

MINUTES OF THE MEETING
NATURAL RESOURCES
MONTANA STATE SENATE

March 5, 1979

The twenty-first meeting of the Natural Resources Committee was called to order by Senator George F. Roskie, Chairman, at 1:05 P.M., on the above date in Room 405 of the State Capitol Building.

ROLL CALL: Upon roll call all members were present with the exception of Senator Dover, Etchart and Thiessen. Senator Thiessen arrived during the hearing on HJR 37 and Senator Etchart arrived during the hearing on HB 733.

Mr. Jim Lear, Staff Attorney from the Legislative Council, was also present. See attached visitors' register for the names of visitors present.

CONSIDERATION OF HJR 37: "A joint resolution of the Senate and the House of Representatives of the State of Montana outlining to the Congress of the United States and the Legislatures of Washington, Oregon, and Idaho Montana's position with regard to the Pacific Northwest Electric Power Planning and Conservation Act."

Chairman Roskie called on Representative Jim Azzara, District 96, to present HJR 37 to the Committee. Representative Azzara said that HJR 37 was re-written quite extensively in the House and felt it still needed more work on it. He felt there should be an amendment regarding the makeup of the Consumer Council, but was not prepared to present such an amendment to the Committee at this time. However, he still felt HJR 37 was worth considering and hoped the Committee would defer action on it until he was able to get an amendment prepared.

Chairman Roskie called for any other proponents to HJR 37. Mr. Gene Phillips, Pacific Power and Light, spoke in favor of HJR 37. Mr. Phillips pointed out several reasons why it was necessary to have a regional energy policy in the pacific northwest. For instance, BPA has no source of additional power in the pacific northwest and has notified their direct service industries that their contracts will not be renewed and they have to begin getting their power elsewhere. BPA can not tell them how much power they can expect to receive from them in the future. He did have some problems with the resolution particularly with regard to the language concerning the Utility Council and the Consumer Council and felt it should be amended in some way with respect to that. He also pointed out that there have been a number of problems arising from rate disparities.

Mr. David Alberswerth, Northern Plains Resource Council, spoke in favor of HJR 37 if amended and submitted his proposed amendment in writing (see attachment).

Sanna Porte, Environmental Information Center, spoke in favor of HJR 37.

Mr. Mike Dahlem, Associated Students of the University of Montana, spoke in favor of HJR 37 and said we need to get a consensus in the northwest about what path to pursue as long as the State of Montana doesn't lose any rights in the process.

There being no other proponents to HJR 37, Chairman Roskie called for any opponents to HJR 37 and there were none.

Chairman Roskie then called on Terry Carmody, Executive Director for the Environmental Quality Council, for his opinion. Mr. Carmody pointed out that the input that the ad hoc committee has had in the past on this bill was very beneficial and the recommendations they have made to Congress should be looked at and should follow the same lines as their suggestions.

Chairman Roskie then opened the hearing to questions from the Committee and there were none.

Representative Azzara closed by saying he was desirous of working with the Committee on the needed amendments.

Chairman Roskie told the Committee they would defer action on HJR 37 until the Committee has an opportunity to look at the proposed amendments.

CONSIDERATION OF HB 313: "An act requiring performance of a life-cycle cost analysis before any state agency may construct a facility."

Chairman Roskie called on Representative Jim Azzara, District 96, to present HB 313 to the Committee. Representative Azzara told the Committee this bill was broken down into two parts. The first part tells what life cycle is and the second part delegates rule-making authority to the Department of Administration.

Representative Harrison Fagg, District 63, also spoke in favor of HB 313. Representative Fagg pointed out that the bulk of energy waste goes right up the chimney, and what he would like to see in this bill is not an increase in government bureaucracy but some way of addressing government waste. Representative Fagg also pointed out that he had HB 313 amended in the House on page 4, lines 1 through 4, and the key to whether or not the architects could do what was stated in the amendment lies with the Department of Administration since they can come up with some standards that are within the grasp and scope of the architects.

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Bill Bronson, Associated Students of the University of Montana, spoke in favor of HB 313. He pointed out that the students pay building fees to help build new structures so they want those buildings to be as energy efficient as possible.

Mr. Richard Steffel, Missoula Energy Forum, spoke in favor of HB 313 and submitted his comments in written form (see attachment).

Sanna Porte, Environmental Information Center, also spoke in favor of HB 313 and said they are concerned about conserving energy and conserving tax dollars.

Dawn North, League of Women Voters, also spoke in favor of HB 313 and submitted her comments in written form (see attachment).

There being no other proponents Chairman Roskie called for any opponents to HB 313.

Mr. H. S. Hanson, Montana Technical Council, spoke in opposition to HB 313. He said he was in favor of life-cycle cost analysis, but pointed out that with life-cycle cost analysis you are not necessarily going to end up with a lower energy cost. Mr. Hanson then read the definition of life-cycle costing as defined by the federal government and pointed out that the federal government only requests a life-cycle cost analysis on buildings over 50,000 square feet and does not even require it at that point.

Mr. Phil Hauck, Department of Administration, also spoke in opposition to HB 313. Mr. Hauck said it would be difficult for a small department like his to do what this bill would require of them. He pointed out that this bill only addresses life cycle costing on new buildings and the State of Montana now has in effect a building code dealing with new buildings. He also said that this bill assumes architects are not interested in this problem. Mr. Hauck said that architects are interested and are already addressing this problem.

Mr. A. A. van Teylingen, Facilities Planning Director at Montana State University, also spoke in opposition to HB 313. He said that engineers and architects are already very energy conscious and that the United States Department of Energy will shortly be publishing energy performance standards which by federal law must be adopted by the states.

Chairman Roskie then informed the Committee they would allow times for Representative Huennekens to come address the Committee before acting on HB 313. He then opened the hearing to questions from the Committee. There were several questions about whether or not the three building plans presently being considered by this Legislature are energy conscious (Legislative wing to capitol, library at Northern, and activities

center for the School for Deaf and Blind). Senator Lowe asked Representative Azzara if he was familiar with the energy code that has been legislated for state buildings and expressed the feeling that it was quite stringent.

Representative Azzara then closed by stating he felt HB 313 was the first step in bringing more energy consiousness to building.

Senator Lockrem expressed his resentment towards the presentation of HB 313. He said he did not appreciate the fact that Representative Fagg had spoken in favor of HB 313 and then left before the Committee had an opportunity to ask questions.

CONSIDERATION OF HB 733: "An act to generally revise the laws relating to controlled groundwater areas; amending sections 85-2-501, 85-2-506, and 85-2-507, MCA."

Chairman Roskie called on Representative Day, District 54, to present HB 733 to the Committee. Representative Day stated that HB 733 deals with modifying or establishing groundwater controls.

Chairman Roskie then called for any other proponents to HB 733. Mr. Don McIntyre, Department of Natural Resources and Conservation, spoke in favor of HB 733. He said it would facilitate the method of setting up controlled groundwater areas in Montana and will aid in the steps of setting up temporary controlled groundwater areas. He said HB 733 also better describes the criteria than does the present law with respect to groundwater areas.

Mr. Zack Stevens, Montana Farm Bureau and their affiliated organizations, also spoke in favor of HB 733, but said he had requested a transcript of the television program 20/20 which dealt with the Colorado groundwater law and felt this would be helpful to the Committee when they considered HB 733.

Pat Smith, Northern Plains Resource Council, also spoke in favor of HB 733.

Mr. Martin Miller, Montana Bureau of Mines and Geology, also spoke in favor of HB 733.

There being no other proponents Chairman Roskie called for any opponents to HB 733. Mr. Bill Asher, Agricultural Preservation Association, spoke in opposition to HB 733. He said he was concerned that the bill would give the Department of Natural Resources the authority to yank permits if the well began to draw down on a neighbors well.

There being no other opponents to HB 733, Representative Day closed. Representative Day requested that the Committee not take action on HB 733 until the transcript from the 20/20

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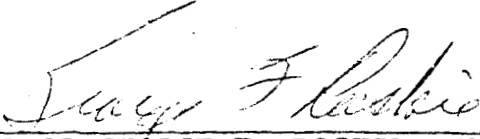
program is available because he feels there is a good possibility the bill should be amended.

Chairman Roskie then opened the hearing to questions from the Committee and there were several questions concerning the effects of this bill. Representative Day said it is imperative we protect groundwater rights and he is not sure this bill does that. Senator Brown asked someone to explain the problems Colorado has had with their groundwater law and why that would have any bearing on Montana's groundwater law. Mr. Don McIntyre, Department of Natural Resources, responded.

Chairman Roskie then informed the Committee that they would defer action on HB 733 until the transcript from the 20/20 program was received.

Chairman Roskie then informed the Committee that HB 329 had died before it could be acted on so it had been re-drafted. He said that because Representative Sheldon had not arrived to present HB 329 to the Committee the hearing on HB 329 would not be held at this meeting. Chairman Roskie did point out some things to the Committee that he felt still made HB 329 necessary.

ADJOURNMENT: There being no further business, the meeting adjourned at 2:45 P.M.



SENATOR GEORGE F. ROSKIE, Chairman

date 3/5/79

ROLL CALL

Natural Resources COMMITTEE

46th LEGISLATIVE SESSION - 1979

| NAME | PRESENT | ABSENT | EXCUSED |
|---------------------------------|---------|--------|---------|
| ROSKIE, George F., Chairman | ✓ | | |
| DOVER, Harold L., Vice-Chairman | | ✓ | ✓ |
| BROWN, Steve | ✓ | | |
| ETCHART, Mark | ✓ | ✓ | |
| JERGESON, Greg | ✓ | | |
| LOCKREM, Lloyd C., Jr. | ✓ | | |
| LOWE, William R. | ✓ | | |
| MANLEY, John E. | ✓ | | |
| STORY, Pete | ✓ | | |
| THIESSEN, Cornie R. | ✓ | ✓ | |
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Each Day Attach to Minutes.

SENATE _____ COMMITTEE _____

BILL _____

VISITORS' REGISTER

DATE 3/10/73

Please note bill no.

| NAME | REPRESENTING | BILL # | (check one) | |
|--------------------|----------------------------------|--------|-------------|------|
| | | | SUPPORT | OPPO |
| Don K. ... | Area Bureau | HB 733 | X | |
| Paul J. ... | Area Bureau | HB 733 | X | |
| D. ... | Area Bureau | HB 733 | X | |
| Charles Bowman | MSU | 733 | X | |
| ... | ... | HB 313 | | |
| ... | ... | HB 313 | | |
| ... | ... | HB 313 | X | |
| ... | ... | HB 313 | X | |
| ... | ... | HB 313 | X | |
| Bill Branson | Associated Students, MSU | HB 313 | X | |
| ... | ... | HB 313 | X | |
| ... | ... | HB 313 | X | |
| ... | Environmental Information Center | HB 313 | X | |
| ... | ... | HB 313 | | |
| A. A. van Tolingen | Commissioner of Higher Ed | HB 313 | | X |
| Phil ... | ... | HB 313 | | X |
| ... | ... | HB 313 | X | |
| ... | ... | HB 313 | X | |
| Bill Asher | AGRICULTURAL PRESERVATION ASSN. | HB 733 | | X |
| ... | ... | HB 313 | | X |
| ... | ... | HB 313 | | |
| ... | ... | HB 313 | | |
| ... | ... | HB 313 | | |

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY

NAME: Mike Schlim DATE: Mar 5 1979

ADDRESS: 1836 Fennell

PHONE: 442-0032

REPRESENTING WHOM? Associated Students of U.M.

APPEARING ON WHICH PROPOSAL: HJR 37

DO YOU: SUPPORT? X AMEND? OPPOSE?

COMMENTS: The resolution states the
concern of the people of Michigan
to remove their control over
plant siting and utility rate
making. We urge your support
so that the Congress will be
made aware of that concern.

NAME: ~~AGRICULTURAL~~ BILL ASHER DATE: 3-5-79

ADDRESS: Rt 1 Box 344-25 MANHATTAN, MT.

PHONE: 284-6664

REPRESENTING WHOM? AGRICULTURAL PRESERVATION ASSN.

APPEARING ON WHICH PROPOSAL: HB 733

DO YOU: SUPPORT? AMEND? OPPOSE? ☒

COMMENTS:

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: Samuel Porter DATE: 3/5/79

ADDRESS: Box 1154, Nelspruit

PHONE: 443-2520

REPRESENTING WHOM? Environmental Information Center

APPEARING ON WHICH PROPOSAL: HIB 313, HTR 37

DO YOU: SUPPORT? ☒ AMEND? ☐ OPPOSE? ☐

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: _____ DATE: _____

ADDRESS: _____

PHONE: 5712

REPRESENTING WHOM? DARC

APPEARING ON WHICH PROPOSAL: 7.1

DO YOU: SUPPORT? _____ AMEND? _____ OPPOSE? _____

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: Neil Stedman DATE: 3/5/79

ADDRESS: Boston

PHONE: 587-3153

REPRESENTING WHOM? Farm Bureau

APPEARING ON WHICH PROPOSAL: H13733

DO YOU: SUPPORT? ☒ AMEND? ☐ OPPOSE? ☐

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: Richard Stepp DATE: 3/5/29

ADDRESS: 3311 Stephens Apt 12, Msk

PHONE: 728-4439

REPRESENTING WHOM? MISSOURI ENERGY Forum

APPEARING ON WHICH PROPOSAL: HB 313

DO YOU: SUPPORT? ☒ AMEND? ☐ OPPOSE? ☐

COMMENTS: _____

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: Bill Bronson DATE: 3/5/79

ADDRESS: A 2480 E. Broadway, Apt. 13C Helena

PHONE: 442-4986

REPRESENTING WHOM? Associated Students, University of Montana

APPEARING ON WHICH PROPOSAL: HB313

DO YOU: SUPPORT? ☒ AMEND? ☐ OPPOSE? ☐

COMMENTS: Since student building fees have been or will
be used in the construction of public buildings on the
UM campus, the students have an interest in
supporting the most economical and energy
efficient construction. HB313 is a means for
insuring this efficiency and economy. Hence, our
support for HB313.

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: A. A. van Tergingen DATE: 3/5/79

ADDRESS: 916 - No. 17th Berzema, apt 59715

PHONE: 408 487-4867

REPRESENTING WHOM? Commissioner of Higher Education

APPEARING ON WHICH PROPOSAL: HB 313

DO YOU: SUPPORT? _____ AMEND? ☒ OPPOSE? _____

COMMENTS: The United States Department of Energy will shortly
publish energy performance standards which by federal
law must be adopted by the states in Feb. 1980. Therefore
we either do not need this law or it should be
amended to read to effect that the above mentioned
standards be adopted

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: ISSANSON DATE: 3/5

ADDRESS: 11 E. R. 11

PHONE: 449-5500

REPRESENTING WHOM? Mont Tech Council

APPEARING ON WHICH PROPOSAL: HB 313

DO YOU: SUPPORT? _____ AMEND? _____ OPPOSE? ☒

COMMENTS: _____

1) Very Costly

2) Will not optimize WHATS Required.

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

NAME: George Phillips DATE: 3/5/71

ADDRESS: 1500 1st St

PHONE: 150-6144

REPRESENTING WHOM? Public Affairs

APPEARING ON WHICH PROPOSAL: 1500 1st St

DO YOU: SUPPORT? X AMEND? 4 OPPOSE?

COMMENTS:

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

Testimony in support of HB 313

"An act requiring the performance of a life cycle cost analysis before any state agency may construct a facility"

My name is Richard Steffel. I reside at 3811 Stephens in Missoula and I am a candidate for a Master's of Science degree at the University of Montana; my emphasis being on appropriate technology. I come before you today representing the Missoula Energy Forum, a group of approximately 40 citizens concerned with various aspects of conservation and wise energy use. The Missoula Energy Forum rises to endorse this bill and has authorized me to make the following arguments in its behalf.

In an effort to ascertain some of the potential effects and benefits such a law might have in Montana, I contacted several other states that have enacted similar legislation. I found that two states, Massachusetts and Colorado, are having what might be termed only "part success". These less than desirable results are, I think, attributable to legislation that is too specific and rigid to allow for needed flexibility in application; and/or to half hearted application of the standards and guidelines that were promulgated under their legislation. Another factor is that the programs in both these states have only been in effect for ~~some~~ a little over a year.

In contrast, two other states, North Carolina and Florida, have had life cycle analysis requirements in effect for over three years, and they have had some quite different results. Their programs have incorporated the necessary flexibility because they adopted a "performance" instead of a "prescriptive" approach to implementation. They also have established enforceable, yet effective performance standards and other guidelines, and have applied them consistently throughout the planning process of all proposed buildings. As a result, their ventures have proved amazingly effective.

North Carolina has been requiring life cycle cost analyses of all proposed state sponsored construction of greater than 40,000 sq. ft. since 1975. According to Doug Kolbreath of the State Energy Division and John Emerson of the Construction Department, the program is working very well. There have not been any follow up studies to determine the particular energy savings (alone), but both gentlemen assured me that they are saving energy and dollars.

In North Carolina, building contractors are required to seek a computer analysis of their proposed plan from the private sector and to then submit the results for approval, prior to commencing construction. They use a standard computer program capable of handling up to four building "packages" simultaneously. (the CRECE program by Honeywell) So far, their main focus has been on discerning the most appropriate Heating, Ventilation, and Air Conditioning (HVAC) systems, and both men emphasized the important role of good "envelope" performance standards in that pursuit.

In 1974, Florida enacted its life cycle cost law. It requires the same type analysis as does HB 313 regarding building placement, "envelope" performance standards, and implementation of the most energy conserving and cost effective technological means of construction, HVAC, and maintenance.

The life cycle analysis system in use in Florida is unique in that they developed their own computer program (FLEET) which is capable of comparing six different facility "packages" simultaneously. The state itself oversees the analysis process and then suggests any necessary improvements. They require agency approval at every step of the planning process and thereby eliminate the possibility of a contractor making premature, burdensome investments that might prove to be an obstacle to the ultimate selection of the most effective facility.

Since 1974, Florida has initiated the construction of some 45 state sponsored buildings that are subject to a life cycle cost analysis. On the basis of these projects, the projected energy savings amount to an average of just over 55%. So far, the buildings that have been on line long enough to present a complete picture have proved the accuracy of the projected savings to within $\pm 10\%$. Using an energy cost escalation factor of 7%/year, this translates to a savings over the next ten years alone of over \$30.2 million. This would seem to be a very strong argument in favor of this similar legislation before you now.

In talking to the administrators of both the N.C. and the Florida programs, one thing stood out as being particularly important. The development and enforcement of adequate performance standards for energy conserving materials and techniques have played a major role in these states' energy saving successes. This led me to research the success of performance standards elsewhere and this in turn led me to focus on Davis, California. In October, 1975, the city of Davis adopted energy conservation performance standards for new, residential construction. The bill before you would not affect residential codes, but the events in Davis can provide a fine example of the kinds of savings possible with good performance standards. Since the implementation of the code in Davis, the per capita consumption of energy has decreased by some 18% while the per capita energy use in nearby towns has increased by some 15%. The adoption of a few relatively simple building techniques, coupled with a new citizen awareness of conservation has, in Davis, Ca., served to reverse the world wide trend of ever increasing consumption of energy.

The same thing could begin to happen in Montana with the adoption of the bill before you. HB 313 allows for the development and implementation of the same principles that have proved so effective in Fla., N.C., and Ca.; the three states that have had similar laws in effect the longest. HB 313 is specific enough to make clear the intent of this body in adopting it, and yet general enough to allow for the promulgation of thoroughly effective guidelines. This characteristic will not only ease the inevitable transition into a new energy conservation consciousness in state government, but will also allow for freedom of design within the guidelines. Architectural and engineering creativity will still have a free hand as to function and unique design characteristics of new facilities; the only difference being that greater conservation measures will have to be considered.

HB 313 would, if enacted, make large strides in the direction of energy conservation in Montana. It would ensure that all future buildings larger than the specified minimum sizes, to be built by the state, would be the singularly most appropriate "package" for a specific use on a specific site. This is an extremely important concept that should be pursued to its

to its energy and money saving ends. I rise therefore, as a representative of the Missoula Energy Forum, and for myself, as a citizen of Montana, to wholeheartedly support and endorse this legislation. I urge you to render a Do Pass on HB 313, in the name of desperately needed energy conservation and sensible resource use.

Thank You

NAME: John Doe DATE: Mar 2, 1971

ADDRESS: 123 Main St

PHONE: 555-1234

REPRESENTING WHOM? Dept. of Admin.

APPEARING ON WHICH PROPOSAL: HB 313

DO YOU: SUPPORT? AMEND? OPPOSE? ✓

COMMENTS:

- * Unnecessary - already in the code book
- * Have no money and a few to buy some more money
- * Costly of 1% to 4% of
- * 1% of 1% of 1% of 1% of 1%
- * This is too close to schedule all and are not necessary.
- * If required requires judgement
- * Why is this necessary??
- * No money to benefit of building

PLEASE LEAVE ANY PREPARED STATEMENTS WITH THE COMMITTEE SECRETARY.

FONTANA LEAGUE OF WOMEN VOTERS

Testimony in support of HB 313 - An Act Requiring Performance
of a Life-Cycle Cost Analysis
before any State Agency may
Construct a Facility

March 2, 1979

The League of Women Voters has had a strong position in favor
of energy conservation since 1975. Our recently completed
Energy Concurrence Position for Fontana suggests life-cycle
costing as one measure to reduce energy use. Energy efficient
designs will save both energy and money in the long run.
For these reasons we urge your support of Hb 313.

A first look at the proposed Federal energy performance standards

The Department of Energy has issued its proposal for energy performance standards that are being studied and debated by design professionals and many professional bodies. This article describes the standards and the vast array of problems facing their implementation. The big question is: since energy conservation has become second nature to architects and engineers, should we press the government for more time to work out the technical problems and problems of compliance?

In November, the Department of Energy published its first version of building energy performance standards for buildings (known to the cognoscenti as BEPS)—a step that could lead to final promulgation in August this year, followed by obligatory adoption of these standards (or their equivalent) by the states in February of 1980. That the Federal government had these standards in preparation came as a surprise to many in the building community—perhaps because more than 40 states have adopted, or are about to adopt, codes based upon ASHRAE Standard 90, and because the timetable for developing them has been extremely short, considering how complex the problem is.

Performance standards were mandated by Congress in the Energy Conservation Standards for New Buildings Act passed in August, 1976, and the AIA actively encouraged passage of the Act in an effort to promote conservation, but also to put its authority behind the performance-standards approach. The Act provided for promulgation no later than 1981, but the Carter administration has advanced the timetable by one year.

In an unusual step, on November 21 the Department of Energy published the standards in an Advance Notice of Proposed Rulemaking (ANPR) in the Federal Register "...to make available to the public the form of the Standards as presently envisioned by the Department, as well as support information available at the time of publication, and to invite the public's review and comments on the standards." The actual Notice of Proposed Rulemaking is scheduled for publication this month. Public meetings (not hearings) for discussion and comment on the ANPR were held in Washington, Chicago and San Francisco early in December. For lack of publicity, they drew only limited audiences, not a spectrum of the building community except in San Francisco, where some spirited and helpful discussion took place. The

McGraw-Hill Information Systems Company presented meetings in New York City and Kansas City for building product manufacturers on the new Standards, at which DOE and HUD officials explained the basic proposals. The National Institute of Building Sciences sponsored a workshop in Washington at which these officials spoke, and for which an impressive workbook was prepared covering a dozen significant issues such as energy-budget format, state and local compliance, sanctions, and residential and commercial-building impacts.

Given an Administration anxious to have energy standards, and a building community—in particular the engineers and the code officials—with a vast number of concerns and reservations about them, DOE seems to be betwixt and between. And for this reason, perhaps, at the public meetings DOE's Dr. Maxine Savitz emphasized some of the alternatives DOE has asked Battelle Pacific Northwest Laboratories to evaluate in the environmental assessment of the BEPS required by law. The range of alternatives includes: 1) no action, or the repeal of the legislated mandate for the Standards; 2) design energy budgets set at three different levels, the first as chosen for the Standards, the second less stringent, and the third more stringent; 3) component performance standards instead of building performance standards; 4) the Standards with tax incentives; 5) prescriptive standards; 6) education and dissemination of information instead of the promulgation of standards; 7) different methods to encourage the use of renewable energy resources; and 8) energy pricing to effect conservation.

What are the proposed standards like, and how were they developed?

The energy performance standards (the BEPS) are "design energy budgets" for buildings over-all, rather than their parts, expressed in Btu per square foot per year that are applica-

ble at the design stage of the construction process. They were given in the ANPR for 16 different building classifications and for seven different climatic zones. They were not given for assembly buildings, which might need a finer breakdown in classification, for industrial buildings in which it is difficult to separate process and non-process energy, for restaurants where there is a high ratio of process to non-process energy, or for warehouses where there were some high, unexplained energy consumptions in the original data.

The design energy budgets in the ANPR are also source-energy related—through the use of multipliers known as resource utilization factors (RUFs) which are intended to account for the energy losses involved in delivering non-renewable resources to a building site.

With oil and gas, transportation results in a small loss from origin of the fuel to delivery at the building site; with electricity, losses inherent in the generation process (the largest percentage) and in distribution mean that for every Btu of fuel used at the power plant, about one-third of a Btu equivalent of electricity is delivered to the site.

The design energy budgets in the Advance Notice are not the numbers determined by evaluation of the statistical sample of 1,661 buildings, but are larger to the extent of the multiplication by the RUF factors. For purposes of presentation in the Advance Notice, the RUFs were based upon the original statistical sample. The RUFs are different for every building classification and also for the different climatic zones because of the typical fuel usages in the various regions. The individual RUFs in the Advance Notice for oil and gas were set at slightly over one, but the individual RUF for electricity is 1.0.

An example of how this was applied in the Advance Notice. The preliminary unadjusted design budget for a small office building (less than 50,000 sq ft) in Climatic Zone 2

was determined to be 55,000 Btu per sq ft per yr. The combined RUF for small office buildings in Zone 2 was set at 2.5—indicating that the energy usage is to a large extent electricity (for air conditioning and for lighting), with other fuels for heating. Multiplying 55,000 by 2.5 would give an allowable design energy budget of 137,500 Btu per sq ft per yr. The Advance Notice does not indicate what a building designer would do if he is using a different mix of energy sources than those assumed in the proposed standards. It is not clear whether or how building designers could determine their own RUFs.

The advance notice states that "Theoretically RUFs can be computed for individual sites, but the practical application of this theory is, in reality, quite complex." On the other hand, the ANPR also states that, "...ongoing studies relate to setting RUFs equal to or less than zero for renewable resources, in order to encourage their utilization. . . ." To account for sociological considerations (such as fuel availability, economics, health and environmental impacts, etc.) DOE is examining the effects of applying resource impact factors (RIFs), but this concept is still embryonic.

Three months after the energy act (Public Law 94-385) was passed, AIA and ASHRAE formed a Joint Energy Budget Committee to investigate the feasibility of energy performance standards. The committee considered a proposal for collecting actual energy usage by real buildings to provide a reference base, and also discussed the merits of developing prototypical buildings for different building types, with detailed calculations of energy requirements for specified operating condi-

tions and schedules. Shortly thereafter the AIA Research Corporation, independently, began negotiations with HUD for a research contract to develop energy performance standards. Earlier HUD, which had the original responsibility for developing and implementing the standards, had asked for a proposal from the National Bureau of Standards, but this did not proceed, apparently because of time and cost factors. Meanwhile the Joint Committee had been expanded to include three more professional societies: American Consulting Engineers Council, Illuminating Engineers Society, and National Society of Professional Engineers (NSPE/PEPP). AIA/RC subsequently asked the committee to serve as a Technical Advisory Committee, and in the spring of 1978, the National Association of Home Builders and the Manufactured Housing Institute were added.

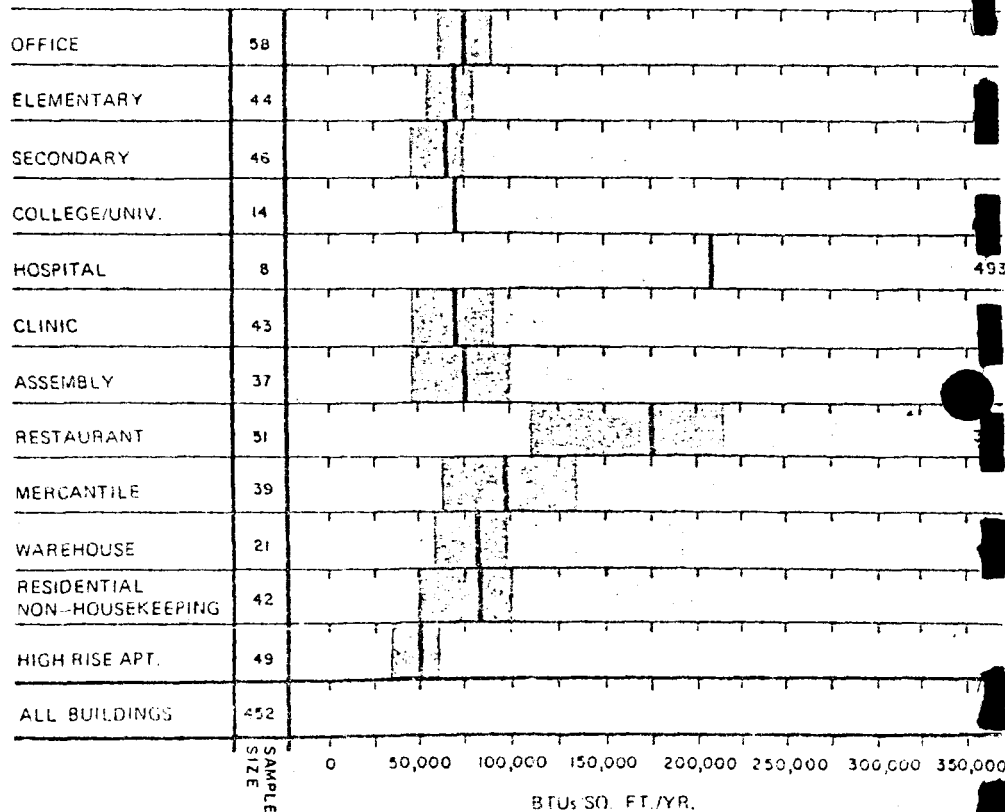
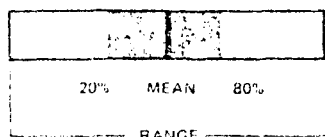
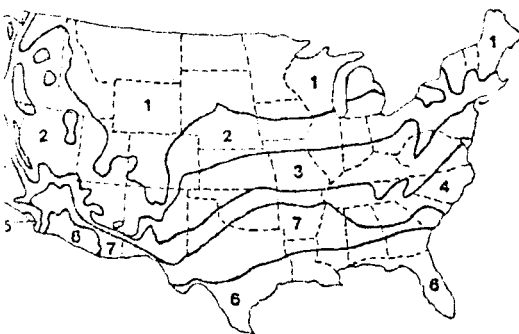
AIA/RC signed a contract with HUD in the spring of 1977 to conduct a study basic to the establishment of standards for energy consumption in buildings—a study that became known as the "Baseline Project." The first phase of the project, conducted from May through November of 1977, was designed to assess the amount of energy that buildings are currently designed to use. Though the AIA/RC's Technical Advisory Group (TAG) had hoped that actual operating data would be gathered for a reference base, and that prototypical buildings could be developed and analyzed in detail, AIA/RC decided against this approach because they said HUD did not want to consider buildings designed prior to the 1973 oil embargo. Further, it is reported that AIA/RC felt that use of actual consumption data would imply a

consumption standard rather than a design standard, and thus aggravate liability concerns of design professionals.

For data collection in Phase I of the project, buildings were broadly divided into nonresidential (which included high-rise residential) and residential, which included single family homes, low-rise multifamily housing, and mobile homes. Consultants to AIA/RC estimated that an average of 10 buildings of each building type in each climate region would produce summary estimates of sufficient accuracy for design consumption figures. This yielded a total sample of approximately 3,200 buildings which was obtained from *Dodge Construction Reports*. Of this total, 1,661 survey forms were returned sufficiently complete and consistent for analysis. This number, then, provided a representative sample of recent building designs, and a baseline for the evaluation of alternative energy standards.

For Phase II, AIA/RC selected 168 commercial/multifamily buildings out of the 1,661 and paid the architects and their consultants to do energy-conscious redesigns of their buildings to achieve the most feasible levels of energy conservation to arrive at realistic limits for energy efficiency.

To obtain energy consumption data for the 1,661 buildings in Phase I, a modified version of the ACCESS Short Form energy analysis computer program was used, with data requirements being on the order of 100 to 125 data points per building. Consulting engineers Syska & Hennessy processed the data and developed supplemental and default values as inputs where data on the survey forms were incomplete or missing.



residential sample data were collected from existing surveys representing 125,000 single-family homes, 45,000 multifamily low-rise units, and 175,000 mobile homes.

Who will be most affected by standards, and what problems loom for enforcement?

The groups that would be most affected by energy-budget type standards are architects, engineers and building code officials. The designers have to develop a building that meets the energy budget figure, proved through some type of simulation procedure, most probably a computer program. Building code officials have to find some way of assuring themselves that the energy consumption figures were calculated correctly.

The technical standards as presented in the Advance Notice were developed by DOE/HUD from the data presented to them by AIA/RCA, and this is where most of the emphasis has been placed so far. But the standards cannot be more than voluntary, until their implementation has been worked out in the form of regulations that spell out what must be done to comply with the standards, and tell the states how to determine whether or not the standards they have in their codes are "equivalent" to the Federal standards.

The Energy Act of 1976 specified that the National Institute of Building Sciences provide advice and assistance to "identify procedural obstacles or technical constraints inhibiting implementation of such standards," and pursuant to this NIBS has conducted an "issues" study, a "code equivalency" study, and four case studies on states' experience with energy-conservation standards for build-

ings, including California, Connecticut, Massachusetts and Virginia.

Implications of the building energy performance standards as they now stand

NIBS analysis of the Advance Notice developed the following:

- The design-energy budget format represents a significant departure from the formats of existing energy standards.
- The simplicity of a "single goal" is complicated by the diverse nature and use of the nation's building stock.
- The BEPS are design standards, and actual energy usage may depart significantly from design goals.
- The assumptions associated with the design energy budgets (energy uses included/excluded, the distinction between process, non-process energy, and operating profiles) may be artificial or remote in regard to a particular project, causing the designer to design the project for one set of conditions and calculate it for another.
- The state of the art of energy-analysis techniques is such that it will cause problems in providing an accurate calculation of a building's design energy consumption.
- Existing computer programs do not always provide the same result when applied to a single building, which further compounds the problem of obtaining an accurate energy consumption level.
- The use of a computer program to do the energy analysis adds effort and, presumably, cost to design and construction.
- It is not clear whether energy analyses will have to be done for each change during construction.

- Problems of coming up with an adequate design level of energy consumption for a single building will certainly complicate the problem of establishing equivalency between the BEPS and an existing standard that a state or locality wishes to have enacted.
- There may be confusion between the BEPS as a design standard and the building owner's expectations of the building's total annual energy consumption levels once the building is in use.
- The DOE Advance Notice does not compare the preliminary standards with design levels of energy consumption resulting from use of codes based upon ASHRAE 90-75R, and thus the magnitude of the code-equivalency problem is yet unknown.
- BEPS may lead to site inequities within a given climatic region because of the wide range of climates within the region.
- RUEs will markedly affect energy selections in new construction, which may or may not correspond to proper economic decisions.
- RUEs will require additional education at all levels of the design, contract and construction cycle.
- RUEs have far-reaching, long-term implications for utility planning, specifically in the areas of load management, capital expansion requirements, and rate structures.
- RUEs will tend to be a divisive factor among energy suppliers.
- BEPS will require an infusion of new financial and staffing support for many building code departments.
- The scheduled period of approximately four months for the public to review and comment on the standards and regulations may be too short for concerned groups to be

| DESIGN ENERGY CONSUMPTION (MBTU/SQ. FT./YR) | CLIMATIC ZONE | | | | | | |
|---|---------------|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10% BASELINE | 50 | 49 | 49 | 47 | 47 | 54 | 47 |
| 30% BASELINE | 56 | 55 | 55 | 53 | 53 | 60 | 55 |
| 50% BASELINE | 56 | 64 | 64 | 62 | 62 | 70 | 64 |
| 10% TECHNICAL REDESIGN | 49 | 47 | 47 | 46 | 46 | 52 | 47 |
| HIGHEST TECHNICAL REDESIGN | 29 | 45 | 20 | * | * | 39 | * |

* Not available.

| CLIMATIC ZONE | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|-------|-------|-------|-------|-------|-------|-------|
| BASE II PARAMETRIC BASELINE BUILDING LINE DESIGN ENERGY CONSUMPTION (MBTU/SQ. FT./YR) | 56 | 55 | 55 | 53 | 53 | 60 | 55 |
| COMBINED RUE | 2.6 | 2.5 | 2.7 | 2.8 | 2.7 | 3.0 | 2.8 |
| DESIGN ENERGY BUDGET (MBTU/SQ. FT./YR) | 145.6 | 137.5 | 148.5 | 149.4 | 143.1 | 180.0 | 154.0 |

The source of numbers for the design energy budgets was the Baseline Study of the AIA Research Corporation on 1,661 buildings designed in 1975 and 1976, and the redesign of 168 of these to determine maximum feasible energy savings. The chart across the page shows the range of design energy consumptions for the buildings that were in Climatic Zone 2. For office buildings, these ranged from about 30,000 Btu per sq ft per yr minimum to 200,000 maximum. The chart includes the total population of office buildings. The design energy consumptions and energy budgets shown in the tables on this page are for small office buildings (i.e., under 50,000 sq ft). The top table shows that 20 per cent of these buildings in Climatic Zone 2 had design consumptions of 49,000 Btu per sq ft

per yr. The 30th percentile was up to 55,000 and the 50th percentile was up to 64,000. DOE chose the 30th percentile figure for all the building types except where the 80th percentile of the redesigned buildings turned out to be higher, and in such cases the 80 per cent figure was used. The 30th percentile figure was felt to be low enough to encourage energy-conscious design, while still not imposing economic hardships. The design energy budgets were obtained by multiplying the design energy-consumption numbers by resource utilization factors (RUEs) that account for energy losses between source of the energy and the building site. For example, for the small office buildings in Climatic Zone 2, 55,000 Btu per sq ft per yr is multiplied by a RUE of 2.5 to give 137,500

both comprehensive and detailed enough to shape standards and regulations.

- Given the apparent technical complexity in formulating and administering the BEPS, it may be impossible for a number of states and local jurisdictions to achieve compliance by the scheduled date (February 1980).
- Widespread noncompliance resulting from an unrealistic implementation schedule could seriously undermine the BEPS program.

Engineers are concerned about the cost of proving compliance, and about liability

Government officials and others have suggested that administrative problems at the code-jurisdiction level might be mitigated if building designers certified that buildings designed with assumed operation and weather conditions would consume given Btus/sq ft/yr. This worries engineers familiar with the BEPS program, who say that their liability insurance will not allow them to "certify," and who envision nuisance suits from building owners who do not understand the difference between "design" and "operating" energy budgets, and who might have operated the building differently than assumed by the designers. Attorney/architect Arthur Kornblut, who writes for *RCORP* on legal matters, says that the law does not expect professionals to guarantee results, and that language might be used on the order of "to the best of our knowledge, information and belief," or "to the best of our professional experience, we certify that. . . ." A California engineer says that jurisdictions his firm has worked with have accepted the phraseology recommended by a West Coast insurance carrier somewhat to the effect that "the documents have been reviewed and are in substantial conformance with the regulations." The California energy code allows either a BEPS approach or a subsystem energy performance standards approach (SEPS) that has been based upon ASHRAE Standard 90-75R. A consulting engineer from the East says his insurance carrier states that by "certifying" performance, *per se*, the professional would have contracted away the carrier's rights, but that the professional can file an affidavit with acceptable language on the order of "to the best of our knowledge and belief. . . ."

Costs of demonstrating compliance are a moot question at this time since methods have not yet been specified by the government. Nonetheless, computer time plus the engineering firm's time is said to be at least \$1,000 for a small multizone building. A Pennsylvania engineer states that preparation for and running the AXCESS Short Form for a large elementary school might cost \$1,200 or more; preparation for and running the Long Form AXCESS might cost \$3,000 to \$4,000. These figures could represent from 10 to 25 per cent of the engineer's fee for this kind of building. One study reported by NIBS in its issues analyses indicated that an office building has to be over 220,000 gross square feet before the "commensurate" design fee is adequate to support a computer analysis of two alternative mechanical designs, let alone

an analysis of a building's total estimated annual energy consumption. On the other hand, a computer services firm involved in building energy simulations believes that buildings with simple plans might be simulated for fees on the order of a few hundred dollars.

Engineering societies, the TAG and ad hoc groups say more work needs to be done

If building energy performance standards are going to be promulgated, ASHRAE feels that Standard 90-75R should be the vehicle, primarily because of the consensus approach employed, says ASHRAE president Morris Backer, not because it is "the ultimate refinement in energy conservation"—admittedly it is not, having gone through several revisions already, and terment is developing for still further improvements. Of course this standard is a subsystem performance standard primarily with respect to the building envelope and lighting. Architects got behind the building energy performance standards approach in the beginning because they felt the building envelope was being unduly singled out. Section 10 of Standard 90-75R permits trade-offs between the envelope and interior systems as demonstrated by energy simulation analysis, but the building first has to be designed according to Sections 4 through 9. Architects apparently have relaxed a bit about Standard 90, if the experience in California is any measure. Given the option of either a BEPS approach or a SEPS (subsystem-oriented energy performance standards) approach in the state's energy code, building designers are reported to be taking the SEPS approach most of the time—though this could be because the SEPS approach is simpler and less costly to do. One California consulting engineer comments that for conventional design the SEPS approach does not pose unreasonable constraints. When his firm has done energy simulations of building designs, they generally have been for public-building clients.

The Technical Advisory Group gave kudos to the AIA/RC project in some areas, but also expressed some concerns. Among the positive results cited: 1) the project was an enlightening educational experience for a broad segment of design professionals, 2) the project indicates that energy can be saved through a cooperative effort of design professionals, 3) a broad base of valuable information has been accumulated on recently designed buildings, 4) the project should enlighten the government on the complexity of buildings and the difficulty in implementing a performance standard.

Some of their concerns were: 1) even though 1,661 teams of design professionals responded in Phase I, "this was a volunteer effort, and the quality of data collected left something to be desired," 2) process loads, including domestic hot water, elevators, office machines, computers, etc., were not considered in the energy calculations in Phase I, 3) the lack of an adequate reference base on actual energy use of existing buildings made it impossible to validate the computer

results in Phases I and 2.

Another group, the ad hoc Design Professional Federal Agencies Conference on Energy Standards, wrote a resolution that could be adopted by professional societies. "The Society endorses the concept of energy performance standards and recognizes that the proposed design energy budgets, though tentative and incomplete, will provide guidelines for future improvements." But, "before design energy budgets can be considered as adequate performance standards, considerable sustained effort will be required to develop and resolve key technical issues and economic factors."

More complex than technical issues are those of compliance and equivalency.

The government has a number of options to ease assimilation of standards

The equivalency of state and local codes to the Federal Standards is likely to become an important issue because most states have adopted, or plan to adopt, codes derived from ASHRAE 90-75R which the Federal government helped finance under Public Law 94-163.

A study by NIBS says it appears that the Federal government could take any of a number of administrative approaches to equivalency, such as making an administrative determination that a state code is in compliance with the Federal Standards, or incorporating a code version of ASHRAE 90-75R into the Federal Standards.

Or the government could take technically-based approaches to equivalency. These are too numerous and the ramifications too involved to discuss here, but suffice it to say that one type is *absolute equivalency*, which means that any building designed under a local standard must consume an equal or smaller amount than under the Federal Standards, or *statistical equivalency*, which means that some acceptable portion of buildings designed under a local standard consume an equal or smaller amount than the Federal Standards. It is doubtful that most localities could meet absolute equivalency without adopting the Federal Standards.

A still different approach the Federal government might take, according to the NIBS report, is a "multiple-path" approach under which it might promulgate both standards that establish Btu per sq ft goals and standards based on ASHRAE 90-75R. Under this "multiple-path" approach, states and localities would then have the option of which standard to follow.

And finally, the government might take the regulations that go with the Standard as that the program takes effect in steps over time, with SEPS-type standards (like ASHRAE 90-75R) in effect to start, and BEPS-type standards being made mandatory at some future date.

So the question becomes—shall we go ahead with performance standards with their greater flexibility but with their vast implementation problems, or shall we proceed with deliberate speed to arrive there at a later date?

While the residents of the City of Davis have stabilized their consumption of electricity, use of electricity continues to grow at a substantial rate in nearby communities situated in the same climate zone, with a similar population size, and comparable per capita income. The per customer residential electrical growth rates of Davis, Woodland, and Vacaville are compared in the adjacent graph.

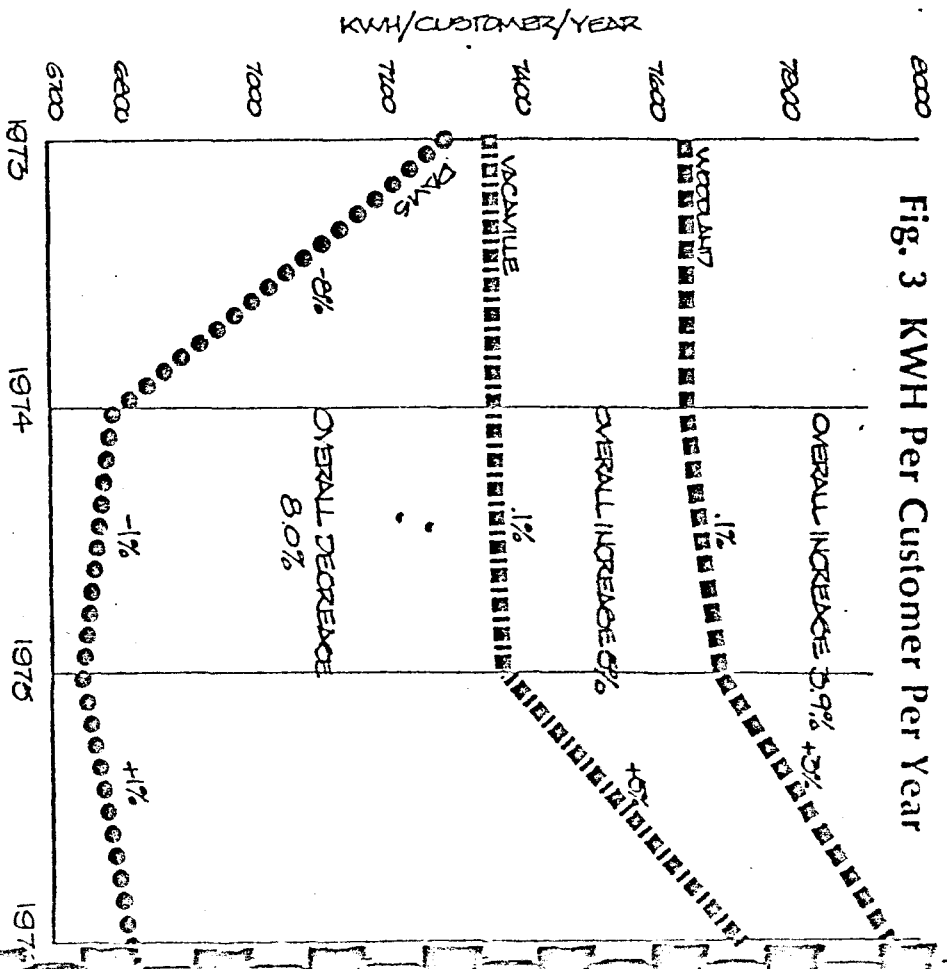
The charts drawn from Pacific Gas and Electric Company data show an eight percent reduction in electrical use from 1973 to 1974, a 1 percent decrease in 1974 to 1975, and a 1 percent increase from 1975 to 1976. Most of the reduction in electrical use may be attributable to educational programs.

No miracle has occurred in Davis. The same results and much more would be possible in any community in the nation with a well planned energy conservation program. A comprehensive program must include a number of elements: energy conservation building code tailored to the local microclimate, planning policies which will foster energy conservation, a retrofit program to improve the thermal performance of existing buildings, a transportation plan which will reduce the wasteful use of energy, and an educational program on energy conservation in the home environment.

All these elements have been incorporated to some degree within the Davis program. Davis offers the nation an example for energy conservation. The Davis experience suggests that the best place to conserve energy is on the community level. It is within a community that the greatest communication is possible, and consequently the most significant accomplishments.

(Emphasis Added) RGS

Fig. 3 KWH Per Customer Per Year



Note: All figures refer to residential use only

Source: Pacific Gas and Electric Co. 2-9-77 and Davis Community Development Department

From: the Davis Energy Conservation

Report HUD Innovative Project

B-75-S1-06-001 April 1977

City energy-saving panel hears how Davis did it

By DON SCHWENNESEN
Staff writer

MS 2/15/79

In the past five years, residents of Davis, Calif., have sliced their energy consumption by 18 percent per person, while residents in nearby communities have increased energy consumption by around 15 percent per person.

The result is that Davis residents now save almost \$1 million a year on energy costs, and much of the money saved is probably helping the local economy, according to the former mayor of the agricultural and university communi-

ty near Sacramento.

How were the savings achieved? Mostly by simply requiring developers to orient new subdivisions toward the south, by encouraging more south-facing windows and by requiring roofs to slightly overhang those south windows to shade them in the summer when the sun is hot and high.

Even contractors who bitterly opposed the requirements now are having second thoughts about them, according to Robert N. Black, who was mayor of Davis until last year when he resigned to

run successfully for the county board of supervisors.

Black visited Missoula Wednesday to talk about the Davis energy conservation program with City Council conservation committee members and others who believe Missoula is overdue for its own energy conservation program.

"I'm not particularly here to sell the people of Missoula on what the people of Davis did," Black told a University of Montana audience at one of several Wednesday presentations.

He noted that Davis has a much

warmer climate, with winter temperatures seldom below freezing, and that summer air conditioning has been one of the big energy demands in the city of 35,000.

Black stressed the importance of minor changes in building design that take advantage of the energy from natural sunlight in a "passive" way, without using solar collectors or expensive moving parts and components.

"The fact is that you can do something" to lower energy consumption, he said. "You can do something very significant at the local level."

"It's almost impossible to go wrong with a passive solar system," he said, adding that "going wrong simply means you're a little less efficient" at saving energy.

"It's hard to imagine the effect that it has," he told the City Council energy conservation committee, "but it has an enormous effect."

Black said that according to energy data provided by Pacific Gas and Electric, the utility that serves Davis, the community reduced its per capita electric energy requirements by 8 percent in

1974, 1 percent in 1975, 2 percent in 1976 and 7 percent in 1977.

Gains in the early years were from voluntary measures taken by residents during the heated community debate over the need for a local conservation plan, he said. The debate began in 1972, but the ordinance was not adopted until 1975.

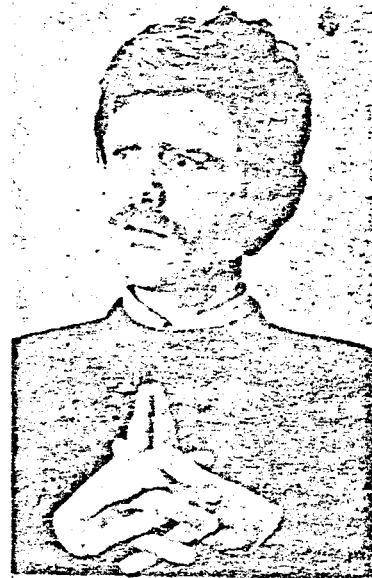
In contrast, Alderman Bill Boggs, who heads the city conservation committee, said Missoula now has no energy conservation program at all.

He added that despite soaring consumer costs, energy conservation still seems to have "a relatively low public priority in this town at the moment."

Boggs was among a half dozen City Council members who met with Black, although neither the mayor nor any of the county commissioners took part in the sessions. Black's visit was paid for with \$200 from city and state funds.

Scott Sproull, a local businessman who heads AERO-West, an alternative energy organization, cited figures to illustrate that the Missoula area is going in the opposite direction of Davis.

He said electric heat is being in-



Robert N. Black

stalled in 75 percent of the new homes in the city and in 99 percent of those outside the city — despite the fact that the cost of such heating has skyrocketed

(Turn to page 2, col. 1)

(Continued from page 1)

to as much as \$200 to \$400 a month this winter.

Montana Power Co. officials, including Missoula area Manager Don Leuschen, have warned that the trend toward electric heat and away from natural gas will mean high energy costs for Missoula consumers in the future and greater need for new power plants.

Black said that the Davis conservation plan consisted of modifications to the Uniform Building Code already in effect in many parts of the nation.

The modifications contained a mixed bag for developers, who welcomed some of the changes, opposed others, and generally took a dim view of additional government regulation of private business.

Changes that were welcomed includ-

quirements and reductions in street width requirements, to enable better use of residential lots and to reduce paving.

Black noted that paving is expensive, uses asphalt (which comes from petroleum), increases storm runoff problems and absorbs very large amounts of solar heat in summer.

Wide streets can raise the temperature of a California neighborhood by as much as 10 degrees on a hot summer day, he noted, and narrower streets can be more easily shaded by trees.

Changes that were opposed by contractors included requirements to limit the glass in new homes to 12.5 percent of the floor space and to make roofs overhang windows enough to shade them from summer sun.

South-facing windows were exempted from the 12.5 percent requirement

the home in winter, by collecting solar heat when the sun is low in the sky.

Some contractors opposed the code changes because they didn't believe solar energy researchers could know anything about proper homebuilding techniques that experienced contractors did not already know.

But Black said one of the most bitter opponents of the code changed his tune after monitoring his own homes in an effort to prove that the city council had erred in changing the code.

The contractor recently testified before Congress in support of the Davis code, Black said.

The contractor told a congressional subcommittee that the construction changes required by the code raised the cost of his first 46 homes by only \$35.10 per house. He added that the next 16 homes cost him no more to build than

2/15/79
Missoula

ESTIMATED ENERGY COST SAVINGS ACHIEVED ON STATE BUILDING DESIGNS
 THROUGH THE USE OF THE FLORIDA LIFE-CYCLE ENERGY
 EVALUATION TECHNIQUE (FILED) PROGRAM

BY: Engineering Administration
 Bureau of Construction
 T. A. Sechler, P.E.
 R. W. Clem, P.E.

| BUILDING NAME | BUILDING GROSS INTERIOR SQUARE FOOTAGE (FT ²) | BUILDING DESIGNED USING FILED PROGRAM | | TYPICAL BUILDING PRIOR TO FILED PROGRAM | | 10 YEARS SAVINGS & ENERGY EVALUATION (DOLLARS) |
|--|---|---|------------------------------|---|------------------------------|--|
| | | ENERGY CONSUMPTION (KBTU/FT ² /YEAR) | ANNUAL ENERGY COST (DOLLARS) | ENERGY CONSUMPTION (KBTU/FT ² /YEAR) | ANNUAL ENERGY COST (DOLLARS) | |
| State Capitol Bldg., F.S.D. | 85,172 | 77 | 45,638 | 175 | 106,284 | 59,106 |
| Florida Department of Transportation Bldg., U of S.F. | 75,081 | 59 | 43,395 | 135 | 99,293 | 55,798 |
| Florida Department of Transportation Bldg., State Fair | 88,000 | 64 | 47,969 | 128 | 95,938 | 47,969 |
| Florida Department of Transportation Service Center | 162,099 | 35 | 49,384 | 96 | 135,906 | 86,422 |
| Florida Department of Transportation Service Center | 164,150 | 50 | 71,463 | 100 | 142,926 | 71,463 |
| Florida Department of Transportation Building | 17,246 | 66 | 9,284 | 132 | 15,586 | 9,284 |
| Florida Department of Transportation Service Center | 191,340 | 51 | 99,506 | 102 | 199,132 | 99,506 |
| Florida Department of Transportation Service Center | 151,260 | 39.5 | 52,554 | 92 | 131,345 | 78,531 |
| Florida Department of Transportation Service Center | 103,153 | 32 | 24,399 | 96 | 73,197 | 48,798 |
| Florida Department of Transportation Science Bldg., UFLA | 83,360 | 61 | 37,962 | 122 | 75,924 | 37,962 |
| Florida Department of Transportation Service Center | 72,425 | 40 | 34,131 | 100 | 85,327 | 51,196 |
| Florida Department of Transportation & Research, UFLA | 20,619 | 46 | 9,928 | 115 | 24,815 | 14,887 |
| Florida Department of Transportation Bldg., U of W.F. | 27,500 | 60 | 13,425 | 150 | 33,562 | 20,137 |
| Florida Department of Transportation Service Center | 71,215 | 50 | 26,729 | 114 | 60,942 | 34,213 |
| Florida Department of Transportation Service Center | 64,330 | 39 | 22,474 | 100 | 57,625 | 35,151 |
| Florida Department of Transportation Bldg., FSU | 86,964 | 50 | 37,220 | 114 | 84,862 | 47,642 |
| Florida Department of Transportation Complex | 16,954 | 78 | 11,576 | 178 | 26,417 | 14,841 |
| Florida Department of Transportation Education/Library | 12,730 | 61 | 6,199 | 195 | 19,816 | 13,617 |
| Florida Department of Transportation Detection Center | 24,253 | 84 | 17,133 | 192 | 39,161 | 22,028 |
| Florida Department of Transportation Bldg., UFLA | 95,200 | 58 | 48,276 | 133 | 110,702 | 62,426 |
| Florida Department of Transportation Bldg., UFLA | 71,196 | 65 | 39,763 | 149 | 91,149 | 51,386 |
| Florida Department of Transportation Center, UFLA | 52,346 | 59 | 26,577 | 135 | 60,812 | 34,235 |


TOTAL SAVINGS 13,779,355

Building, NAME

| BUILDING | BUILDING GROSS INTERIOR SQUARE FOOTAGE (FT ²) | BUILDING DESIGNED USING FLEET PROGRAM | | FLEET PROGRAM | | ANNUAL ENERGY COST SAVING (\$) | 10 YEARS SAVINGS @ 7% ANNUAL ENERGY ESCALATION (\$) |
|---|---|---|-------------------------|---|-------------------------|--------------------------------|---|
| | | ENERGY CONSUMPTION (MBTU/FT ² /YEAR) | ANNUAL ENERGY COST (\$) | ENERGY CONSUMPTION (MBTU/FT ² /YEAR) | ANNUAL ENERGY COST (\$) | | |
| Original Purchase "B", Architectural U of F | 71,215 | 32 | 18,223 | 95 | 54,103 | 35,880 | 495,732 |
| Academic I, FIU North | 101,438 | 50 | 44,476 | 114 | 101,403 | 56,927 | 786,526 |
| Academic Center, Tallahassee | 228,994 | 23 | 56,903 | 71 | 175,690 | 118,787 | 1,641,202 |
| Academic Stadium / Natatorium U of F | 260,965 | 74 | 216,512 | 114 | 333,541 | 117,029 | 1,616,922 |
| Auto Training Center DOIR | 11,083 | 51 | 4,146 | 118 | 9,593 | 5,447 | 75,258 |
| Florida KOSA Guidance Clinic | 34,914 | 187 | 50,871 | 250 | 68,000 | 17,129 | 236,661 |
| Mass Stadium USF | 189,917 | 63 | 70,986 | 133 | 149,864 | 78,878 | 1,089,810 |
| McDowell TV | 38,505 | 218 | 98,292 | 276 | 124,448 | 26,156 | 361,382 |
| Stadium IA USF ST. PETERSBURG | 23,561 | 72 | 16,101 | 135 | 30,186 | 14,085 | 194,604 |
| Student Services Building FIU North | 32,260 | 142 | 52,205 | 195 | 71,682 | 19,477 | 269,102 |
| University UNF | 88,617 | 37 | 36,989 | 145 | 144,957 | 107,968 | 1,491,729 |
| University UNF | 34,312 | 37 | 11,188 | 114 | 34,474 | 23,286 | 321,728 |
| University UNF | 15304/6572 | 316/41 | 41,257 | 335/72 | 45,529 | 4,272 | 59,024 |
| University JC USF ST. PETERSBURG | 20,900 | 57 | 11,290 | 135 | 26,744 | 15,454 | 213,519 |
| University JB USF ST. PETERSBURG | 52,135 | 52 | 25,382 | 135 | 65,894 | 40,510 | 559,702 |
| University Education / Gym FAU | 60,748 | 23 | 23,892 | 69 | 43,380 | 19,488 | 269,258 |
| University Manufacturing Plant, Dade County | 15,720 | 21 | 2,932 | 42 | 5,863 | 2,931 | 36,351 |
| University Coast Building | 97,898 | 42 | 60,203 | 98 | 140,473 | 80,270 | 1,109,042 |
| UNDC UNF | 34,060 | 49 | 12,014 | 114 | 27,953 | 15,939 | 220,229 |
| University Junior College | 229,810 | 97 | 254,128 | 119 | 390,365 | 136,237 | 1,882,305 |
| Natural Guard Armory | 22,376 | 55 | 10,898 | | 21,791 | 10,893 | 150,502 |
| Administrative Complex UNF | 22,673 | 30 | 57,943 | 87 | 168,032 | 110,089 | 1521,031 |
| New Kinkman Expansion, Tallahassee | 150,188 | 34 | 59,660 | 117 | 196,526 | 136,866 | 1,890,945 |
| Total | | | | | | | |

30,272,566

TOTAL THIS PAGE 1 492,666
TOTAL PREVIOUS PAGES 13,779,955



Environmental Information Center Box 1184, Helena, MT 59601 (406) 443-2520

TESTIMONY ON HB 313
Life-Cycle Costing

My name is Sanna Porte. I'm a staff member of the Environmental Information Center, supporting HB 313 on behalf of the organization.

The members of EIC are concerned about conserving energy in Montana. They are also concerned, as is everyone, about conserving their tax dollars. We know that cutting taxes is a major concern of the legislature this session, and it seems to me that HB 313 provides a very sensible way to do that. This bill addresses one of those happy cases where those concerned with cutting energy use in the state and those concerned with cutting taxes can agree completely.

With its many public buildings, State Government is one of the largest users of energy in Montana. Those energy costs account for a lot of tax dollars. It seems fitting, therefore, that the taxpayer get the best buy for his money when State Gov't builds a new public building with taxpayers money.

HB 313 requires the State to do just that--to procure the best deal for its clients--the taxpayers. Life Cycle Costing is actually just an extension of the conventional method of awarding building contracts to the lowest bidder. But instead of focusing just on the initial cost of the building, Life Cycle Costing takes into account additional costs for the operation, maintenance and replacement of energy systems over the life of the building.

Life Cycle cost analysis, such as has been used by the states of Florida and North Carolina, provides an accurate method for comparing different energy system and building design alternatives which may be used in state owned buildings. It provides the architect/engineer with a means of evaluating the efficiency and costs of these different alternatives, so that the architect/engineer can put together the most efficient, low cost package for any specific building.

The Florida Lifecycle Energy Evaluation Technique (FLEET) is a computer system which considers all the variables in initial costs, maintenance costs, discount and interest rates, escalation factors of all alternatives considered; plus such things as weather patterns, cloud cover, wind velocity. Obviously, getting the best buy for the taxpayer's dollar involves the juggling of many different factors: building location, energy systems available in that location, projected price escalations for different systems, etc. Fortunately for Montana, other states have paved the way for us in figuring out how to do that juggling. HB 313 would allow Montana to take advantage of the work done by other states, while at the same time allowing the Dep't of Administration to develop a Life Cycle program which is tailored to Montana's particular needs.

As a taxpayer myself, I am quite impressed when I look at Florida charts which show how much energy will be saved in several buildings which were designed by life cycle analysis. I see savings from \$2,931 to \$136,866 per building in just one year. I'm even more impressed to see how much can be saved over a 10 year period. Florida will save \$30,272, 560 in 10 years just because of its life cycle analysis program!

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David
Allersworth

Be it further resolved, that the Legislature of the State of Montana affirms support for the principle of the preference clause, which gives Montana's rural electric cooperatives priority access to publicly generated electric power.