ELECTRICAL POWER GENERATION IN WISCONSIN:
THE CHALLENGE OF MEETING PRESENT NEEDS AND FUTURE DEMANDS

Final Report

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The Wisconsin Academy of Sciences, Arts and Letters
Madison, Wisconsin

MASTER

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ABSTRACT

Six symposia covering Electrical Power Generation in Wisconsin: the Challenge of Meeting Present Needs and Future Demands were held during the 1973-74 school year. Each symposium was held in a different area of the state and together they were attended by over 500 students and teachers. Evaluation showed that over 70% of the participants indicated that program objectives were met and a higher percentage felt the program format was effective.

Ideas generated by the students during the symposium as to how they could increase student understanding of the problems involved in meeting present needs and future demands of electrical power generation were printed and sent to all symposia participants. A survey will be conducted in the spring of 1974 to determine if any of the ideas were used in the schools.

ELECTRICAL POWER GENERATION IN WISCONSIN:
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Final Report
February 28, 1974

The subject of the "energy crisis" in the United States and the associated concerns over the environmental impact of increased electrical power generation are presently topics of immediate and real concern to high school students. To provide unbiased factual information and to create an awareness of the alternatives and value systems involved in the "energy crisis," six one-day symposia were held in Wisconsin during the 1973-74 school year. The specific objectives of the program were to:

1. Provide background information and understanding of the current state and future possibilities of electrical power generation in the U.S. and in Wisconsin in particular;
2. Explore alternative methods of meeting electrical power needs of the future, including nuclear resources, with stress on provision of factual background information;
3. Offer balanced and meaningful discussion on the environmental impact of nuclear, conventional and alternative resources for electrical power generation;
4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation;
5. Develop an outline for possible learning models which program participants can employ in their schools to increase understanding of the subject.

Location of each symposium was based on distribution of population within the state. Dates were selected based on such criteria as: conflict with other school events, availability of facilities, local preference for weekday or Saturday meetings, and expected weather.

Symposia Schedule

<u>City</u>	<u>Location</u>	<u>Date</u>
Monona Grove	Monona Grove High School	Wednesday Oct. 31, 1973
Racine	University of Wis.-Parkside	Wednesday Nov. 28, 1973
Eau Claire	Memorial High School	Saturday Dec. 1, 1973
Wausau	Wausau West High School	Saturday Dec. 8, 1973
Neenah	Armstrong Senior High School	Saturday Jan. 12, 1974
Milwaukee	University of Wis.-Milwaukee	Saturday Jan. 19, 1974

Eighteen schools, public and private, were invited in each district, to send a teacher and four students. Seventy-four percent of the original goal was reached with an average of 13.3 schools attending in each district. This represents 19.7% of Wisconsin high schools. A list of participating schools is attached as Appendix A. Seventy-nine percent of the goal of 108 teachers was met with an average of 14.3 teachers per symposium. The program was designed for 432 attending students. Ninety-four percent of this goal was reached with an average attendance of 67.8 students at each district.

Symposia Attendance

<u>Location</u>	<u>Schools</u>	<u>Teachers</u>	<u>Students</u>	<u>Other (guests, speakers, etc.)</u>	<u>Total</u>
Monona	15	16	76	5	97
Racine	12	13	114	15	142
Eau Claire	10	10	40	12	62
Wausau	9	11	32	6	49
Neenah	17	19	80	13	112
Milwaukee	17	17	65	5	87
Total	80	86	407	56	549

Description of the Symposia

A District Chairman was selected for each of the six districts and given the responsibility of selecting schools and making the necessary arrangements. To provide a uniform program, and to allow for diverse learning experiences, such as outside readings, lectures, small group sessions and model building, all chairmen followed the same program format.

Appendix B includes a generalized program sent to all invited schools and specific programs, with a time schedule that was developed for each district. A generalized program included:

Introduction

Resource Lecture - "Environment Costs and Trades
of Energy Use"

Resource Lecture - "Energy and Wisconsin--Today
and Tomorrow"

Discussion Sessions

Lunch

Resource Lecture - "Power Sources for Electricity--
Promises and Problems"

Discussion Sessions

Model Building

Adjournment.

Prior to each symposium, participants were provided with the following reading material:

- (1) *A Procedure for Evaluating Environmental Impact*
U.S. Geological Survey Circular 645. 1971.
- (2) *1973 Survey of Energy Use in Wisconsin*
W.K. Foell, D.B. Shaver, O.S. Goldsmith, and
M.A. Caruso. Report 10, Sept. 1973. Insti-
tute for Environmental Studies. University
of Wisconsin-Madison.
- (3) *Energy Use in Wisconsin-A Survey of Energy Flow
in the State of Wisconsin*
W.K. Foell and J.E. Rushton. Working Paper 4,
Oct. 1972. Institute for Environmental Studies.
University of Wisconsin-Madison.
- (4) The following reprints - 1973 *Aware* magazine pub-
lished by Community Performance Publications,
Inc., Madison, Wisconsin.

"The Energy Outlook: Now to 1985"

by Paul Kruger, Professor of Civil En-
gineering, Stanford University, and
Carel Otte, Manager of Geothermal Divi-
sion, Union Oil Company.

"Thermal Conversion Offers Potential in Solar Energy Production"

by Aden Meinel and Marjorie Meinel, Optical Sciences Center-University of Arizona.

"Electric Generation and the Environment"

by Chauncey Starr, Dean, School of Engineering-University of California, Los Angeles.

"Environmental Effects of Electric Power Generation"

by Morton Goldman, Senior Vice President, Environmental Systems Group, NUS Corporation.

- (5) Environmental facts: Information taken from *Environmental Facts* of U.S. Environmental Protection Agency. (See Appendix C)
- (6) Memo to teachers: An information sheet based on feedback from a discussion leader. (See Appendix C)
- (7) A cover letter (see Appendix C) also suggested reading the Sept., 1971 *Scientific American* and the "Search for Tomorrow's Power" in the Nov., 1972 issue of the *National Geographic*.

The concluding session of each symposium was devoted to developing ideas that participants could use in their schools to increase student understanding of the problems involved in meeting present needs and future demands of electrical power generation. The ideas from all symposia were tabulated, and along with general information about the symposia, were published (Appendix D). All student participants, teachers and discussion leaders received copies.

Speaker Selection

Of utmost concern was the assurance that the program participants be provided with a balanced and objective learning experience. To insure this, a Program Steering Committee was formed to select speakers and topics. The following served on the Program Steering Committee:

Dr. Reid A. Bryson, Director
Institute for Environmental Studies
The University of Wisconsin
Madison, Wisconsin 53706

Dr. Harold A. Peterson
Professor of Electrical Engineering
The University of Wisconsin
Madison, Wisconsin 53706

Dr. Max W. Carbon, Chairman
Dept. of Nuclear Engineering
The University of Wisconsin
Madison, Wisconsin 53706

Dr. John E. Ross, Associate Director
Institute for Environmental Studies
The University of Wisconsin
Madison, Wisconsin 53706

Topics and speakers selected were:

"Environmental Costs and Trades of Energy Use"

Dr. Daniel E. Willard, Project Associate and Lecturer,
Environmental Monitoring and Data Acquisition Group,
Institute for Environmental Studies, UW-Madison.

"Energy and Wisconsin - Today and Tomorrow"

Dr. Wesley K. Foell, Department of Nuclear Engineering,
Institute for Environmental Studies, UW-Madison.

"Power Sources for Electricity - Promises and Problems"

Dr. William F. Vogelsang, Associate Professor of Nuclear
Engineering, UW-Madison.

District Chairmen Selection

District Chairmen were selected by the Project Director in each symposium area based on their ability to organize meetings, their reputation in that area and their local knowledge of schools, teachers and educational climate. Two meetings of all chairmen, the project director and Steering Committee were held to insure uniformity.

District Chairmen

Richard Bliss
Racine County Uni-
fied School District #1

Jon L. Harkness
Wausau West High School

Edward Mueller
Armstrong High School
Neenah

William J. Weishar
Brookfield East High School

William Reineke
Memorial High School
Eau Claire

Carl H. Pfeiffer
Monona Grove High School

Discussion Leaders Selection

Each chairman was responsible for selecting discussion leaders. Selection was based on background knowledge, experience in small-group discussion techniques and ability to work with students. In addition to their knowledge of local teachers, a list of teacher participants in the 1972 and 1973 summer workshops on electrical power generation sponsored by AEC and held at UW-Madison Department of Nuclear Engineering, was used. Appendix E lists discussion leaders and their affiliations.

Each discussion leader was provided with:

- (a) a resume of the original proposal (see Appendix E),

- (b) all of the material provided the participating students and teachers,
- (c) *Energy Technology to the Year 2,000*, a special symposium published by Technology Review. M.I.T. Cambridge. 1972.,
- (d) a memo from the Project Director stressing importance of their role (see Appendix E),
- (e) communication with District Chairmen regarding importance of their role. This was by memo (see Appendix E) or by phone.

Participant Selection

Each District Chairman was responsible for selecting 18 schools. Selection was made to achieve a balance between private and public, large and small schools, and schools that are typically active in programs and those that are not. Appendix A lists schools in attendance.

Teachers were selected by school principals and the teachers, in turn selected the students. Appendix F includes a sample letter to schools.

Publicity

An attempt was made to secure publicity for those attending to insure that they would be recognized for having participated and identified as possible source people in their schools. Newspaper releases (see Appendix G for sample), TV and radio were successfully used.

Evaluation

Evaluation forms were provided to all participants to be completed and returned the same day (Appendix H). Seventy-two percent of participants returned completed evaluations. Following are the results of all symposia:

Evaluation of Program Objectives

How well do you feel that the symposium accomplished the following objectives?

<u>Objectives</u>	<u>percent of students replying</u>		
	<u>Good</u>	<u>Average</u>	<u>Poor</u>
1. Provide background information of the present state and future possibilities of electrical power generation in the U.S. with emphasis on Wisconsin.	88%	10%	1%

Evaluation of Program Objectives (contd.)

<u>Objectives</u>	<u>percent of students replying</u>		
	<u>Good</u>	<u>Average</u>	<u>Poor</u>
2. Discuss alternate methods of meeting electrical power needs of the future. Stress will be placed on providing factual background information.	78%	17%	5%
3. Provide balanced discussions on the environmental impact of nuclear, conventional and other methods of electrical power generation.	73%	18%	9%
4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation.	83%	14%	2%
5. Develop a list of activities that could be used in schools to increase student understanding of problems involved in meeting present needs and future demands of electrical power generation.	63%	29%	7%

EVALUATION OF SMALL GROUP SESSIONS

	<u>percent of students replying</u>	
Were these sessions worthwhile?	Yes: 90%	No: 10%
These sessions were:	Too long - 8% Too short - 22% Just right - 70%	

EVALUATION OF THE LARGE GROUP PRESENTATIONS

<u>Level of Content</u>	<u>Percent of students replying</u>		
	<u>Generally too difficult for me to understand with the background I now have</u>	<u>Generally I could understand the material presented</u>	<u>Generally too elementary</u>
<u>Environmental Costs & Trades of Energy Use</u>	93%	3%	3%
<u>Energy & Wisconsin - Today & Tomorrow</u>	84%	11%	4%
<u>Power Sources for Electricity-Promises & Problems</u>	83%	13%	4%

Evaluation of the Large Group Presentations (contd.)

<u>Manner of Presentation</u>	<u>Good</u>	<u>Average</u>	<u>Poor</u>
Environmental Costs & Trades of Energy Use	88%	7%	4%
Energy & Wisconsin - Today & Tomorrow	77%	18%	4%
Power Sources for Electricity-Promises & Problems	57%	25%	18%

Space was provided in the evaluation sheet for open comments. Following are typical comments from all symposia:

Teachers

The program ran smoothly. The eats were good and the only criticism might lie in the nature of my particular group activity discussions. There was too much leader activity.

I feel that this was a worthwhile program.

The way the schedule was arranged was very good. There was a good balance between discussions and lecture. It probably would have been better if we could have had full half hour of discussions. I was generally impressed with the symposium; it was quite informative and good for the students if they participated in the proper spirit.

Start at 9:15 a.m. The small groups could have been about twice the size. This probably would have led to more questions and argumentative discussion.

The program was handled very well. Speakers were well informed on topics. Small group discussions handled well, the students were able to contribute their ideas that so often aren't heard from.

Get more participants. Follow up the program with another program that includes presentations by power companies and their opponents. The students should be able, by then, to evaluate such presentations.

Students

All small group leaders should have a working knowledge of physics.

I feel it was a good symposium, but I do feel it would have been more worthwhile if we could get more students and some of the public to attend.

Students (contd.)

It was well organized and therefore interesting and successful. It was a very worthwhile symposium. I think we have all learned something from this experience.

These talks were very well organized and we able to teach me a great deal more than what I knew before. My comment is that it was very well organized. And the speakers were very good.

I think the program was well conducted, but I would have liked a longer question and answer period. I learned many things today.

I learned that America's shortage is due to individual wastefulness.

It was very helpful in understanding the present crisis. Although it didn't explain the functions of the various types of energy plants, e.g., nuclear, coal, oil.

I think this should be done in the rest of the U.S.

It was quite good at parts, but the group discussions could have been longer.

I was very interested in the small group discussions but the speakers' presentations tended to get, not really too long, but a little bit distant. Otherwise the symposium was informative and interesting.

More time in small groups. Let students do more of the talking. Leaders should try to be less dominant and biased.

The speakers' talks were generally all right, but at some points they dragged a bit and that lost the kids' attention and interest. Perhaps if they had concentrated on points that would have interested the kids a bit more, the talks would have been more beneficial. I think they spend a little bit too much time on facts that weren't relevant or important to remember.

More question and answer time should be allotted in the large group presentations.

The first two lectures were in themselves presented very well but I feel that a break for relaxing or walking around between the lectures and the small group sessions would be beneficial and make it easier to concentrate on the next lecturer. I enjoyed the first half very much. The lectures were generally one-sided as to presenting views on nuclear power as opposed to alternatives.

Students (contd.)

I believe it was an excellent idea, however, the speakers should bring out both sides, the good and bad points, should be brought out equally. For there were no bad points brought out about nuclear energy, but some do exist.

It was wonderful! I only wish the group discussions could be longer. Congratulations!!! You did a fine job! I wish things like this could happen more often. It certainly has opened my eyes! Thank you!!!

I think the speakers were excellent, I do think however that some more discussion could have been brought up other than nuclear and fossil fuels.

I feel there should be some coordination between speakers in order to eliminate the same points restated over and over. The discussion groups were a good idea--they make the symposium more interesting and break up monotony. It would also be helpful for leaders of industry and government to give their biased opinions--too many times an educator gives his bias--making it hard to keep an open mind on the subject.

They should have discussed more the effects of thermal pollution. They could have been more specific when they talked about radioactive wastes from nuclear reactors.

I think the speakers could have stressed a little more about how dangerous waste materials are and what precautions could be taken.

The small groups are good so you can discuss what you learned through the lecture and apply it. Very worthwhile and educational day. I never realized or understood the problem and facts behind the energy crisis.

I enjoyed this day. It was well organized. The talks were very interesting. I learned more now than I ever learned. I enjoyed the small group. Everybody participated in it. I am glad I was invited.

I feel that it would have been better if it was discussed what future generations are going to do after our exploitation of material resources (fossil fuels). It was an overall valuable experience for me.

This I thought was fantastic! I think you should have more of these types of doings. I am grateful for being picked to come to Parkside to hear these people talk. Thanks again.

The meal was pretty good but I didn't like the chairs. Thank you for a nice day and the folder.

Students (contd.)

Fairly good food. Very good speakers and facilities.

I liked the relaxed atmosphere of the symposium. Also, the small number of people here made it easy to keep in touch with what was going on.

I think you did a very good job! I'm really glad I came. I think to make it a better success you could have the students have a chem. background to really understand. It sure helped me!

I learned quite a lot about the energy problem and how much we have left of the sources. I enjoyed the speakers. I learned some things I never thought existed. It was too bad not more showed up. If more people showed up, I think more people would realize the problems.

I thought this was one of the best organized lectures and discussions I have ever attended. Information was given in an interesting manner and things kept moving. I did think the lecturers could have given more opinions on what they thought should be done in the future.

Director's Comments

Three areas of the program need to be improved if the project is to be continued:

- (1) More time, or at least a rescheduling of time to allow for longer discussion and question/answer periods. This could be accomplished by having only two major speakers cover the necessary topics. If speakers familiar with high school students were obtained, there would be no problem of holding participant attention.
- (2) A method of ensuring the number of participants desired should be developed. All six symposia experienced similar problems in that invited schools would not return acceptance or rejection as asked and thus finalization of numbers was difficult and, in most cases, resulted in not enough schools or a last-minute selection of a school.
- (3) Small group discussions can be, and in many cases were, the strongest part of the program. Ineffective discussion leaders, however, develop negative attitudes on the part of participants. Future programs should include a premeeting of all discussion leaders to discuss goals and methods of conducting sessions.

Director's Comments (contd.)

Minor problems that occurred included the general lack of uniform background in students. This was not only in course background as reflected by various age groups, but also background in having worked in small group discussions previously. This perhaps should be considered in assigning of students to groups.

Another suggested change would be in the material provided for students to read prior to the sessions. Most students did not read the material, but rather considered it as resource material. If it is to be used as resource material, it could better be given out the day of the symposium. Simple, brief material needs to be located if minimal uniform background is desired.

Based on conversations with participants, discussion leaders, speakers and chairmen, and based on the written evaluations, I believe that the information presented and the manner in which it was presented was unique and served a needed role in today's schools. Students were exposed to concepts that were not being taught in their schools, nor were they concepts that are readily available from other sources. The program should be continued and possibly expanded to include other forms of energy problems.

Expenditures

Participant Support

Allowance for meals \$ 1,097.73

Operating Costs

District Chairmen (including
mileage for meetings) 785.20

Guest Lecturers (including
mileage) 1,800.00

Discussion Leaders (including
mileage) 1,648.90

Director 500.00

Secretarial & Clerical 137.00

Instruction Materials 239.50

Office Supplier, Communications,
Publicity 485.78

Total expended . . . \$ 6,694.11

Participating Schools

Madison Area Symposium - Monona Grove High School, Madison - October 31, 1973

District Chairman: Carl H. Pfeiffer, Monona Grove High School

Albany High School Albany	Cambridge High School Cambridge	Columbus High School Columbus
LaFollette High School Madison	Oregon Senior High School Oregon	West High School Madison
Wayland Academy Beaver Dam	Richland Center High School, Richland Center	Monona Grove High School Monona Grove
Dodgeville High School Dodgeville	Fort Atkinson Senior High School, Fort Atkinson	Campion High School Prairie du Chien
Sauk Prairie High School Sauk Prairie	Belleville High School Belleville	Memorial High School Madison

Racine Area Symposium - University of Wisconsin-Parkside, Racine - November 28, 1973

District Chairman: Richard Bliss, Racine County Unified School District #1

Wilmot Union High School Wilmot	Waterford Union High School, Waterford	Bradford High School Kenosha
Prairie High School Racine	Tremper Senior High School Kenosha	Kemper Hall Kenosha
Washington Park High School Racine	J.I. Case High School Racine	St. Catherines High School Racine
Badger Union High School Lake Geneva	Saint Joseph High School Kenosha	Walden Three Racine
	Horlick Senior High School Racine	

Eau Claire Area Symposium - Memorial High School, Eau Claire - December 1, 1973

District Chairman: William Reineke, Memorial High School, Eau Claire

North High School Eau Claire	Black River Falls High School, Black River Falls	River Falls High School River Falls
Cadott High School Cadott	Regis High School Eau Claire	Memorial High School Eau Claire
Barron High School Barron	Chetek High School Chetek	Chippewa Falls High School Chippewa Falls
	Augusta High School Augusta	

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Wausau Area Symposium - Wausau West High School, Wausau - December 8, 1973

District Chairman: Jon Harkness, Wausau West High School

Wausau East High School Wausau	Wautoma High School Wautoma	Rhineland High School Rhineland
Newman High School Wausau	Wittenberg High School Wittenberg	Tri-County High School Plainfield
Wausau West High School Wausau	Winter High School Winter	D.C. Everest High School Schofield

Neenah Area Symposium - Armstrong High School, Neenah - January 12, 1974

District Chairman: Edward Mueller, Armstrong High School, Neenah

Armstrong High School Neenah	Kimberly High School Kimberly	Lena High School Lena
South High School Sheboygan	Bay Port High School Green Bay	East High School Green Bay
West High School Oshkosh	North High School Oshkosh	West High School Appleton
Hortonville High School Hortonville	Hilbert High School Hilbert	Kiel High School Kiel
Menasha High School Menasha	Gillett High School Gillett	Pulaski High School Pulaski
St. Mary's High School Menasha	East High School Appleton	

Milwaukee Area Symposium - University of Wisconsin-Milwaukee - January 19, 1974

District Chairman: William J. Weishar, Brookfield East High School, Brookfield

Marshall High School Milwaukee	Wauwatosa East High School Wauwatosa	Divine Savior-Holy Angels High School Milwaukee
Nathan Hale High School West Allis	Brookfield East High School Brookfield	Brookfield Central High School Brookfield
Pulaski High School Milwaukee	New Berlin High School New Berlin	Martin Luther High School Greendale
Messmer High School Milwaukee	Milwaukee Lutheran High School, Milwaukee	Waukesha High South Campus Waukesha
Oak Creek High School Oak Creek	Homestead High School Mequon	Washington High School Milwaukee
Hamilton High School Milwaukee	Nicolet High School Milwaukee	

Energy Symposia for High School Students

Electrical Power Generation in Wisconsin - Present - Future

Sponsored Jointly by

The Wisconsin Academy of Sciences, Arts & Letters
and the United States Atomic Energy Commission

Symposia site Monona Grove High School, Oct. 31, 1973

(Morning Schedule)

- 7:45 - 8:05 Registration
- 8:05 - 8:10 Announcements
- 8:10 - 9:10 Address: "Environmental Costs and Trades of Energy Use"
Dr. Daniel E. Willard, Project Associate and
Lecturer, Environmental Monitoring and Data
Acquisition, Group Institute for Environmental
Studies, U.W. Madison
- 9:10 - 9:50 Participant Group Discussion Sessions
- Group 1 Leader: Mr. Paul McIntosh, LaFollette H.S. Madison
Group 2 Leader: Mr. Don Mitchell, Stoughton H.S.
Group 3 Leader: Mr. Douglas Johnson, Memorial H.S. Madison
Group 4 Leader: Mr. Jack Pett, Cambridge H.S.
Group 5 Leader: Mr. John Bauman, Oregon H.S.
Group 6 Leader: Mr. David Braunschweig, West H.S. Madison
- 9:50 - 10:50 Address: "Energy and Wisconsin - Today and Tomorrow"
Dr. Wesley K. Foell, Department of Nuclear
Engineering and Institute for Environmental
Studies, U.W. Madison
- 10:50 - 11:30 Participant Group Discussions
(Same groupings as first session)
- 11:30 - 12:40 Luncheon and Free Time

(Afternoon Schedule)

- 12:45 - 1:45 Address: "Power Sources for Electricity - Promises and Problems"
Dr. William F. Vogelsang, Associate Professor of
Nuclear Engineering, U.S. Madison
- 1:45 - 2:25 Participant Group Discussions
(Same groupings as first session)
- 2:25 - 2:30 Summation and Charge to the Participants
with regard to ways and means of developing increased awareness
and understanding of the energy problem among high school students
- 2:30 - 3:15 Small group meetings to develop ideas or models for informing stu-
dents, locally, about the nature of the energy problem
- 3:15 Adjournment

Agenda
Energy Symposia for High School Students

Electrical Power Generation in Wisconsin - Present - Future

Sponsored Jointly by

The Wisconsin Academy of Sciences, Arts & Letters
and the United States Atomic Energy Commission

Location
University of Wisconsin Parkside
Nov. 28, 1973

- 7:45 - 8:05 Registration
- 8:05 - 8:10 Announcements
- 8:10 - 8:15 Welcome - Dr. Norbert Isenberg (Chm. Sci. Div., UW-Parkside)
- 8:15 - 9:15 Dr. Daniel E. Willard - "Environmental Costs and Trades of Energy Use"
(Environmental Monitoring and Data Acquisition, Group
Institute for Environmental Studies, UW-Madison)
- 9:15 - 9:45 Small Group Discussion Sessions
Group 1: Prof. Kenneth Hamm, Carthage College
Group 2: Prof. Richard Haney, UW-Milwaukee
Group 3: Prof. Donald Newman, UW-Milwaukee
Group 4: Prof. Gerald Buck, College of Racine
Group 5: Prof. L. Ray Stonecipher, UW-Whitewater
Group 6: Prof. Henry Cole, UW-Parkside
Group 7: Prof. Morris Firebaugh, UW-Parkside
Group 8: Prof. Lon Ruedisili, UW-Parkside
Group 9: Prof. Frank Stekle, UW-Whitewater
- 9:45 - 10:45 Dr. Wesley K. Foell - "Energy and Wisconsin - Today and Tomorrow"
Dept. of Nuclear Engineering and Institute for Environmental
Studies, UW-Madison
- 10:45 - 11:15 Small Group Discussion Sessions (same grouping as 1st session)
- 11:15 - 12:30 Luncheon (on Parkside campus)
- 12:45 - 1:45 Dr. William F. Vogelsang - "Power Sources for Electricity - Promises
and Problems"
Associate Professor of Nuclear Engineering, UW-Madison
- 1:45 - 2:15 Small Group Discussion Sessions (same grouping as 1st session)
- 2:15 - 2:20 Summation and Charge to Participants
- 2:20 - 2:50 Small Group Meeting to develop ideas that might help to give high
school students a better understanding of the energy problem
- 3:00 Adjournment (Secretaries turn in their reports)

Energy Symposia for High School Students
Electrical Power Generation in Wisconsin - Present - Future

Sponsored Jointly by
The Wisconsin Academy of Sciences, Arts & Letters
and the United States Atomic Energy Commission

Symposia site Memorial High School, Eau Claire Dec. 1, 1973

(Morning Schedule)

- 8:00 - 8:55 Registration
- 8:55 - 9:05 Announcements: assemble in Little Theater
- 9:05 - 10:05 Address: "Environmental Costs and Trades of Energy Use"
Dr. Daniel E. Willard, Project Associate and
(Little Theater) Lecturer, Environmental Monitoring and Data
Acquisition, Group Institute for Environmental
Studies, U.W. Madison
- 10:10 - 11:10 Address: "Energy and Wisconsin - Today and Tomorrow"
Dr. Wesley K. Foell, Department of Nuclear
(Little Theater) Engineering and Institute for Environmental
Studies, U.W. Madison
- 11:15 - 12:00 Participant Group Discussion Sessions
Group 1 Leader: Mr. Arthur Ludvigson, Memorial High School,
Eau Claire
Group 2 Leader: Mr. Gerald Bjerke, Black River High School
Group 3 Leader: Mr. Harry Gibbs, Memorial High School, Eau Claire
Group 4 Leader: Mr. Gary Steglich, Barron High School
Group 5 Leader: Dr. Melvin Gleiter, U.W.-Eau Claire
Group 6 Leader: Mr. Robert Thorson, Cadott High School
- 12: - 1:00 Luncheon and Free Time (Memorial High School Cafeteria)

(Afternoon Schedule)

- 1:05 - 2:05 Address: "Power Sources for Electricity - Promises and Problems"
Dr. William F. Vogelsang, Associate Professor of
(Little Theater) Nuclear Engineering, U.W. Madison
- 2:05 - 2:35 Participant Group Discussion Sessions
(Same groupings as first session)
- 2:35 - 2:40 Summation and Charge to the Participants
with regard to ways and means of developing increased awareness and
understanding of the energy problem among high school students
- 2:40 - 3:15 Small group meetings to develop ideas or models for informing stu-
dents, locally, about the nature of the energy problem
- 3:15 Adjournment

SYMPOSIUM FOR HIGH SCHOOL STUDENTS

Electrical Power Generation in Wisconsin - Present - Future

sponsored jointly by

The Wisconsin Academy of Sciences, Arts & Letters
and the United States Atomic Energy Commission

Symposia Site Wausau West High School Dec. 8, 1973

<u>Time</u>	<u>Location</u>	<u>Activity</u>
7:45 - 8:30	Room 338	Registration
8:30 - 9:30	Room 315	<u>Address:</u> "Environmental Costs and Trades of Energy Use" Dr. Daniel E. Willard, Project Associate and Lecturer, Environmental Monitoring and Data Acquisition Group, Institute for Environmental Studies, U.W. Madison
9:30 - 9:45	Room 338	Refreshment break
9:50 - 10:20		<u>Small Group Discussions:</u>
	Room 237	Group 1: Mr. Wm. Erdman
	Room 220	Group 2: Mr. Richard LeClair
	Room 222	Group 3: Mr. Gordon Cowles
	Room 226	Group 4: Mr. John Ihde
	Room 229	Group 5: Mr. Herb Soderlund
	Room 242	Group 6: Mr. Dennis Tietge
10:25 - 11:25	Room 315	<u>Address:</u> "Energy and Wisconsin - Today and Tomorrow" Dr. Wesley K. Foell, Dept. of Nuclear Engineering and Institute for Environmental Studies, U.W. Madison
11:30 - 12:00		<u>Small Group Discussions:</u> (same group and location)
12:00 - 1:00	Cafeteria	Luncheon and Free Time
1:00 - 2:00	Room 315	<u>Address:</u> "Power Sources for Electricity - Promises and Problems" Dr. Wm. F. Vogelsang, Dept. of Nuclear Engineering, U.W. Madison
2:05 - 2:35		<u>Small Group Discussions:</u> (same group and location)
2:40 - 2:55	Room 315	Charge to Participants with regard to ways of developing increased understandings of the energy problem among high school students.
		Evaluation questionnaire
3:00 - 3:30		<u>Small Group Task</u> (same group and location) Develop a model by which the nature of energy problems can be approached in the high school.
3:30		Adjourn
	Room 230	Coat Check
	Room 225	Headquarters - (Lost & found, telephone, etc.)

ELECTRICAL POWER GENERATION IN WISCONSIN:
THE CHALLENGE OF MEETING PRESENT NEEDS AND FUTURE DEMANDS

A Symposium for High School Students and Teachers
Sponsored Jointly By
The Wisconsin Academy of Sciences, Arts & Letters
and the United States Atomic Energy Commission

Symposia Site Armstrong High School Jan. 12, 1974
Neenah, Wisconsin

8:30 - 8:45	Registration
8:45 - 9:45	<u>Address:</u> "Environmental Costs and Trades of Energy Use" Dr. Daniel E. Willard, Project Associate and Lecturer, Environmental Monitoring and Data Acquisition, Group Institute for Environmental Studies, U.W. Madison
9:45 - 10:15	<u>Discussion Session I</u> Group 1 Leader: Mr. Ray Greisinger, Green Bay SW H.S.-Rm. 121 Group 2 Leader: Mr. David Hackbarth, Goodrich H.S., Fond du Lac-Rm. 122 Group 3 Leader: Mr. Gerald Hansel, Appleton East H.S.-Rm. 123 Group 4 Leader: Mr. Carl R. Moede, Pulaski H.S.-Rm. 124 Group 5 Leader: Mr. Phillip Rehberger, Oshkosh H.S.-Rm.-Prep. Group 6 Leader: Mr. Robert Showers, Green Bay East H.S.-Rm. 120 Group 7 Leader: Dr. Paul Taylor, UW-Oshkosh - Rm. 113
10:15 - 10:30	Break
10:30 - 11:30	<u>Address:</u> "Energy and Wisconsin - Today and Tomorrow" Dr. Wesley K. Foell, Department of Nuclear Engineering and Institute for Environmental Studies, U.W. Madison
11:30 - 12:00	<u>Discussion Session II</u> Same groupings as Session I
12:00 - 12:30	Luncheon
12:30 - 1:10	<u>Address:</u> "Nuclear Power Production at the Two Creeks Plant" Mr. Dan Sullivan, Public Relations Manager, Wisconsin Electric-Wisconsin Michigan Power Companies
1:10 - 2:10	<u>Address:</u> "Power Sources for Electricity - Promises and Problems" Dr. William F. Vogelsang, Associate Professor of Nuclear Engineering, U.W. Madison
2:10 - 2:50	<u>Discussion Session III</u> Same groupings as Session I
2:50 - 3:00	Wrap-Up
3:00	Adjournment

SYMPOSIUM FOR HIGH SCHOOL STUDENTS ON:

ELECTRICAL POWER GENERATION IN WISCONSIN:

The Challenge of Meeting Present Needs and Future Demands

At the University of Wisconsin-Milwaukee, Jan. 19, 1974

Sponsored jointly by: The Wisconsin Academy of Sciences, Arts and Letters, and the
United States Atomic Energy Commission

8:15 - 8:45 Registration. Physics-Engineering Building (Corner of N. Cramer and
E. Kenwood Blvd.)

8:45 - 8:55 Announcements. (Room 137) Physics-Engineering Building

9:00 - 10:00 Room 137, Physics-Engineering Building
Address: "Environmental Costs and Trades of Energy Use"
Dr. Daniel E. Willard, Project Associate and Lecturer, Environ-
mental Monitoring and Data Acquisition Group, Institute for
Environmental Studies, UW-Madison

(10-minute break, coffee and rolls)

10:20 - 11:20 Address: "Energy and Wisconsin - Today and Tomorrow"
Dr. Wesley K. Foell, Department of Nuclear Engineering, Insti-
tute for Environmental Studies, UW-Madison

11:20 - 12:00 Participant Group Discussion Sessions:

Group A, Rm. 120: Leader, Dr. Richard E. Haney, Dept of Curr.
& Instr., UW-M

Group B, Rm. 122: Leader, Mr. Roy Genskow, Shorewood High School

Group C, Rm. 127: Leader, Mr. Francis Mitchell, Brookfield
High School

Group D, Rm. 128: Leader, Mr. Jerome Stueber, Muskego High School

Group E, Rm. 142: Leader, Mr. Edward Tobias, Badger High School,
Lake Geneva

Group F, Rm. 143: Leader, Mr. Neal Schulz, Greenfield High School

12:00 - 12:50 Luncheon.. Kenwood Inn, UW-M Union

1:00 - 2:00 Address: "Power Sources for Electricity - Promises and Problems"
Dr. William F. Vogelsang, Associate Professor of Nuclear
Engineering, UW-Madison

2:05 - 2:35 Discussion groups as above meet to discuss speech and overall problems
and possibilities of electrical energy in Wisconsin.

2:40 - 2:50 All groups meet in Room 137 for summation and directions on follow-up
to schools.

2:50 - 3:20 Separate groups meet to prepare recommendations and to develop learning
models to use in their schools.

3:20 Adjournment

(Facilities extended through the courtesy of the office of Cooperative Educational Pro-
grams and Dept. of Curriculum and Instruction, School of Education, UW-M)

ELECTRICAL POWER GENERATION IN WISCONSIN: THE CHALLENGE OF MEETING PRESENT NEEDS AND FUTURE DEMANDS

A symposium for high school students and teachers sponsored
by the Wisconsin Academy of Sciences, Arts and Letters

Morning Session

(prior to the program participants will receive selected reading material to insure a uniform general background)

"Environmental Costs and Trades of Energy Use"

Daniel E. Willard

Project Associated Lecturer, Environmental
Monitoring and Data Acquisition Group
Institute for Environmental Studies
UW-Madison

"Energy and Wisconsin - Today and Tomorrow"

Wesley K. Foell

Department of Nuclear Engineering, Institute
for Environmental Studies
UW-Madison

Discussion Sessions

Participants will form small groups to discuss
the speeches

Noon Luncheon

Afternoon Session

"Power Sources for Electricity - Promises and Problems"

William Vogelsang

Associate Professor of Nuclear Engineering
UW-Madison

Discussion Sessions

Participants will form small groups to discuss
the speech and to prepare recommendations and
develop learning models that could be used in
their schools to further understanding of the
prospects and problems of electrical power
generation

Program Follow-up

A summary report of the topics covered during
the program plus a report of learning models
developed by participants will be provided.

- - -

Primary support for this symposium is from the United States Atomic Energy Commission, Division of Biomedical and Environmental Research

Energy Policies

The United States is the most energy intensive nation in the world. With only 6 percent of the total population, this country accounts for more than one-third of the world energy consumption. Annual national energy use is 70 quadrillion Btu's (which equals 2.8 billion tons of coal, or 616 billion gallons of oil, or 70 trillion cubic feet of natural gas). Gross energy use per capita has risen from 229 million Btu's in 1947 to 333.3 million Btu's in 1971.

Energy is a vital component of environmental rehabilitation as well as America's prosperity. The problem is whether reasonable energy demands can be met without harming the environment.

ENERGY SOURCES: (Trillion British thermal units)

	1971	1975	1980	1985	2000
Coal	12,560	13,825	16,140	21,470	31,360
Petroleum	30,492	35,090	42,190	50,700	71,380
Natural Gas	22,734	25,220	26,980	28,390	33,980
Nuclear Power	450	2,560	6,720	11,750	49,230
Hydropower	2,798	3,570	3,990	4,320	5,950
TOTAL	68,989	80,265	96,020	116,630	191,900

ENERGY USE: (Trillion British thermal units)

	1971	1975	1980	1985	1990
Consuming sector					
Household & Commercial	17,441	20,175	23,860	27,700	39,630
Industrial	22,623	25,860	29,390	34,870	57,780
Transportation	16,989	19,090	22,870	27,130	42,660
TOTAL	57,053	65,125	76,120	89,700	140,070

EPA ENERGY OBJECTIVES:

- * Minimize growth of energy demand.
- * Promote efficiency and conservation.
- * Make energy-environment impact assessments on basis of entire energy chain--extraction, processing, transportation and use.
- * Work toward decreasing reliance on fossil fuels.
- * Maximize pollution control technology and increase energy flexibility by increasing electricity end uses, particularly in transportation.
- * Encourage clean use of domestic coal.
- * Promote development of exotic energy sources--solar, geothermal, fusion.
- * Oppose projects which promise quick energy but at high environmental cost.

FUELS POLICY:

- * Primary (health-related) air quality standards to be attained in all states by 1975 even if some States must delay attainment of secondary (welfare-related) standards. Secondary standards to be achieved by 1977 or 1978.

FUELS POLICY (continued)

- * Encourage production of clean fuels, particularly natural gas, and stack cleaning equipment.
- * Promote new technologies which will permit maximum use of coal, our greatest fossil fuel resource.
- * Discourage large-scale switching of high-sulfur coal or oil to natural gas or low-sulfur oil.
- * Use natural gas and low-sulfur oil for industrial feedstocks and residential and commercial heating; use high-sulfur fuels for industrial purposes where stack-cleaning is more efficient and economical.

CONSERVATION:

- * One-half of every barrel of domestic crude oil goes for gasoline to power autos and trucks, convenient but inefficient vehicles....promote use of smaller vehicles and shifting of urban passengers from autos to mass transit.
- * Railroads carry one-half of intercity freight tonnage at one-tenth of the total fuel consumption....promote shifting of intercity freight from high-way to rail; consolidate urban freight movements.
- * Airliners, on the average, fill 50-60% of their seats....consolidate flights, spread out arrivals and departures, eliminate short and low-density flights and switch passengers to ground transport, use the most efficient aircraft, and fly at optimum speed.
- * Improve home insulation, install more efficient air conditioning, and use architectural and landscaping techniques which make the most of natural lighting and temperature control.
- * Streamline industrial processes and equipment.

Wisconsin Academy of Sciences, Arts & Letters

1922 University Avenue • Madison, Wisconsin 53705 • Telephone 263-1692 Area Code 608

TO: Participating Teachers in the Symposium on Electrical Power Generation in Wisconsin

FROM: LeRoy Lee, Project Director

Doug Johnson, a discussion leader at the first symposium held on Electrical Power Generation in Wisconsin, found that many students in attendance exhibited a lack of knowledge about electrical power generation. He indicated to me that it is important that participants in the small group discussions have some basic knowledge of the concepts and that it will also enable them to gain more from the presentations. Following is a summation of concepts Mr. Johnson identified. Would you please try to insure that all of your students are aware of these?

- I. There are several specific ways to generate electricity. Some of these are so inefficient or inherently costly that they are not, at the present time, being seriously considered for use in commercial power plants.

Of those which are presently being used or considered for commercial application, all but one work on the same principle: energy in one form is converted to kinetic energy in a rotating device (the generator or dynamo) which produces the electricity. There are two major classifications of this general approach:

- A. Those in which the raw form of energy is converted to heat. This heat may be transferred to water which, in the form of steam, passes through the blades of a turbine causing a dynamo to rotate, or the fuel (liquid or gas) may be burned in the turbine itself (as in a jet engine) causing the dynamo to rotate. The only major difference is in the choice of the raw energy form:

1. Fossil fuels (coal, oil, natural gas)
2. Nuclear fuels (fission, fusion)
3. Solar energy (focused by lenses or mirrors)
4. Geothermal (natural heat from the earth's interior).

There is an exception to the above. This energy conversion method is called Magnetohydrodynamics (MHD) and has not yet been proven economically feasible. It works by turning the fuel into a plasma (an electrically charged gas at high temperatures and pressure). The moving charged particles in the plasma are directed by a magnet and conducted away as electricity.

- B. Those in which the raw form of energy is converted directly to rotational motion of the dynamo:

1. Wind (which turns a propeller)
2. Hydroelectric (river water backed up by a dam falls through a channel turning a turbine)
3. Tidal (same as hydroelectric except the water behind the dam is carried there by the high tide).

II. All forms of electrical generation have some advantages and some disadvantages, both economic and environmental. These will be the major theme of the symposium. For various reasons the use of nuclear energy for generating electricity is most in the news and as a result this may lead to students making this the most discussed topic at the symposium. Because of this, it may be helpful to be aware of the following:

A. There are several types of fission reactors:

1. Boiling Water Reactor (BWR)
The core of the reactor is cooled by water. The water is under enough pressure (about 1000 psi) to raise the boiling point to about 550°F. This super-hot steam passes through the turbine.
2. Pressurized Water Reactor (PWR)
The core of this reactor is cooled by water under sufficient pressure (about 2250 psi) to allow the water to be heated to 600°F without boiling. This hot water is used to heat a second water supply to boiling. The steam from this second water supply drives the turbine.
3. Gas-Cooled Reactor (GCR)
The core of this reactor is cooled by a gas, usually helium or carbon dioxide under a few hundred psi. The gas heats water to steam as in the PWR.
4. Liquid Metal, Fast Breeder Reactor (LMFBR)
The core of this reactor is cooled by a liquid metal, usually sodium, at a temperature of about 1000°F and at relatively low pressure. An intermediate coolant, also liquid metal, transfers heat from the primary coolant to the water, which in turn boils to produce steam for the turbine.

A second important characteristic of this reactor is that it makes more fuel than it uses. A blanket of non-fissionable Uranium 238 is placed in the core where, under neutron bombardment, it is transformed into fissionable Plutonium 239. The Plutonium is removed, refined and used as fuel in other reactors.

B. Fusion reactors present an attractive alternative to fission because (a) there is apparently an inexhaustible supply of fuel available in the form of hydrogen from the ocean, (b) the amount of radioactive waste will be much less than for fission reactors, and (c) in case of a loss of coolant accident, the fusion reactor cannot continue to run (fusion does not occur except under ideal conditions) as a fission reactor can (fission goes on continuously under any conditions).

The technical problems surrounding fusion power are staggering and estimates by knowledgeable persons as to when a prototype reactor may be operational range from 30 years to never.

Chartered in 1870

Wisconsin Academy of Sciences, Arts & Letters

1922 University Avenue • Madison, Wisconsin 53705 • Telephone 263-1692 Area Code 608

October 25, 1973

1973-74 COUNCIL

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Richard W. E. Perrin
9825 Concordia Avenue
Milwaukee, WI 53222

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237 Veterinary Science/UW
1655 Linden Drive
Madison, WI 53706

Electrical Power Generation in Wisconsin: The Challenge of Meeting Present Needs and Future Demands

Vice-President—Sciences:

Daniel O. Trainer
College of Natural Resources
UW—Stevens Point
Stevens Point, WI 54481

To: Symposium Participants

From: LeRoy Lee, Program Director

Vice-President—Arts:

Robert E. Gard
719 Lowell Hall/UW
Madison, WI 53706

Vice-President—Letters:

Donald C. Windfelder
720 E. Wisconsin Avenue
Milwaukee, WI 53202

Soon you will have the opportunity to join with 18 other area schools to learn more about Electrical Power Generation in Wisconsin. By now you have received the program listing the speaker and sessions.

Secretary:

Jean Cronon
5601 Varsity Hill Drive
Madison, WI 53705

Treasurer:

Edw. Schneberger
6818 Forest Glade Court
Middleton, WI 53562

To help you prepare for this symposium, I am enclosing several publications dealing with the topic. Suggested reading not enclosed, but easily obtained in your school is the September, 1971 issue of *Scientific American* and "The Search for Tomorrow's Power" in the November, 1972 issue of *National Geographic*. This list is not exhaustive of the subject and it is hoped that you will supplement your background with other readings from a variety of sources.

Librarian:

Jack A. Clarke
425 Henry Mall/UW
Madison, WI 53706

Editor-Transactions:

Elizabeth McCoy
205A Bacteriology/UW
Madison, WI 53706

I hope that you will find the symposium interesting and challenging and that it will provide you with the information necessary to make rational decisions in this one phase of our growing energy problem.

Executive Director and Editor Wisconsin Academy Review:

James R. Batt
1922 University Avenue
Madison, WI 53705

LL:mc

Director—Junior Academy:

LeRoy Lee
1922 University Avenue
Madison, WI 53705

Enclosures

Past Presidents:

Henry A. Schuette, Madison
Otto L. Kowalke, Madison
Katherine G. Nelson, Milwaukee
Ralph N. Buckstaff, Oshkosh
Joseph G. Baier, Milwaukee
Stephen F. Darling, Appleton
Robert J. Dicke, Madison
Henry A. Meyer, Whitewater
Carl Welty, Beloit
J. Martin Klotsche, Milwaukee
Aaron J. Ihde, Madison
Walter E. Scott, Madison
John W. Thomson, Madison
Adolph A. Suppan, Milwaukee
William B. Sarles, Madison
Norman C. Olson, Milwaukee
F. Chandler Young, Madison
Louis W. Busse, Madison

SYMPOSIA SUMMARY

*Electrical Power Generation
in Wisconsin*

THE CHALLENGE OF MEETING PRESENT NEEDS
AND FUTURE DEMANDS

SPONSORED BY

THE WISCONSIN ACADEMY OF
SCIENCES, ARTS AND LETTERS

UNDER A GRANT FROM

THE UNITED STATES
ATOMIC ENERGY COMMISSION

During the 1973-74 school year, the Wisconsin Academy of Sciences, Arts and Letters sponsored six symposia dealing with electrical power generation under a grant from the United States Atomic Energy Commission.

Entitled "Electrical Power Generation in Wisconsin: The Challenge of Meeting Present Needs and Future Demands," each symposium consisted of resource lectures and small discussion groups. Approximately five hundred students from sixty-five Wisconsin high schools accepted invitations to attend.

What follows is a summary of the program--its format, objectives, speakers and discussion leaders, participating schools, and suggestions generated for student follow-up activities.

OBJECTIVES

The symposia on electrical power generation in Wisconsin were designed to meet the following objectives:

1. To provide background information of the present state and future possibilities of electrical power generation in the U.S. with emphasis on Wisconsin.
2. To discuss alternative methods of meeting electrical power needs of the future. Stress to be placed on providing factual background information.
3. To provide balanced discussions on the environmental impact of nuclear, conventional and other methods of electrical power generation.
4. To consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation.
5. To develop a list of activities that could be used in schools to increase student understanding of problems involved in meeting present needs and future demands of electrical power generation.

STATE PERSONNEL

PROJECT DIRECTOR: LeRoy Lee, The Wisconsin
Academy of Sciences, Arts and Letters

PROGRAM STEERING COMMITTEE:

Dr. Reid A. Bryson
Director
Institute for Environmental Studies
The University of Wisconsin-Madison

Dr. Max W. Carbon
Chairman
Department of Nuclear Engineering
The University of Wisconsin-Madison

Dr. Harold A. Peterson
Professor of Electrical Engineering
The University of Wisconsin-Madison

Dr. John E. Ross
Associate Director
Institute for Environmental Studies
The University of Wisconsin-Madison

MAIN SPEAKERS:

Dr. Daniel E. Willard, Institute for Environmental
Studies, UW-Madison. "Environmental Costs and
Trades of Energy Use."

Dr. Wesley K. Foell, Department of Nuclear
Engineering and Institute for Environmental
Studies, UW-Madison. "Energy and Wisconsin--
Today and Tomorrow."

Dr. William F. Vogelsang, Department of Nuclear
Engineering, UW-Madison. "Power Sources for
Electricity--Promises and Problems."

MADISON AREA SYMPOSIUM

Monona Grove High School

October 31, 1973

DISTRICT CHAIRMAN: Carl H. Pfeiffer
Monona Grove High School

DISCUSSION GROUP LEADERS:

John Bauman Oregon High School Oregon	Paul McIntosh LaFollette High School Madison
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David Braunschweig West High School Madison	Donald Mitchell Stoughton High School Stoughton
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Douglas Johnson Memorial High School Madison	Jack Pett Cambridge High School Cambridge
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SCHOOLS PARTICIPATING:

Albany High School Albany	Wayland Academy Beaver Dam
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Cambridge High School Cambridge	Richland Center High Richland Center
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Columbus High School Columbus	Monona Grove High School Monona Grove
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LaFollette High School Madison	Dodgeville High School Dodgeville
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Oregon Senior High Oregon	Fort Atkinson Senior High Fort Atkinson
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West High School Madison	Campion High School Prairie du Chien
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Sauk Prairie High
Sauk Prairie

Memorial High School
Madison

Belleville High
Belleville

RACINE AREA SYMPOSIUM

University of Wisconsin-Parkside

November 28, 1973

DISTRICT CHAIRMAN: Richard Bliss
Racine County Unified School
District #1

DISCUSSION GROUP LEADERS:

Jerry Buck
College of Racine

Dr. Richard Haney
UW-Milwaukee

Dr. Hank Cole
UW-Parkside
Racine

Dr. Donald Newman
UW-Milwaukee

Dr. Morris Firebaugh
UW-Parkside
Racine

Dr. Lon Ruedisili
UW-Parkside
Racine

Dr. Kenneth Hamm
Carthage College
Kenosha

Dr. Frank Stekle
UW-Whitewater

Ray Stonecipher
UW-Whitewater

SCHOOLS PARTICIPATING:

Wilmot Union High
Wilmot

Waterford Union High
Waterford

Bradford High School
Kenosha

St. Catherines High
Racine

Prairie High School
Racine

Badger Union High
Lake Geneva

Tremper Senior High
Kenosha

Saint Joseph High
Kenosha

Kemper Hall
Kenosha

Walden Three
Racine

Washington Park High
Racine

Horlick Senior High
Racine

J.I. Case High
Racine

EAU CLAIRE AREA SYMPOSIUM

Memorial High School, Eau Claire

December 1, 1973

DISTRICT CHAIRMAN: William Reineke
Memorial High School
Eau Claire

DISCUSSION GROUP LEADERS:

Gerald Bjerke
Black River Falls
Senior High School

Arthur Ludvigson
Memorial High School
Eau Claire

Harry Gibbs
Memorial High School
Eau Claire

Gary Steglech
Barron High School
Barron

Dr. Melvin Gleiter
UW-Eau Claire

Robert Thorson
Cadott High School
Cadott

SCHOOLS PARTICIPATING:

North High School
Eau Claire

Memorial High School
Eau Claire

Black River Falls High
Black River Falls

Barron High School
Barron

River Falls High
River Falls

Chetek High School
Chetek

Cadott High School
Cadott

Chippewa Falls High
Chippewa Falls

Regis High School
Eau Claire

Augusta High School
Augusta

WAUSAU AREA SYMPOSIUM

Wausau West High School

December 8, 1973

DISTRICT CHAIRMAN: Jon Harkness
Wausau West High School

DISCUSSION GROUP LEADERS:

Gordon H. Cowles
Wittenberg High School

Richard LeClair
Wausau West High School

William R. Erdmann
Tri-County High School
Plainfield

Herb Soderlund
Wausau West High School

John Ihde
Wausau West High School

Dennis Tietge
Wausau West High School

SCHOOLS PARTICIPATING:

Wausau East High
Wausau

Wautoma High School
Wautoma

Rhineland High
Rhineland

Newman High School
Wausau

Wittenberg High
Wittenberg

Tri-County High
Plainfield

Wausau West High
Wausau

Winter High School
Winter

D.C. Everest High
Schofield

NEENAH AREA SYMPOSIUM

Armstrong High School, Neenah

January 12, 1974

DISTRICT CHAIRMAN: Edward Mueller
Armstrong High School, Neenah

DISCUSSION GROUP LEADERS:

Ray Greisinger
Southwest High School
Green Bay

Carl Moede
Pulaski High School
Pulaski

David Hackbarth
Goodrich High School
Fond du Lac

Phillip Rehberger
West High School
Oshkosh

Gerald Hansel
East High School
Appleton

Robert Showers
East High School
Green Bay

Dr. Paul Taylor
UW-Oshkosh

SCHOOLS PARTICIPATING:

Armstrong High
Neenah

Hortonville High School
Hortonville

Kimberly High School
Kimberly

Hilbert High School
Hilbert

Lena High School
Lena

Kiel High School
Kiel

South High School
Sheboygan

Menasha High School
Menasha

Bay Port High
Green Bay

Gillett High School
Gillett

East High School
Green Bay

Pulaski High School
Pulaski

West High School
Oshkosh

St. Mary's High School
Menasha

North High School
Oshkosh

East High School
Appleton

West High School
Appleton

MILWAUKEE AREA SYMPOSIUM

University of Wisconsin-Milwaukee

January 19, 1974

DISTRICT CHAIRMAN: William J. Weishar
Brookfield East High School

DISCUSSION GROUP LEADERS:

Roy Genskow
Shorewood High School

Neal Schulz
Greenfield High School

Discussion Group Leaders (contd.)

Dr. Richard Haney
UW-Milwaukee

Jerome Stueber
Muskego High School

Francis Mitchell
Brookfield East High

Edward Tobias
Badger High School
Lake Geneva

MILWAUKEE AREA:

Marshall High School
Milwaukee

Messmer High School
Milwaukee

Wauwatosa East High
Wauwatosa

Milwaukee Lutheran High
Milwaukee

Divine Savior-Holy
Angels High
Milwaukee

Waukesha High South Campus
Waukesha

Nathan Hale High
West Allis

Oak Creek High
Oak Creek

Brookfield East High
Brookfield

Homestead High
Mequon

Brookfield Central High
Brookfield

Washington High
Milwaukee

Pulaski High School
Milwaukee

Hamilton High
Milwaukee

New Berlin High
New Berlin

Nicolet High
Milwaukee

Martin Luther High
Greendale

SYMPOSIUM FORMAT

The following format was followed at all six symposia:

MORNING SESSION

Lecture: "Environmental Costs and Trades of Energy Use"

By Dr. Daniel E. Willard

Lecture: "Energy and Wisconsin-- Today and Tomorrow"

By Dr. Wesley K. Foell

Discussion Sessions: Participants form small groups to discuss the preceding lectures.

Noon Luncheon.

AFTERNOON SESSION

Lecture: "Power Sources for Electricity-- Promises and Problems"

By Dr. William Vogelsang

Discussion Sessions: Participants form small groups to discuss the lecture and to prepare recommendations and develop learning models that could be used in their schools to further understanding of the prospects and problems of electrical power generation.

STUDENT-GENERATED SUGGESTIONS FOR FOLLOW-UP ACTIVITIES

The fifth objective of this program was to develop a list of activities that could be used in schools to increase student understanding of the problems involved in meeting the present needs and future demands of electrical power generation. The following is a composite list developed by participating students in the course of the small group discussions. They are grouped in general categories.

Present information within existing courses (science, English, social studies, speech, etc.) to develop an awareness of the problems of electrical power generation--i.e., a systems approach analyzing risk vs. cost and alternate sources of energy. Include conservation of electrical energy.

- Student research followed by speeches, discussions, debates, etc.
- Role-play by forming an imaginary utility company with various officials investigating cost factors of all possible forms of electrical power generation--environmental, efficiency, and real cost factors of all kinds.
- Allow students who participated in the Academy Symposium to make presentations.
- Use speakers from utility company, university professors, environmentalists, etc.
- Make scrapbooks of current news items relating to Wisconsin electrical power generation.
- Use multimedia (films, videotapes, slide sets, etc.) and multidiscipline approach to better relate to students.

- Field trips to various power plants to see how electricity is produced and problems involved. Use the plant personnel as resource persons.
- Use informative sources such as the *Aware* magazine, *Scientific American*, etc.

Organize a course(s) or ask the administration to develop a course which deals specifically with the nature of energy, its production, its use, and the problems associated with providing for society's energy demands.

- A semester or a full year course.
- A course during "interim" for the schools which offer this type of alternative to the regular curriculum.
- A summer enrichment course.
- Develop a multidisciplinary course dealing with the energy problem. Perhaps it should become a part of the required curriculum.
- Design a minicourse for the adults of the community as part of the adult education program.
- Design a minicourse for the grade schools. Have high school students teach it.

Conduct an all-school day-long program dedicated to developing a clear definition and understanding of the energy problem. This could be organized by the student government, ecology club, science club or any interested group.

- Have an assembly with speakers. Invite outstanding resource people to speak.
- All classes within the school could explore the problem as it relates to their respective areas of concern.
- Involve industry.

Develop an "Energy Week" program for the school and community using various methods of informing and generating concern and focusing on appropriate courses of action that people can become involved in.

- Call attention to the problem by reducing heat in the school to 50° or by turning off all electrical power for a period of time without advance notice.
- Use various methods of informing and generating concern: posters, skits, speakers, local and school newspapers, displays, debates, etc.
- Develop a questionnaire on energy usage to gather information from the student body, analyze results and report back to students.
- Have a "Cold Day" with no heat to draw attention to the problem.
- Organize a group to study possible means of saving energy within the school physical plant.
- Encourage "car pooling." Make and issue citation tickets which explain how energy is wasted as a result of driving cars with only one occupant. Set aside one day when no one will be allowed to drive a car to school.
- Have student speakers during special hours.
- Run student-conducted seminars during study halls.
- Have a group study energy waste in the schools and make recommendations that will correct these situations.
- Sponsor a "Do Without Day." Use the least amount of energy possible.

Encourage science projects on Electrical Power Generation that could be entered in science fairs and/or used for informational displays in the school.

- Build a windmill to generate electric power.
- Build a model of a home with solar heating panels

to show how it can save energy.

- Miscellaneous projects dealing with solar energy for heating, air-conditioning and electrical energy production.

Develop a science club or group interested in energy problems. This group could carry out some of the suggestions developed at the Academy Symposium. Additional activities could include:

- Prepare a taped audio-visual program dealing with some aspect of the energy problem. This program could be used in the school or by various community groups.
- Identify specific ways in which the operation of the school could be modified to conserve energy and make specific recommendations to the administration.
- Organize a letter-writing campaign directed toward political leaders to encourage enactment and support of legislation concerned with finding long-range solutions to our energy situation.
- Sponsor a poster contest with a display of posters that call attention to the various aspects of the energy problem.
- Use the club to provide interested students with the opportunity to go into greater depth on the subject of electrical power generation.
- Construct displays.
- Record and inform students of electrical energy used in the school each day--including wattage, cost, etc.
- Study insulation types. Inspect own homes and report to club. Develop models to show effect of insulation.
- Compile data on, and disseminate to students and adults, the electrical consumption of all common electrical appliances.
- Encourage reduced levels of energy consumption in the school to provide examples of good conservation practices.

Make special reading and source material available to the student body and teachers.

- Subscribe to the *Aware* magazine and have copies available.
- Make copies of *Scientific American*, that deals with the energy problem, available.
- Use materials and information provided at the Academy Symposium as the basis for preparing a continuing series of articles on the energy problem for the school newspaper.
- Provide information relating to the energy problem to teachers so that they can incorporate it into existing courses.

Suggestions for conservation of energy in the school.

- Cut down use of hot water.
- Cut out decorative lighting.
- Close off empty rooms.
- Take out every other light.
- Combine classes where possible to save space.
- Lower hallway temperature.
- Install treadmills in Phy.Ed.--to generate electricity.
- Use windows to let in solar heat during day and curtain them during the night.
- Provide only cold lunches.
- Cut down unnecessary usage of electrical appliances.
- Four-day schooldays (longer days) with reduced temperatures other days.
- Close schools in January and extend into June.
- Use less entrances during winter months.
- Lower ceilings in old buildings.
- Cut extracurricular activities, or change times.. Example: evening football.
- Revise schedules to make maximum use of daylight lighting.
- Post signs by every light switch: "Is this light necessary?"

Wisconsin Academy of Sciences, Arts & Letters

1922 University Avenue • Madison, Wisconsin 53705 • Telephone 263-1692 Area Code 608

January 4, 1974

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Dear Discussion Leader:

We are making the final preparations for the Energy Symposium on Saturday, January 12, 1974. I hope the materials from the Junior Academy have arrived and you have had some time to look them over. As it now appears, you will have about 13-14 students in your section. A special section for instructors will have 16-18 teachers working on ideas for teaching energy and environment related problems.

From your backgrounds and readings you should develop a list of leading questions to stimulate student discussion about power generation, energy demands, ecological considerations, etc. As you well might imagine, students new to each other and the situation might be hesitant to offer ideas and/or criticism. An overall goal to be striving for is: "What they (the students) can do in their schools to impart their knowledge to other kids." These ideas should form the basis for learning models. All relevant models will be collected, typed and returned to participants by the Junior Academy. It is suggested that a recorder be selected to jot down the ideas of the groups.

Our starting time and format has changed slightly with the first session at 8:45 and a 30-45 minute discussion session following. Second session is at 10:30 with a 30 minutes small group session. A luncheon speaker will be followed by session 3 at 1:10 with a 30-40 minute discussion period.

Briefly the important information is:

Place: Armstrong High School - Neenah (see map)
Time: 8:45 a.m. - 3:00 p.m.
Date: Saturday, January 12

If you have questions or problems, please call 725-2476 (home) or 725-4353 after 11:00 a.m. I'm looking forward to seeing you on Saturday.

Sincerely yours,

Edward M. Mueller
District Chairman

EMM:jj

Discussion Leaders

Madison Area Symposium

Mr. Paul McIntosh
LaFollette H.S., Madison

Mr. Don Mitchell
Stoughton High School

Mr. Douglas Johnson
James Madison Mem.H.S., Madison

Mr. Jack Pett
Cambridge High School

Mr. John Bauman
Oregon High School

Mr. David Braunschweig
West High School, Madison

Racine Area Symposium

Dr. Frank Stekle
University of Wisconsin-
Whitewater

Dr. Ken Hamm
Carthage College,
Kenosha

Dr. Lon Ruedisili
University of Wisconsin-
Parkside, Racine

Mr. Jerry Buck
College of Racine

Dr. Dick Haney
University of Wisconsin-
Milwaukee

Dr. Don Newman
University of Wisconsin-
Milwaukee

Dr. Hank Cole
University of Wisconsin-
Parkside, Racine

Dr. Morris Firebaugh
University of Wisconsin-
Parkside, Racine

Mr. Ray Stonecipher
University of Wisconsin-
Whitewater

Eau Claire Area Symposium

Gerald Bjerke
Black River Falls Senior
High School

Harry Gibbs
Memorial High School
Eau Claire

Dr. Melvin Gleiter
University of Wisconsin-
Eau Claire

Arthur Ludvigson
Memorial High School
Eau Claire

Gary Steglech
Barron High School

Robert Thorson
Cadott High School

Wausau Area Symposium

Herb Soderlund
Wausau East High School

Gordon H. Cowles
Wittenberg High School

Wm. R. Erdmann
Tri County High School,
Plainfield

Richard LeClair
Wausau West High School

John Ihde
Wausau West High School

Dennis Tietge
Wausau West High School

Neenah Area Symposium

Ray Greisinger
Southwest High School
Green Bay

David Hackbarth
Goodrich High School
Fond du Lac

Gerald Hansel
East High School, Appleton

Carl Moede
Pulaski High School

Phillip Rehberger
Oshkosh West High School

Robert Showers
Green Bay East High School

Dr. Paul Taylor
University of Wisconsin-
Oshkosh

Milwaukee Area Symposium

Dr. Richard E. Haney
University of Wisconsin-
Milwaukee

Mr. Roy Genskow
Shorewood High School

Mr. Francis Mitchell
Brookfield East High School

Mr. Jerome Stueber
Muskego High School

Mr. Edward Tobias
Badger High School,
Lake Geneva

Mr. Neal Schulz
Greenfield High School

Electrical Power Generation in Wisconsin:
The Challenge of Meeting Present Needs and Future Demands

I. Narrative Information

A. Objectives and Scope of Program:

The subject of the "energy crisis" in the United States and associated concerns over the environmental impact of increased electrical power generation tend, in discussion, to produce as much "heat" as they do "light." In part this may be ascribed to the emotional overtones of the matter. In even larger part this may perhaps be the result of inadequate understanding or misunderstanding of the facts, alternatives and value systems involved. Given the expanding social awareness of our youth, it would certainly seem to be a subject of educational importance, one which requires a large measure of balance and objectivity in treatment.

The purpose of this proposal is to request financial support for a program of symposia for Wisconsin high school students and teachers from throughout the state, a program designed to:

1. Provide background information and understanding of the current state and future possibilities of electrical power generation in the U.S. and in Wisconsin in particular;
2. Explore alternative methods of meeting electrical power needs of the future, including nuclear resources, with stress on provision of factual background information;
3. Offer balanced and meaningful discussion on the environmental impact of nuclear, conventional and alternative resources for electrical power generation;
4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation;
5. Develop an outline for possible learning models which program participants can employ in their schools to increase understanding of the subject.

To accomplish these objectives, the proposal calls for the operation of six regional symposia in Wisconsin, reaching a total of 540 persons, or 90 participants per program. Participants would be comprised of 72 students and 18 teachers from within each of the six regions, plus resource

personnel. More than 100 Wisconsin high schools, about 20% of the total public and private schools in the state, would be represented. Regions have been selected with consideration of the distribution of population within the State and would include:

1. Appleton Area	4. Milwaukee Area
2. Eau Claire Area	5. Racine-Kenosha Area
3. Madison Area	6. Wausau Area

Design of the symposia allows for diverse learning experiences, including outside readings, lectures, dialogue, small group discussion and model building. It is hoped that successful completion of the program might serve as a stimulus for comparable undertakings by other states and for expanded efforts in Wisconsin.

B. Facilities and Staff:

Of utmost concern to the applicant is the assurance that program participants be provided a balanced and objective learning experience with a subject all too frequently burdened with emotion and bias from one side or the other. Although the administrative operation of the program would be the responsibility of the Wisconsin Academy of Sciences, Arts and Letters, selection of speakers and resource personnel and refinement of topics would be the function of a Program Steering Committee. Composition of the Program Steering Committee has been determined through the selection of persons widely accepted for their sense of objectivity of the subject and for their scholarly standing in disciplines relevant to the program. The following persons have agreed to serve on the Program Steering Committee:

Dr. Reid A. Bryson, Director
Institute for Environmental Studies
The University of Wisconsin
Madison, Wisconsin 53706

Dr. Max W. Carbon, Chairman
Dept. of Nuclear Engineering
The University of Wisconsin
Madison, Wisconsin 53706

Dr. Harold A. Peterson
Professor of Electrical Engineering
The University of Wisconsin
Madison, Wisconsin 53706

Dr. John E. Ross, Associate Director
Institute for Environmental Studies
The University of Wisconsin
Madison, Wisconsin 53706

The administrator of the program, who would also serve as chairman of the committee, would be Mr. LeRoy Lee, Director of the Wisconsin Junior Academy and Chairman of the Science Department, James Madison Memorial High School, Madison, Wisconsin.

The Wisconsin Junior Academy is an integral part of the Wisconsin Academy of Sciences, Arts and Letters. The Wisconsin Academy is a non-profit, tax-exempt organization chartered by the Wisconsin State Legislature in 1870 for the purpose of encouraging research and the dissemination of information on the sciences, arts and letters in Wisconsin. Over the course of its history, much of the leadership and many of the Academy's officers have been derived from University of Wisconsin faculty and staff or from other institutions of higher education in the state.

As indicated, selection of speakers and refinement of topics will be determined by the Program Steering Committee; however, it is anticipated that resource personnel will be drawn primarily from such sources as the Department of Nuclear Engineering, Department of Electrical Engineering, and the Institute for Environmental Studies of the University of Wisconsin, from commercial electrical power companies, the Wisconsin Public Service Commission, the Wisconsin Department of Natural Resources, and other sources appropriate to achieve balance and objectivity in programming.

A District Chairman will be named for each of the six districts, and each of the six symposia will employ six Discussion Leaders. In selecting the district chairmen and the discussion leaders, the Program Administrator will draw on a list of 40 high school teachers, each of whom were participants in a workshop on Electrical Power Generation: Comparative Costs and Benefits, which was sponsored by AEC and conducted by the UW Dept. of Nuclear Engineering in the summer of 1972. The programs will be held at area high school or college facilities.

C. Topics to be Covered:

It is proposed that each of the six one-day symposia be held sometime during the first semester (September-December) of 1973, with specific dates to be determined by the district chairmen upon consultation with the program administrator and Program Steering Committee.

A typical symposium might follow a format such as the following:

Preceding the Program

Selected reading material on the subject will be sent to all participants prior to the symposia to help assure a general backgrounding or overview.

Morning Session

Introductory Address: Present and Projected Electrical Power Needs in Wisconsin

Resource Lecture: The Potential and Limitations of Hydro-electrical and Fossil Fuel Power Plants

Resource Lecture: The Promise and Problems of Nuclear Power Plants: Risk and Benefits

Dialogue and Discussion Sections: Participants will break into six discussion groups, no group larger than 15 persons, plus discussion leader. Resource Lecturers will spend time with each group for further questioning and dialogue.

Noon Luncheon

Afternoon Session

Resource Lecture: The Environmental-Social Implications of Increased Energy Demands

Dialogue and Discussion Sections: (As in Morning Sections)

General Meeting: The six discussion groups will meet together briefly, at which time they will receive directions regarding the remainder of the program--which will focus on determining what role the participants can play in furthering understanding of the subject in their schools and communities.

- Planning Sections: Each of the six groups, including teachers and students, will be given an opportunity to prepare recommendations and develop learning models which might further understanding of the prospects and problems of electrical power generation.
- General Meeting: Participants will again reassemble to hear the summary reports of each of the six planning sections.

Program Follow-Up

A written report on the recommendations and learning models offered during the symposia will be provided all participants. Included will be a summary report on the topics covered during the program.

D. Selection of Participants:

Resource personnel and discussion leaders will be selected in the manner previously outlined. Teacher participants will be selected through the cooperation of school supervisory personnel; students will be selected on the basis of academic interest and leadership, individual students to be chosen by the teacher participants.

E. Evaluation:

The evaluation of the program will be conducted at two levels:

1. A questionnaire to be completed by participants, and discussion leaders to evaluate program format and information presented by resource lecturers;
2. A second questionnaire to be completed by the participants in late spring, to determine if any follow-up programs have been initiated in the schools and communities of the participants.

Chartered in 1870

Wisconsin Academy of Sciences, Arts & Letters

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Adolph A. Suppan, Milwaukee
William B. Sarles, Madison
Norman C. Olson, Milwaukee
F. Chandler Young, Madison
Louis W. Busse, Madison

TO: Discussion Leaders of Electrical Power Generation in
Wisconsin Symposium

FROM: LeRoy Lee, Project Director

The Regional Chairman has informed me that you have agreed to serve as a discussion leader at the coming symposium on Electrical Power Generation in Wisconsin.

Your role in this symposium is critical to its success. As you know from your teaching experience, lectures, no matter by how eminent a speaker, do not make the lasting impression that verbalization of ideas and concerns can bring. By your involvement with a small group of students, they will be provided the opportunity to seek answers, express opinions and have concepts reinforced.

To help you prepare for this task, a packet of materials is enclosed. It includes materials that each participant will have the opportunity to read prior to the symposium, plus some other supportive publications.

Also enclosed you will find a copy of the proposal as sent to the Atomic Energy Commission, to give you an overall view of the philosophical background of this project. One concept, not included in the proposal, but stressed by the steering committee as needing to be stressed in discussion, is conservation of energy. More specifically, what can individuals do to reduce electrical power consumption.

I'm sure the Regional Chairman has given you more specific directions than those briefly outlined here. If you have questions, please contact him.

Thank you for your involvement in this important aspect of our goal to provide students with factual information about the problems and future of Electrical Power Generation in Wisconsin.

Encs.

10/26/73

Chartered in 1870

Wisconsin Academy of Sciences, Arts & Letters

1922 University Avenue • Madison, Wisconsin 53705 • Telephone 263-1692 Area Code 608

September 16, 1973

Mr. Clinton Barter, Principal
James Madison Memorial High School
201 South Gammon Road
Madison, Wisconsin 53717

Dear Mr. Barter:

The subject of the "energy crisis" in the United States and associated concerns over the environmental impact of increased electrical power generation tend, in discussion, to produce as much "heat" as they do "light." In part this may be ascribed to the emotional overtones of the matter. In even larger part this may perhaps be the result of inadequate understanding or misunderstanding of the facts, alternatives and value systems involved. Given the expanding social awareness of our youth, it would certainly seem to be a subject of educational importance, one which requires a large measure of balance and objectivity in treatment.

As one agency concerned with developing this kind of awareness among young people, the Wisconsin Academy of Sciences, Arts and Letters, with financial support from the Atomic Energy Commission, has scheduled a series of six "Energy Symposia" for a limited number of high school students and teachers in the state of Wisconsin. The symposia sites and dates scheduled for this year are:

Madison	Wednesday	October 31
Racine	Wednesday	November 28
Eau Claire	Saturday	December 1
Wausau	Saturday	December 8
Neenah	Saturday	January 12
Milwaukee	Saturday	January 19

The symposia planned for each site will be essentially the same with the following objectives in mind:

1. Provide background information and understanding of the current state and future possibilities of electrical power generation in the U.S. and in Wisconsin in particular;
2. Explore alternative methods of meeting electrical power needs of the future, including nuclear resources, with stress on provision of factual background information;
3. Offer balanced and meaningful discussion on the environmental impact of nuclear, conventional and alternative resources for electrical power generation;

4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation;
5. Develop an outline for possible learning models which program participants can employ in their schools to increase understanding of the subject.

Because of the nature of the program planned, each symposia is being limited to a maximum of 90 participants. Your school, along with 17 others in this area, is invited to send 4 students and 1 staff person to participate in the symposia being held in the Madison area Wednesday, October 31, at Monona Grove High School.

Would you please complete the enclosed confirmation form and return it to "Energy Symposia" % Carl H. Pfeiffer, Monona Grove High School, 4400 Monona Drive, Monona, Wisconsin, 53716, by October 16th. In the event that it will not be possible for your school to participate we will still have time to invite another school in the area.

A copy of the program is enclosed which we hope will be helpful to you in evaluating this opportunity.

Selected resource materials will be sent to all participating schools prior to the symposia in order to provide background information on the subject. Lecture guides for each of the three addresses will also be provided in advance of the symposia. The cost for the entire symposia, including the luncheon, is underwritten by the AEC in its grant to the Wisconsin Academy.

We feel that this program represents an outstanding educational experience for far-sighted and deep-thinking young people. We hope that as a result of their participation, not only they, but your school and community will become more knowledgeable about the nature of energy use and production in Wisconsin and its associated problems.

We hope that it will be possible for your school to be represented.

Sincerely yours,

Carl H. Pfeiffer
Energy Symposia Coordinator
S.W. District

CHP:mh

Enclosure

ENERGY SYMPOSIA CONFIRMATION FORM

Date: Wednesday, October 31 Site: Monona Grove High School

Time: 8:00 AM to 3:15 PM

School _____

WILL PARTICIPATE

☐

UNABLE TO PARTICIPATE

☐

STAFF PERSON ATTENDING: _____

STUDENTS ATTENDING:

PLEASE RETURN BEFORE OCTOBER 15, 1973

ENERGY SYMPOSIA %

Carl H. Pfeiffer
Monona Grove High School
4400 Monona Drive
Monona, WI 53716

Wisconsin Academy of Sciences, Arts & Letters

1922 University Avenue • Madison, Wisconsin 53705 • Telephone 263-1692 Area Code 608

NEWS RELEASE ----- JANUARY 12, 1974

FROM: THE WISCONSIN JUNIOR ACADEMY OF SCIENCE/NEENAH JOINT SCHOOL DISTRICT

RE: ENERGY SYMPOSIUM ON ELECTRICAL POWER GENERATION IN WISCONSIN -
PRESENT AND FUTURE

THE FOLLOWING students _____

and instructor(s) _____

from _____ High School were part of a

group of students, teachers, professors and power industry officials to
take part in an Energy Symposium in Neenah on Saturday, January 12, 1974.

The Symposium, held at the Neenah Senior High School - Armstrong Campus,
attracted over 100 individuals from 21 Northeastern Wisconsin High Schools,
5 power companies, and 3 university campuses. Three University of
Wisconsin - Madison professors and one power company official presented
addresses on: "Electric Power Generation in Wisconsin: The Challenge of
Meeting Present Needs and Future Demands."

The speakers and their topics were:

Dr. Daniel Willard -	"Environmental Costs and Trades of Energy Use"
Dr. Wesley K. Foell -	"Energy in Wisconsin - Today and Tomorrow"
Mr. Dan Sullivan -	"Nuclear Power Production at the Two Creeks
Plant"
Dr. William Vogelsang -	"Power Sources for Electricity - Promises and
Problems"

Each address, followed by a small group discussion for students, by professional discussion leaders, were designed to:

1. Provide background information and understanding of the current state and future possibilities of electrical power generation in the U.S. and in Wisconsin in particular;
2. Explore alternative methods of meeting electrical power needs of the future, including nuclear resources, with stress on provision of factual background information;
3. Offer balanced and meaningful discussion on the environmental impact of nuclear, conventional and alternative resources for electrical power generation;
4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation;
5. Develop an outline for possible learning models which program participants can employ in their schools to increase understanding of the subject.

Expenses for the symposium were provided through a grant to the Wisconsin Academy of Sciences, Arts and Letters by the Atomic Energy Commission.

Ed Mueller
Neenah Joint School
District
District Chairman

ELECTRICAL POWER GENERATION IN WISCONSIN:
THE CHALLENGE OF MEETING PRESENT NEEDS AND FUTURE DEMANDS

PARTICIPANT EVALUATION RESPONSE FORM

Part I. GENERAL INFORMATION

1. Student _____ Teacher _____
2. Size of school you are from: 0-500 _____ 500-1500 _____ Over 1500 _____

Part II. GENERAL EVALUATION

1. Provide background information of the present state and future possibilities of electrical power generation in the U.S. with emphasis on Wisconsin.	good	→	poor	
	1	2	3	4 5
2. Discuss alternate methods of meeting electrical power needs of the future. Stress will be placed on providing factual background information.	1	2	3	4 5
3. Provide balanced discussions on the environmental impact of nuclear, conventional and other methods of electrical power generation.	1	2	3	4 5
4. Consider and analyze the cost-risk-benefits aspects of nuclear, conventional and alternative resources for electrical power generation.	1	2	3	4 5
5. Develop a list of activities that could be used in schools to increase student understanding of problems involved in meeting present needs and future demands of electrical power generation.	1	2	3	4 5

Part III. EVALUATION OF "FOLLOW UP" SMALL GROUP SESSIONS

1. These sessions were worthwhile YES NO
2. These sessions were TOO LONG TOO SHORT ABOUT RIGHT

Part IV. EVALUATION OF THE LARGE GROUP PRESENTATIONS

	Environmental Costs & Trades of Energy Use (Dr. Willard)	Energy & Wisconsin - Today & Tomorrow (Dr. Foell)	Power Sources for Electricity-Promises & Problems (Dr. Vogelsang)	
Nature of the Content Presented	— — —	— — —	— — —	Generally I could understand the material presented Generally too difficult for me to understand with the background I now have Generally too elementary
Manner in which the Content was Presented	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	Very Good Presentation ↓ Poor Presentation

Part V. COMMENTS: PLEASE FEEL FREE TO OFFER ANY COMMENT RELATIVE TO THE WAY IN WHICH THIS PROGRAM WAS ORGANIZED, OR CONDUCTED, WHICH YOU FEEL WOULD HAVE HELPED TO MAKE THIS SYMPOSIA MORE SUCCESSFUL.