M I N U T E S

SPECIAL COMMITTEE ON ENERGY AND NATURAL RESOURCES

July 20 and 21, 1976

Members Present

Senator Leslie Droge, Chairman
Representative Bill Southern, Vice Chairman
Senator Paul Burke
Representative Gus Bogina
Representative Ralph Bussman
Representative Arden Dierdorff
Representative Paul Feleciano
Representative Edgar Moore
Representative Anita Niles

Staff Present

Ramon Rowers, Legislative Research Department
Emalene Correll, Legislative Research Department (July 21st)
Don Hayward, Revisor of Statute's Office (July 21st)

Conferees

Lamar "Bud" Weaver, Energy Office
Dr. William Wentz, Wichita State University
Dr. George Pytlinski, Chairman of Solar Energy Advisory Group and Professor, Kansas State University
Dr. Thomas Dean, University of Kansas
Charles Carey, Kansas Mechanical Contractors Association
Ed Martin, Solar Services, Inc. (July 21st)
Bob Riordan, Wilson and Company, Salina (July 21st)

July 20, 1976

Chairman Leslie Droge called the Committee to order and recognized Mr. Lamar "Bud" Weaver, Director of the Kansas Energy Office, to introduce the conferees for the meeting on Proposal No. 14 - Monitor Solar Energy Activity in Kansas. Mr. Weaver explained that the conferees were members of the Solar Energy Advisory Group (SEAG) which was recently recognized by the Governor as a quasi-official advisory group on solar energy operating under the auspices of the Kansas Energy Office. Mr. Weaver explained that SEAG was created last spring as a result of a workshop on solar energy conducted at Kansas State University. The members serve without compensation, and the sole purpose of SEAG is to promote solar energy in the State of Kansas, Mr. Weaver added.

Dr. George Pytlinski, Chairman of SEAG, made the first presentation on the fundamentals of solar energy. Dr. Pytlinski explained the principles of electromagnetic radiation which the earth receives from the sun. Portions of that radiation are available as solar energy. He stated that there is a variance from month to month in the amount of solar energy which penetrates the atmosphere to any particular point. Diffuse solar energy is available even on cloudy days, he noted. In Kansas we receive 70 to 80 percent of the solar energy that is available in California, Dr. Pytlinski explained. He then described how solar radiation is converted to heat when it passes through glass or transparent panels and is trapped because of a change in wave length.

It is possible to convert 50 percent of solar radiation to heat under ideal circumstances, according to Dr. Pytlinski. Slides of different types of collectors were shown along with slides of different types of buildings constructed for the collection of solar radiation. Dr. Pytlinski also explained how solar concentrators, such as those used in French experiments, can focus the sun's rays on a small area and produce very high temperatures.

Dr. Thomas Dean, of the University of Kansas School of Architecture, gave the second presentation which dealt with solar applications in residential units. Dr. Dean presented numerous slides of various types of solar houses which have been built in this country. He explained the advantages and disadvantages of the various solar designed houses. Dr. Dean stated that most useable insolation (solar radiation) occurs between the hours of 11:00 a.m. and 3:00 p.m.

Kansas has substantial amounts of solar energy to use; however, Dr. Dean reported that there were still many problems of reliability with solar energy devices. He emphasized that almost all existing units require some degree of electric utility back-up. The most effective way of saving energy at this time involves properly insulating homes, he continued, because solar energy development is not at a stage where it will have a major impact for some years.

Mr. Charles Carey, of the Mechanical Contractors Association, gave a presentation on solar applications in water heating. A copy of the materials used in his presentation is attached. Mr. Carey stated that approximately 4 percent of domestic water is now being heated by solar energy according to the Stanford Research Institute; Florida is the principal area where solar water heating occurs. Mr. Carey described the two types of solar water heaters and the economic advantage of adopting solar water heaters, both at present energy costs and at projected increases in energy costs. When asked to what temperature solar energy can heat water, Mr. Carey replied that water could be heated to any temperature desired or needed.

The panel was asked if the mass production of solar collectors would bring the price down. Dr. Dean expressed the view that inflation will cause the price of solar collectors to continue to rise.

The Committee recessed for lunch, and following lunch the members took a field trip to Lawrence to observe Dr. Thomas Dean's house which is designed and equipped for the use of solar energy.

July 21, 1976

Chairman Droge called the meeting to order for the second day. A motion was made by Representative Edgar Moore and seconded by Representative Southern to approve the minutes of the June meeting. The motion passed.

Chairman Droge asked the Committee members and staff for suggestions on setting the agenda for the August 17 and 18 meeting. There was discussion on whether Proposal No. 16, Conservation Easements, should be taken up at that time. Concern was expressed by some Committee members that the proposal would raise the issue of the proposed Prairie National Park which the Legislature has formally acted on in the form of a resolution (HCR 2013, 1975 Laws of Kansas) sent to the U.S. Congress. It was the general consensus of the Committee members that the issue of the Prairie National Park not be raised. Mr. Ramon Powers stated that the persons interested in presenting testimony on conservation easements told him that they did not want the subject of easements tied to the Prairie National Park issue. The Committee agreed to hold one day of hearings on conservation easements at the next meeting. Arrangements for the other meeting day will be handled by the Chairman with the assistance of staff.

The Committee then returned to receiving testimony on solar energy activity in Kansas. Dr. Thomas Dean gave a detailed presentation on the economics and practicality of residential applications of solar energy. He first pointed out that natural gas, which is one of the cheapest sources of energy, is now seven to eight times the price it was three years ago. Also he noted that electricity is now costing three cents per kilowatt hour and may increase to ten cents per kilowatt hour within ten years. Given this trend, Dr. Dean expressed the view that the investment in solar units to heat water is at present economically sound. If the price of fossil fuel continues to rise dramatically, the use of solar energy for space heating may very soon become an economically sound investment. Dr. Dean, however does not believe that there will be a mass use of solar energy nationally in the near future because there is no national crash program for the practical research for commercial applications of solar energy.

When asked what state government could do to further help the development of solar energy, Dr. Dean replied that he thought it should do more to encourage persons who apply for federal grants. He commended the legislators for the passage of a law allowing an income tax credit for those who install solar units. Dr. Dean was asked if hail insurance might increase the maintenance costs of solar units. He replied that so far no problems has arisen for him. He used tempered glass in building his solar collectors and saw no insurance premium increase forthcoming.

When asked about air conditioning by use of solar energy, Dr. Dean stated that only one company manufactures solar air conditioners (which operate on the same principle as the old gas refrigerators). The cost of installation is high and performance is not satisfactory. Solar air conditioners are not commercially feasible at present, he concluded. The question was then asked whether it was feasible to retro-fit a conventional home (i.e., a home not designed for using solar energy units). Dr. Dean answered by stating that if the building were insulated well enough and there was adequate space for the collectors, it could be worthwhile to retro-fit a house. However, Dr. Dean again emphasized the fact that energy conservation should go hand-in-hand with applications of solar energy. He added that a badly insulated house with a solar collector did not make any more sense than a badly insulated house using fossil fuels.

Dr. William Wentz, of Wichita State University, made a presentation on the use of wind power for electricity generation. He charted the development of uses of wind power from the primative windmills to sophisticated wind generators which are being used experimentally for the generation of electricity. Dr. Wentz had slides which accompanied his talk, and he distributed wind charts revealing the wind velocities throughout the country. (A copy of the charts is attached to the minutes.) Dr. Wentz noted that most areas in Kansas have sufficient wind for electrical generation; wind velocity of over ten mph is necessary for electrical generation.

Storage of wind-generated electricity is a problem, according to Dr. Wentz. He described various experimental methods of storage, and he suggested that the most successful was using direct wind-generated electricity to pump water up a hill and, when wind was not available, the water pumped into the storage is released and is used to run a water turbine.

Following the presentation, a question was asked if there was any advantage in wind generated energy over other forms of solar energy applications. Dr. Wentz replied that solar energy collected through flat plate collectors or similar devices was better for space and water heating, but wind-produced energy was best for direct electric generation.

Dr. Pytlinski's presentation on the use of solar energy for electricity generation included slides of experimental and proposed projects for the large scale collection of solar energy and its conversion to electricity. Prior to his presentation, Dr. Pytlinski distributed copies of his recent publication, Use of Solar and Wind Energy As Alternative Energy Sources -- Principles and Applications, to members of the Committee. (A copy is attached.) Dr. Pytlinski described the different methods of using solar energy to produce electricity, e.g., through mechanical generators, through turbo-generators, or directly by solar cells. The solar cells are called photovoltaic cells; these cells are able to directly convert the sun's rays to electricity. Research on the production of photovoltaic cells is at an early stage and the commercial use of such cells will probably not be for another 15 or 20 years, Dr. Pytlinski stated.

Dr. Pytlinski also described the proposed large commercial solar power plants which are being proposed for the future. A field of heliostats (reflectors) will transmit solar energy to a tower-top receiver or boiler where a tubogenerator converts the heat into electricity. It was noted that Black and Veatch in Kansas City has a contract with the Energy Research and Development Corporation to develop a model of this type of solar power plant.

Most methods of converting the sun's rays to electricity are far too costly at present for commercial use, and there is not enough wattage produced to provide satisfactory usage, Dr. Pytlinski concluded. A question was asked concerning the use of collector fields in space for generating electricity and transferring it to the ground. Dr. Pytlinski replied that this concept has been developed for the future, but the cost of setting up a space platform with collectors is prohibitive at this time.

Mr. Ed Martin spoke on behalf of Solar Services, Inc., Wichita, Kansas. He said that architects and engineers could bring about the wider use of solar energy through encouraging clients to consider solar-designed structures. Architects run a business, Mr. Martin stated, and there is a problem in getting the typical professional to push solar-designed houses. Mr. Martin stated that he and two other persons formed Solar Services, Inc.; their goal was to become a central source of information for architects, engineers and contractors interested in building structures designed to use solar energy. He said that at this time there is hardly any market for solar energy products; consequently his firm has become primarily a public information service.

Mr. Martin did describe the projects his firm has designed; the only one in Kansas so far is a medical building in Wichita which has its collectors placed on the south vertical wall of the building. Mr. Martin pointed out that when collectors are placed on walls, there is only a 10 percent loss in efficiency, and the building gains structurally because there is no need to provide special construction for placing the collectors on an angle. He also noted that proper insulation is vital, and that legislation regarding insulation is needed to go hand-in-hand with solar legislation. Mr. Martin closed by stating that an energy crisis remains -- oil, gas, coal, and other fossil fuels cannot last much longer.

Mr. Bob Riordan, of the architectural and engineering firm of Wilson and Co., Salina, Kansas, gave the Committee a brief view of the commercial aspects of solar energy. He emphasized the fact that federally-funded demonstration grants provided by the Housing and Urban Development Administration (HUD) and Energy Research and Development Administration (ERDA) are important for publicizing solar energy. He argued that it would be beneficial for solar energy in Kansas if one of these grants could be funded in the state in order to bring solar energy before the public. He described how an architectural firm goes about applying for an ERA grant by explaining how his firm sought a grant for a proposed unified school district in central Kansas.

The Committee recessed for lunch, and in the afternoon the members travelled to Manhattan, Kansas, to view some residential and non-residential solar energy applications. Attached is an agenda of the tour sites in Manhattan. Also, copies of materials distributed to the Committee during the tour are attached including the publication Solar Energy Activities at Kansas State University by Dr. George Pytlinski.

Prepared by Ramon Powers

Approved by Committee on:

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Date