest newsletter? It is on-line and has to do with education in the field of the renewables. I know those people very well and I am sure you would find quite a welcome from them."

Janet Anderson writes: "Hello Roger- this is nice. One small suggestion- make the text more friendly for reading on screen by moving away from the 3 newspaper columns and to something where you don't have to scroll down and up and down again to follow a story."



FROM THE DESK OF THE EDITOR:

We feel very strongly as independent Energy Educators that it is our duty to inform our citizens about the reasons for energy snafus and impending energy shortages or price hikes, so that they can take prior precautions and budgetary steps if necessary. I would like to comment on two such issues, viz. the recent massive blackout in the North East and the natural gas situation which will make itself felt continent wide this Winter.

The Saint Paul Pioneer Press regularly requests letters from its readers on matters of local and state-wide concern. A couple of weeks ago I submitted a letter to them. For reasons better known to them than to me they refused to publish it. Because we at CREED believe its message is so important and critical I reproduce it below in full.



To the Editor Saint Paul Pioneer Press:

"Could the recent blackout which affected 50 million people in the North East and Canada happen in

Minnesota? Yes it could. Recent reports of outages in Xcel Energy's territory (August 16, 2003) indicate clearly that our Upper Midwest grid is also vulnerable.

"There are three possible ways to lessen our vulnerability. 1. Build more and greater capacity transmission lines and distribution systems. 2. Install "distributed energy systems", such as rooftop solar panels, fuel cells and small wind turbines in and near the points of major demand. 3. Reduce the amount of electricity we use.

"Method three wins handily as the cheapest and most effective means. During the 30 years in which I have lived in Minnesota I and my family have progressively reduced our electrical energy consumption from 27.5 kWh/day to 12.5 kWh/day, without changing our lifestyles. We have done this primarily by:- 1. Installing a Solar Domestic Hot Water System. 2. Replacing an old Sears Coldspot freezer/refrigerator (9 kWh/day) with an RF12 Sunfrost model (0.3 kWh/day). 3. Replacing incandescent lamps with compact fluorescent ones. and 4. Disciplining ourselves to turn off lights and appliances not in use.

"If every household in Minnesota were to match our performance not only would our distribution problems disappear, our energy bills would be cut in half and we could also retire and decommission the two nuclear reactors at Prairie Island!!"

Looming electrical shortages and blackouts are not the only energy concerns we have. This Winter natural gas curtailment and price hikes will affect almost everybody in Minnesota, businesses and residential customers alike. I have been watching the natural gas price structure to my home as a residential customer over the last few months. It peaked at \$1.13/therm (100 cubic feet approx.) last March and has since fallen, but only to about ¢80 which is about double what it would normally be at this time of year. Distribution utilities like Xcel Energy and Center Point Energy Minnegasco normally wait until the Summer months to replenish their local reserves via pipelines from the South or Canada, but this year they are having to replenish at prices twice normal, and their replenished supplies are critically low. This Winter the retail price is expected to hit \$2.00 per therm which means Winter home heating bills in excess of \$2,000 for many home owners. Federal Reserve Chairman Alan Greenspan has hit the warning button for what this means for the economy and the White House is running scared and calling for more exploration and drilling. The same old hackneyed line, "Lets solve the problem by producing more." But they are finding that the new wells and their production are no longer keeping pace with the rising demand, most of which is a consequence of the fact that the fuel being used by 80% of all new electrical generating stations built in the last five years is natural gas (See Time magazine, July 21, 2003, pp. 36-44.)

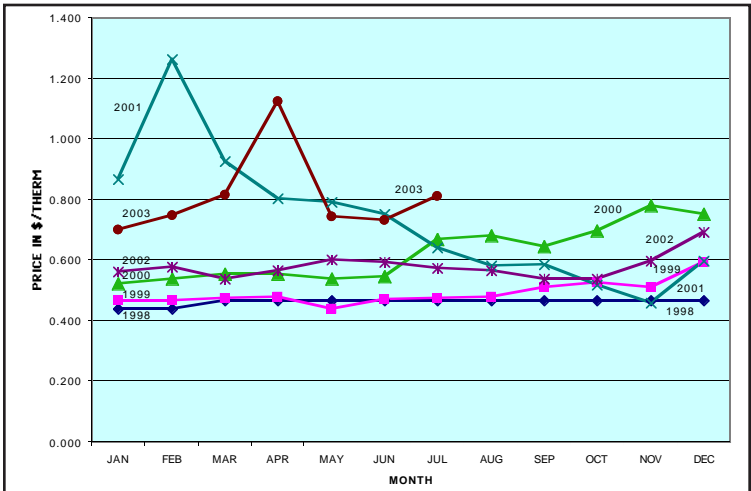


Fig.2. Residential Price of Natural Gas 1998-2003. Xcel Energy Service Area. (Does not include Basic Service Charge of \$6.50/month)

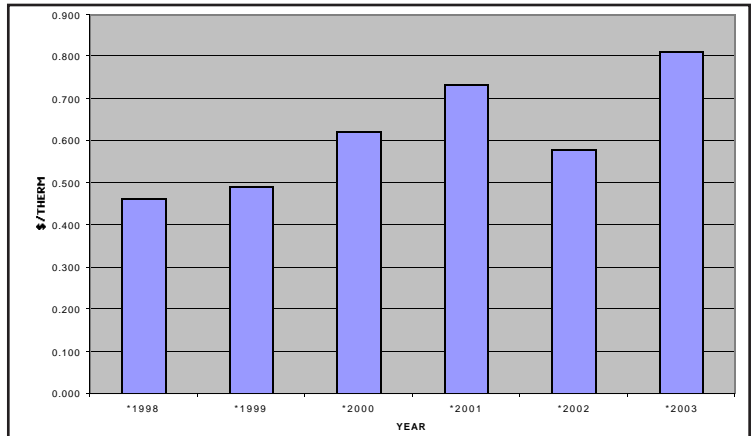


Fig.3. Average Yearly Residential Price of Natural Gas 1998-2003 (Does not include Basic Service Charge of \$6.50/month)

There are some people who are going to take advantage of the coming situation to make a fast buck. In the short term they will feather their pockets and say like Vice President Cheney did to those who conserve, "Conservation may be a sign of personal virtue, but it is not a sufficient basis for a sound, comprehensive energy policy." We need people, now, of courage and integrity to stand up for what is right and tell our citizens like it is and that they should now be preparing themselves for strong conservation and renewable energy development measures.

That is why, starting with this issue, we have decided to tell our readers what people in the EERE Industry in Minnesota are doing about solutions to our worsening energy situation and how you can benefit from their work. The two feature articles in this issue, are in fact, very apropos to the two concerns I have just mentioned. Anders Rydaker & Trudy Sherwood's presentation on District Energy, outlines the perfect solution to our electrical distribution and supply problem because it generates the power right where it is needed, and does so without exacerbating the greenhouse gas problem. Mike Eckhardt of the Energy Services Group describes his firm's expertise in an area where building services managers are going to need all the help they can get when natural gas prices begin to bite this Winter. Make it you business to contact them to find out how they can help you.

Sincerely, Roger G. Aiken.    

UPCOMING MEETINGS AND EVENTS

1. BOARD MEETINGS:

SEPTEMBER 2003:-

CREED: Monday 8, 1600 hrs at Coon Rapids Dam Regional Park East Visitor's Center.

MRES: Thursday 11, 1900 hrs at Whole Builders Cooperative.

OCTOBER 2003:-

CREED: Monday 13, 1600 hrs at Anoka Ramsey Community College's TDC Building.

MRES: Thursday 9, 1900 hrs at Whole Builders Cooperative.

2. C.E. COURSES IN THE RENEWABLE ENERGY CERTIFICATE SERIES AT HAMLIN UNIVERSITY FOR TEACHERS FALL 2003:

2.1. Energy Policy: SCED 6087-12976. Two sessions Saturdays, 8:30 a.m.-5:30 p.m. October 11, 25, plus additional on line hours: This is an elective in the EERE Series.

Decisions about future energy systems in Minnesota are made by energy companies, energy users, state and federal regulators, the Minnesota Legislature and the U.S. Congress. Many energy decisions, such as the decision to construct a new power plant, may endure for 50 years or more. Critical components of energy policy include energy taxes and fees, incentives and subsidies. This course will examine the factors and agents shaping energy policies. Lead instructor for this course will be J. Drake Hamilton, Science Policy Director for Minnesotans for an Energy-Efficient Economy (ME3).

2.2. Energy Basics: SCED 6080-12779. Two sessions Saturdays, 8:30 a.m.-5:30 p.m. November 8, 22, plus additional on line hours: This is the first course in the EERE Series.

Energy in a Technological Society. Units, Dimensions, Nomenclature, Definitions, Energy Forms/Classifications. Energy Sources; Fossil Fuels, Nuclear, Gravitational, Solar. Energy Conversion. Laws of Thermodynamics. Electrical Energy. Energy End Use Sectors; Residential, Commercial, Industrial, Agricultural, Transportation, and Utility Gen. Losses. Conservation. Lead instructor is Roger Aiken.

Each course is worth 2 C.E. Semester Graduate Credits. These Fall classes will introduce a new format. Two Saturdays of contact time 8:30 a.m. to 5:30 p.m., preceded by course lecture and homework assignments to be posted on Hamline's web site one week before each class.

For further information contact:-

Content- Roger Aiken, 651-644-8318 or <rogeraiken@creedproject.org>

J. Drake Hamilton, 651-726-7562 or <hamilton@me3.org>

Registration- Renee Wonser, CGEE @ 651-523-2419 or <rwonser@gw.hamline.edu> or Pam Jessup, CGEE @ 651-523-2591 or <pjessup@gw.hamline.edu>.

3. MTEA FALL CONFERENCE:

Friday-Saturday, September 26-27, 2003. Saint Cloud Holiday Inn.

This will be the 25th year of MTEA's Fall conference gatherings. There will be sample student projects, old texts, tools and other items on display. Also industry tours, sessions on a variety of topics, vendor displays and demos, and door prizes. Join in for the Friday evening banquet.

For info go to www.MTEA.net or contact Cathy Mason at 218-736-5996 (H), 218-998-0544 X2529 (S) or <jcmason@prtcl.com>

4. MRES SOLAR HOME TOUR:

Saturday October 4, 2003. 10:00 a.m. - 4:00 p.m. Twin Cities Metro.

This year's Solar Tour will feature exemplary homes and businesses across the Twin Cities metro area that have "seen the light" and incorporated renewable energy into their buildings' design and function. Taste the only shade-grown coffee roasted with solar energy at the Old Man River Cafe in West St. Paul. See the Science Museum's new zero-energy Environmental Experiment Center. Eat succulent delectables cooked with the sun's heat in Minneapolis. From natural daylighting to solar electricity, from the office to the living room, witness firsthand the improvements in livability, affordability, and sustainability that can come from utilizing natural energy flows in everyday life. This event coincides with the National Solar Tour, organized by the U.S. Dept. of Energy and the American Solar Energy Society (ASES).

For more information on times and places in the Twin Cities, visit the MRES website at www.mres-solar.org or call Dan Moring at 612-298-7909 or <tcsolartour@hotmail.com> For information on other Tours in Minnesota check out the ASES website, at www.ases.org

5. NATL. SCIENCE TEACHERS ASSOC. NORTH MIDWESTERN AREA CONVENTION - 2003:

Thursday, October 30 - Saturday, November 1, 2003.
Minneapolis Convention Center.

For info on **Program** contact Jean Tushie at 952-975-4347 or <jtushie@edenpr.k12.mn.us>
Exhibits contact John Olson at 651-793-1447 or <john.olson@metrostate.edu>

6. UPCOMING ASES AND ISES CONFERENCES:

ASES:

SOLAR 2004:

July 11-14, Portland, Oregon.

ISES:

SOLAR WORLD CONGRESS 2005:

August 8-12, Orlando, Florida.



1. CREED BOARD NEWS.

1.1. Roger Aiken, has intimated to CREED's Board of Directors that he wishes to be relieved of his Executive Director duties as of Jan. 1, 2004. At age 70 he now wants to pace himself within his own capabilities and have time left for his family. He will continue volunteering for CREED in the areas of newsletter editing/publishing and energy course writer/instructor. But in order to do this adequately, he needs to pass the baton for the day-to-day operation of CREED, and its up-front advocacy and initiatives on to a younger dynamic person. The Board has already appointed a search committee for a new Executive Director and anyone interested in either applying or recommending a suitable person with a passion for energy education and renewable energy advocacy should contact either [Valdi Stefanson](mailto:valdi.s@juno.com), 651-762-4015, <valdi.s@juno.com>; or [Rich Huelskamp](mailto:huelshut@redwing.net), 1-651-388-3813, <huelshut@redwing.net>.

1.2. Valdi Stefanson, Board Secretary/Treasurer, resigned from his position as Executive Director of the Environment and Energy Resource Center (EERC) at the beginning of August 2003. Since Valdi has been with CREED since its inception in 1997, and knows its vision and ongoing programs intimately the rest of the Board unanimously agreed that they should offer the CREED Executive Directorship to him, bypassing the normal search process. Valdi was initially open to the idea but has since decided that he no longer wants the job since his heart is no longer in the EERE advocacy and education business. This was a disappointment to the rest of the Board, but we accept and respect his decision. He will remain on the Board for the time being as Secretary/Treasurer.

2. FIVE VACANCIES REMAIN ON CREED'S BOARD:

A number of people have recently expressed interest in our work. CREED is still looking for qualified people both to join our Board and/or to volunteer as staff people to help the Executive Director in our programmatic work. We need people from the teaching professions, EERE industry and the public sector to fill these vacancies. Candidates must have a passion and concern for Energy Education, both in helping our teachers, in their job of creating an awareness in and training our young people for future careers in the EERE industry, and in the initiation of energy demonstrations for the general public

If you know of a person(s) who fits this description and would like to suggest or nominate him or her, please inform CREED's Executive Director, Roger Aiken, 651-644-8318, or Board Chair, Bob Swanson, 763-424-4945.

3. SUCCESSFUL "SOLAR DIRECT" COURSE IN EERE SERIES HELD AT HAMLINE UNIVERSITY:

The latest course in the EERE series for teachers "SOLAR DIRECT" was held at Hamline University, June 16-19, 2003. Covering both the Solar Thermal and Photovoltaic aspects of direct solar energy conversion, it was taught by CREED's Roger Aiken assisted by Mark Seeley (U of M Weather Station), Rory Artig (Radiation Monitoring), Ralph Jacobson (Photovoltaics), Darryl Thayer (Solar Thermal and SDHW Systems) and Mary Jane Heinen (Sustainable Building Designs). Hands-on labs were carried out to measure the solar flux on a horizontal surface, the absorption coefficients of various thermal coatings and the areal and voltage/current characteristics of a PV array. Site visits were made to the U of M's St. Paul campus weather station to look at solar radiation monitoring instruments, to the Tovo and Boyce/Olson residences to look at PV systems, to the Aiken residence to look at a SDHW system and to the Solar Oven Society to see how solar ovens are made using low (third world) technology. A meal served to us from one of the ovens was voted delicious!! See a sample of activities from the course in Fig. 6. on page 12.

4. TAXI2000'S SKYWEB EXPRESS DEBUTS AT THE MINNESOTA STATE FAIR:

A demonstration vehicle of the mass transit system of the future, employing Taxi2000 Corporation's PRT concept, was on display and giving people rides every 15 minutes at the "Wonders of Technology" building at the State Fair, August 21 through September 1. This demonstration vehicle, powered by a linear induction motor and running on a 60 foot section of guideway, represents a breakthrough of sorts for inventor and developer J. Edward Anderson, formerly a Mechanical Engineering Professor at the University of Minnesota. The system, which when fully developed in an urban setting will provide 24/7 on demand non-stop travel for commuters, offers the best possible alternative to the private automobile which has yet been devised. The system was described in detail in an article by Ed Anderson in the Winter 2000, Vol.3. No.1. issue of "THE STREAM".



Fig.4. Taxi2000 SkyWeb Express Inventor and Designer, Ed Anderson talks to an interested visitor at the Minnesota State Fair.

5. 3M TO THE RESCUE: IMPROVED PRODUCT WILL DOUBLE THE CURRENT CARRYING CAPACITY OF HIGH VOLTAGE TRANSMISSION LINES:

New transmission cables which 3M's composite conductor program people have been working on for about seven years, are expected to be able to double the power transmission capability of conventional lines. They are made of heat-resistant ceramic fibers wrapped in aluminum-zirconium wire and then in aluminum wire, as compared to the standard which is a steel core wrapped in aluminum. 3M says that the new cables can be installed on existing equipment and don't sag like conventional lines when they heat up.



DISTRICT ENERGY Cont. from p.1.

partment of Energy wanted to prove the viability of a hot water district heating system in a state with cold winters. The district heating system was a resounding success, and 10 years later District Energy introduced district cooling to building owners who wanted a safe, reliable, and inexpensive way to air condition their facilities.

In 2003 a new era in energy production began in downtown Saint Paul. For the first time, District Energy St. Paul customers heated and air conditioned their buildings with hot and chilled water produced from "green energy." The green energy fuel source is wood waste, including tree trimmings and clean construction debris, collected from the Twin Cities metropolitan area. Formerly considered a waste disposal problem, this biomass fuel is now simultaneously producing electricity for Xcel Energy and heat for District Energy.

The green energy is produced at the new St. Paul Cogeneration plant adjacent to District Energy's heating and cooling facility in downtown Saint Paul. The plant's location demonstrates the viability of siting a

renewable-energy combined heat and power (CHP) facility in an urban environment. It is the largest wood-fired CHP plant serving a district energy system in the United States! All Minnesotans also can be proud of the fact that their state capitol is the first in America to be heated with green energy.

Managed by Market Street Energy Company, a District Energy affiliate, the highly efficient CHP plant began commercial operation in April 2003. The project created over 100 local building trade construction jobs and resulted in the hiring of five new employees at the new facility. The plant's continual need for wood waste will secure 50 to 100 jobs in the wood fuel industry far into the future.

More than 600,000 tons of wood waste are generated in the metro area annually, resulting in huge storage and disposal problems. The CHP plant will turn 280,000 tons of this renewable resource into green energy, replacing 70 to 80 percent of District Energy's use of coal and oil. The resulting environmental benefits are impressive: carbon dioxide emissions will be reduced by 280,000 tons per year, while sulfur dioxide and soot emissions will be reduced by 80 percent and 50 percent respectively.

Low supplies and high demand for natural gas could result in record-high prices for heat this coming winter, hurting consumers and the nation's economy. In contrast, District Energy's heating customers have had no increase in their demand rate for seven years and no increase in their energy rate for three years. Fuel flexibility and operating efficiency have kept our rates low and stable over the years. Adding CHP and renewable energy to the equation is a major plus for our customers and the City.

The new CHP plant wasn't the only District Energy-affiliated building changing the downtown Saint Paul skyline in 2003. A new cooling plant in the rapidly expanding northeast section of the city began producing chilled water for air conditioning in June. The 14,000-square-foot plant, which has one electric chiller and room for two more, also incorporates a chilled water storage tank that is 90 feet high and 90 feet in diameter. The insulated storage tank holds four million gallons of chilled water—enough water to cover a football field 14 feet deep!

This is the second storage tank on District Energy's district cooling system. The use of chilled water storage lowers regional peak electric demands, reducing the need for more power plants. Chilled water storage also improves air quality, increases cooling capacity, provides greater rate stability, and further increases the reliability and efficiency of our current cooling system. Over 50 percent of the buildings in the downtown Saint Paul area are currently served by this system, with additional customers added annually.

In May 2001, President George W. Bush toured District Energy and called the company a model of energy efficiency, diversity and affordability. He described the new CHP facility as "an early look at the future." We are proud to say that the future became a reality in 2003, and it is a tribute to all who have shared our vision for over 20 years!

Anders Rydaker is President and Trudy Sherwood is Communications Marketer for District Energy Saint Paul. They may be reached at 651-297-8955 or at <anders.rydaker@districtenergy.com> and <trudy.sherwood@districtenergy.com> respectively.



ENERGY SERVICES GROUP Cont. from p.1.

management industry for providing clients with truly vendor independent and utility company neutral facility improvement solutions.

ESG was started over six years ago by three principals who had performed similar roles and had helped develop programs for major companies. ESG has grown methodically to its current staff of over 20 full and part time employees. ESG utilizes part time contract employees to help balance its workload and to be able to staff large projects. ESG is very cost effective because of a low overhead structure and a very experienced work force. The organization is based on a very flat management structure and employees who typically are working at customer facilities or in telecommuting environments. This requires an experienced and motivated work force as there is limited ability to supervise and mentor inexperienced staff.

ESG is always interested in experienced professionals capable of various roles including sales/marketing, energy engineering, technical survey, and project management. ESG seeks individuals with a technical education- typically a college or vocational degree, along with a meaningful work history. Candidates are sought that have demonstrated competency in multiple areas along with the ability to work independently.

Our mission is to help our clients maximize the comfort, safety, energy efficiency and productivity of their building environments by providing creative, and valuable professional facility management resource support. We offer the following strengths:

- Federal Department of Defense and Department of Energy certified and qualified.
- Over 180 years of combined professional technical staff experience.
- Technical staff consists of registered Professional Engineers (P.E.'s), Certified Energy Managers (C.E.M.'s), Construction Administrators, Project Managers (P.M.'s), Heating, Ventilating, and Air Conditioning (HVAC) Controls Specialist, and Certified Lighting Efficiency Professionals (CLEP). Financial consultants with Masters in Business Administration (M.B.A.'s).

We help clients solve complex facility management problems including inefficient and outdated mechanical HVAC and electrical systems, escalating energy costs, indoor air quality concerns, deferred maintenance, and changing building system technologies.



To accomplish this, we offer a variety of professional engineering and facility management related services described by the following:

1. Energy Audit Services: Provide our clients with accurate energy consumption and cost baselines from which ESG can identify potential energy conservation measures and other facility operational efficiency improvement opportunities.

2. Comprehensive Facility Assessment Services: Provide our clients with a comprehensive analysis and assessment of all building systems to include energy conservation opportunities, deferred maintenance issues, code compliance issues, building envelope deficiencies, and other facility infrastructure improvement opportunities.

3. Operations and Maintenance Support Services: Assess, recommend and implement unbiased ongoing operation and maintenance programs that best uses the clients in-house labor resources and finds a balance with outside labor resources.

4. Indoor Air Quality Assessment Services: Assess and develop programs for clients to improve the indoor air quality through proper design, and effective operation and maintenance of the heating, ventilating, and air conditioning systems.

5. Monitoring and Verification Services: Provide clients with "on-going" facility management support to ensure that optimum savings are achieved as a result of implementing and properly operating facility improvement measures.

6. Engineering/Design Services: Provide cost effective engineering/design solutions including mechanical (HVAC) and electrical engineering services with emphasis on efficient utility systems, and cost effective HVAC equipment/building system technologies.

7. Training Services: Provide our clients with a variety of training support services including technical training, operations and maintenance training, and behavioral training.

8. Alternative Energy and Utility Procurement Services: An objective and consultative approach to finding the optimum energy source at the most cost-effective rate. This service will identify utility refund opportunities, cost effective utility rate applications, and low or no cost energy improvements.

9. Commissioning Services: Cost effective "post" mechanical and electrical system installation support that provides our clients with the assurance that systems are performing per engineering design and manufacturer specifications.

10. Performance Contracting Services: Comprehensive approach allows our clients to partner with us on facility efficiency improvement projects. Clients benefit from no out-of-pocket capital expenditures and self funded improvements paid for by guaranteed energy and operating cost savings.

11. Project Management: Offer the expertise and necessary support to coordinate and manage building projects efficiently and with our client's best interests in mind by making available the people and the state of the art project management tools and software programs.

12. Financial Support Services: Creative funding solutions that help clients implement facility improvements and ongoing facility management strategies with little or no out-of-pocket capital dollars.

Mike Eckhardt is Manager of Engineering at Energy Services Group LLC. He may be reached at 763-595-4328 or at <mike_eckhardt@1esg.com> or <eckhardtm@aol.com>



BILL BUTLER'S EDGE ACADEMY COLUMN

REPORT ON MRES'S 2003 SOLAR BOAT REGATTA

The 11th Annual MRES Solar Boat Regatta was held on Snail Lake at the Regional Park on Saturday, May 17. The regatta brought entrants from all around the state. Many had designed their own boats with great ingenuity and skill. It was a beautiful spring day and was enjoyed by all.

This year, MRES received a major sponsoring Grant from Great River Energy.

The entrants raced for speed, maneuverability and endurance. The winners and runners up received well deserved recognition and awards. There were exhibits of solar devices supplied by students and vendors. In all it was a terrific social, technical and sporting event. Michael Monroe, the Solar Troubadour, entertained the crowd with his music for over two hours.

Entrants began to assemble at 9 A.M. The races began at 10:30 A.M. and ended around 3 P.M. Awards and Teacher debriefing followed. The boat from Hopkins HS ran totally on the Sun with no battery back-up. Despite the fact that this had never been attempted before, they did well. Fortunately, it was a sunny day. The top speed in the sprint was 10.6 kilometers per hour.

The boats fit into four classes, depending on equipment and age of students/builders: Junior 170, Senior 170, Open 170 and Senior 340.

Junior 170 had:-

* Think-Oar-Sink from Woodland Middle School (Duluth), and * Gracie by Patrick Raines of Shoreview.

Senior 170 had:-

* Athena from Jennings High School in St Paul, and * Solar Dinghy from the School of Environmental Studies in St Paul.

Open 170 had:-

* Waste of Time by Leonard Salverda of Shoreview, and

Senior 340 had:-

* Zero Gravity by St. Paul Area Learning Center * Zephyr's Wind by Mahtomedi High School, and * Royal Sun III by Hopkins High School.

Awards were granted as follows:-

Junior 170 Best in Class - Think-Oar-Sink **Runner Up** - Gracie

Senior 170 Best in Class - Athena **Runner Up** - Solar Dinghy

Open 170 Best in Class - Waste of Time

Senior 340 Best in Class - Zero Gravity **Runner Up** - Zephyr's Wind **Outstanding in Class** - Royal Sun III **A Special Award** was given to Royal Sun III which used no batteries and ran purely on solar power during all races.

Overall awards were as follows:-

Best overall - Zero Gravity **Runner Up** - Think-Oar-Sink **Outstanding** - Athena

If you know of students in grades 7 to 12 who would like to enter this contest next year, have them contact Mr. Allan Meyer at 25921 Dodd Blvd., Lakeville, MN. 55044. There are 9 different classes differentiated by grade in school and size of solar panel(s) so it is a very level playing field.

Bill Butler, Director of Edge Academy and Newsletter Co-Editor for MRES, may be reached at [651-426-3356](tel:651-426-3356) or [<bandco@attbi.com>](mailto:bandco@attbi.com).

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Fig.5. Views from the "Solar Direct" Class for Teachers at Hamline University.