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94-88 ENERGY CONSERVATION ACT OF 1976

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HEARINGS

BEFORE THE

COMMITTEE ON COMMERCE

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

SECOND SESSION

ON

S. 2932

TO MINIMIZE THE USE OF ENERGY IN RESIDENTIAL HOUS-
ING, COMMERCIAL AND PUBLIC BUILDINGS, AND INDUS-
TRIAL PLANTS THROUGH FEDERALLY SUPPORTED STATE
ENERGY CONSERVATION IMPLEMENTATION PROGRAMS

FEBRUARY 25 AND 26, 1976

Serial No. 94-88

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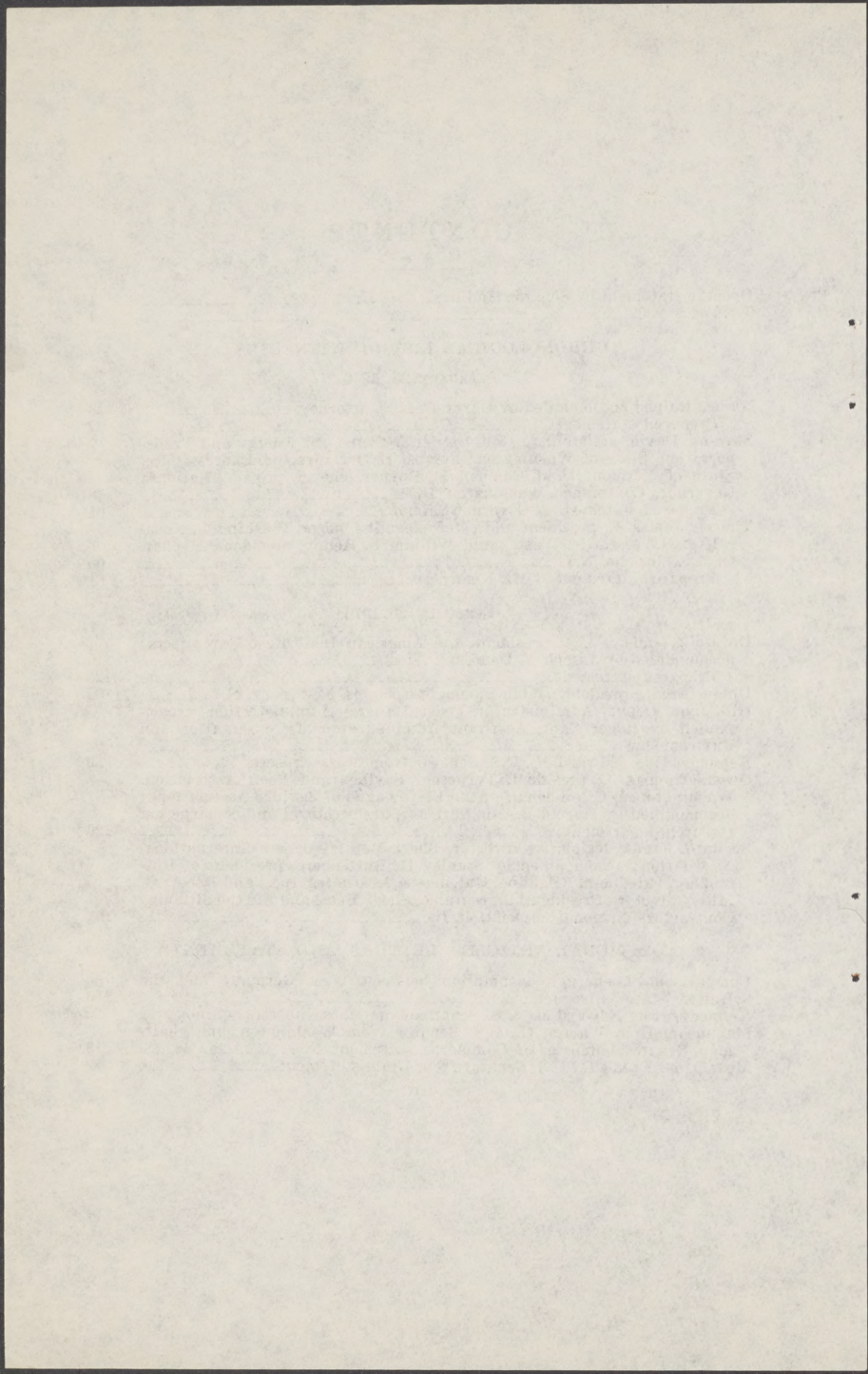
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ENERGY CONSERVATION ACT OF 1976

WEDNESDAY, FEBRUARY 25, 1976

U.S. SENATE,
COMMITTEE ON COMMERCE,
Washington, D.C.

The committee met at 9:50 a.m. in room 5110 of the Dirksen Senate Office Building; Hon. Ernest Hollings presiding.

OPENING STATEMENT BY SENATOR HOLLINGS

Senator HOLLINGS. The committee will please come to order.

For the past 2 years, the United States has been engaged in a long, tedious, and often heated debate on national energy policy. This debate was triggered by the Arab oil embargo of 1973, which exposed the increasing economic and political vulnerability of the United States. More than 24 months later, we are still struggling to adjust American habits and policies to the new realities so dramatically and painfully imposed on the American public.

Some of the pieces in the energy puzzle have finally begun to be put in place. The Energy Policy and Conservation Act, signed into law by President Ford on December 22, 1975, established a national energy policy with respect to oil pricing, and implemented conservation provisions aimed at improving efficiency of energy use in automobiles, domestic appliances, and industrial processes. This same law also provided financial support for State energy conservation programs, which, among other features included provisions promoting the availability and use of car pools, van pools, public transportation, as well as restrictions on the hours and conditions of operation of public buildings.

Other legislation currently active and pending before the Congress includes legislation on national policy with regard to pricing of natural gas, financial assistance for low income families unable to properly weatherize their homes, and standards for new buildings. Considerable attention has also been devoted to developing an appropriate research and development infrastructure within the country designed to produce new and expanded energy supplies, as well as new and improved technology for conservation.

Nevertheless, an important gap still exists in our national energy program. This is our failure to tap in any significant way the tremendous potential for energy conservation using existing technology. This potential has been documented by essentially every study that has taken a broad look at our national energy posture.

Staff members assigned to these hearings: Allan Hoffman and Steve McGregor.

These include studies by the Federal Energy Administration (FEA), by the Energy Research and Development Administration (ERDA), by the Ford Foundation Energy Policy Project, by the American Institute of Architects, by the Sheet Metal Workers International Association, by the Worldwatch Institute, and by numerous other public and private organizations.

The message is clear. For a Nation that underwent its most significant growth during a period of cheap energy, considerable energy has been and continues to be wasted. And for this reason, the potential for energy conservation is tremendous. In his recent testimony before the Joint Economic Committee, Mr. Frank Zarb, Administrator of the FEA, stated that over \$200 billion would be required to take advantage of all the cost-effective energy conservation investments over the next 10 years.

The purpose of S. 2932 is to provide this significant piece in the national energy puzzle. This is not to say that this bill is the final word on conservation, for clearly other energy conservation measures can and should be implemented to take full advantage of the potential that exists in this Nation.

Hopefully, studies currently underway by the Office of Technology Assessment will shed light on other energy conservation strategies that should be employed. Nevertheless, considerable information is already available, indicating that S. 2932 is an important and positive measure to provide conservation assistance to the individual homeowners and small businessmen through the State energy offices. The sponsors of S. 2932, of which I am proud to be one, view conservation as the lowest cost and most environmentally attractive means for avoiding energy shortages and increased dependence on imported fuel.

We further recognize that conservation is entirely consistent with continued economic growth and more jobs. This point has been addressed in many forums, and perhaps most effectively in a speech by Mr. Richard Aspenon of the 3M Corporation to congressional staff on October 20, 1975.

Mr. Aspenon stated that,

Energy conservation does not put people out of work. It does not reduce our GNP. Instead, it keeps our production people working. It also puts more people to work in the engineering, the construction, and the manufacturing sectors. It will also permit more capital formation by business so that new plants are built and more people employed . . . energy conservation, in addition to all its other virtues, makes good business sense.

Energy conservation makes economic sense. Saving energy also saves money, and that reduces the adverse effects of high energy prices on the national economy. As energy prices continue to rise, the savings become even more important. Less money spent for energy means more money that can be spent for other commodities, such as food and services, and that means additional jobs.

The two of the most important reasons for our national failure to tap the potential for energy conservation is the lack of reliable and credible information, and, for many people, lack of ready access to capital at reasonable rates to change this situation.

S. 2932 makes sure that energy consumers, particularly residential and small business consumers, will receive credible information on

potential energy and cost savings. The bill provides the loan guarantees and interest subsidies needed to obtain the up-front money required to make energy conservation investments.

S. 2932, like the Coastal Zone Management Act, recognizes that programs applicable to a variety of States with different geographical and other conditions, should be sufficiently flexible to allow the States to tailor the programs to local needs and opportunities. I consider this an extremely important approach, and S. 2932 provides that the States will be intimately involved in drawing up guidelines for the energy conservation programs mandated by S. 2932, and they will have primary responsibility for implementation of these programs.

It is with these thoughts in mind that I look forward to the testimony to be presented to the Commerce Committee both this morning and tomorrow. The expertise of our witnesses covers the spectrum and we look forward to their comments and constructive criticisms.

Hopefully, with the benefits of these comments, and others to be submitted for the record, an improved energy conservation bill will emerge.

[The bill follows:]

S. 2932

IN THE SENATE OF THE UNITED STATES

FEBRUARY 5, 1976

Mr. KENNEDY (for himself, Mr. HOLLINGS, Mr. JACKSON, Mr. MAGNUSON, and Mr. PEARSON) introduced the following bill; which was read twice and referred to the Committees on Banking, Housing and Urban Affairs, Commerce, Interior and Insular Affairs jointly by unanimous consent

A BILL

To minimize the use of energy in residential housing, commercial and public buildings, and industrial plants through federally supported State energy conservation implementation programs.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That this Act may be cited as the "Energy Conservation
4 Act of 1976".

DECLARATION OF POLICY

6 SEC. 101. (a) The Congress finds and declares that—

(1) A major program to encourage and facilitate energy conservation measures, including a shift from nonrenewable

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1 to renewable sources of energy such as solar energy, in resi-
2 dential housing, commercial and public buildings, and in-
3 dustrial plants is the lowest cost, shortest term, and most
4 environmentally attractive means for avoiding shortages of
5 energy and further dependence on vulnerable foreign sources
6 of energy.

7 (2) Energy conservation efforts are now inadequate
8 because—

9 (A) shortages of capital to finance implementation
10 of energy conservation measures are encountered, partic-
11 ularly by individual consumers and owners of small busi-
12 nesses and manufacturing plants;

13 (B) reliable, impartial information as to the cost
14 savings that would result from such efforts is not readily
15 available; and

16 (C) there is no organized program that enables
17 consumers to undertake such efforts easily and with con-
18 fidence that they are economical.

19 (3) By providing incentives and financial assistance to
20 those sectors of the national economy which do not presently
21 have sufficient access to capital to undertake economical
22 energy conservation efforts, large savings of energy can
23 be realized, and the impact of high energy costs reduced.

24 (4) A major program to implement energy conservation
25 measures in existing residential housing, commercial and

1 public buildings, and industrial plants will increase national
2 economic output and create jobs, particularly in the construc-
3 tion trades which currently suffer from severe unemployment.

4 (5) A major program to implement energy conserva-
5 tion measures will cause less damage to the environment than
6 programs to produce additional energy in an amount equiv-
7 alent to the energy that would be thus saved.

8 (6) A major program to implement energy conserva-
9 tion measures can make a significant contribution to the
10 national security by reducing the volume of petroleum im-
11 ports that would otherwise be required, and thus reducing
12 the political and economic vulnerability of the United States.

13 (7) Primary responsibility for implementing such an
14 energy conservation program should be lodged with the State
15 governments because the great diversity among regions of
16 the Nation requires programs tailored to local conditions. The
17 States should be allowed broad flexibility to fashion their
18 own programs subject to general Federal guidelines designed
19 to insure that the measures undertaken result in significant
20 energy and cost savings, with priority to consumers who are
21 least able to finance such measures on their own.

22 (8) A major program to stimulate energy conservation
23 through loan guarantees and interest subsidies is necessary
24 to supplement and not supplant weatherization assistance
25 programs for low-income consumers, tax credits for conserva-

1 tion investments, or similar financial incentives for con-
2 serving energy.

3 (b) PURPOSE.—It is the purpose of this Act to estab-
4 lish a major program of incentives and financial assistance
5 to encourage widespread implementation of energy con-
6 servation measures.

7 DEFINITIONS

8 SEC. 102. As used in this part:

9 (1) The term “energy conservation measure” means a
10 measure undertaken to permanently modify an existing res-
11 idence, commercial or public building, or industrial plant,
12 and (a) whose primary purpose is to reduce the amount
13 of energy used in such residence, building, or plant, and/or
14 allow a shift from a nonrenewable to a renewable source of
15 energy such as solar energy, and (b) which is likely to
16 result in energy and operating cost savings that will allow
17 recovery of the costs of implementing such a measure within
18 the useful life (not to exceed 15 years) of any permanent
19 facilities installed pursuant to the implementation of such
20 measure.

21 (2) The term “public building” means any building
22 which is open to the public during normal business hours.

23 (3) The term “State energy conservation implementa-
24 tion program” means a State program designed to encourage
25 and facilitate implementation of energy conservation meas-

1 ures by energy consumers in such State, in accordance with
2 this Act.

3 (4) The term "Administrator" means the Adminis-
4 trator of the Federal Energy Administration.

5 STATE ENERGY CONSERVATION IMPLEMENTATION

6 PROGRAM

7 SEC. 103. (a) The Administrator shall, by rule, within
8 90 days after the date of enactment of this Act, prescribe
9 a rule establishing guidelines for the preparation of proposals
10 for the development of State energy conservation im-
11 plementation programs, and shall publish such guidelines in
12 the Federal Register, together with a statement of basis
13 and justification.

14 (b) Such guidelines shall be designed to insure the im-
15 plementation of the Federal criteria enumerated in section
16 108 and the other provisions of this Act, and shall permit
17 the States the maximum flexibility and discretion practi-
18 cable to achieve the purpose of this Act.

19 (c) In developing such guidelines, the Administrator
20 shall invite a representative committee of the Governors of
21 the States (or their designated representatives) to participate
22 with him in preparing such guidelines. The Administrator
23 shall adopt guidelines that are acceptable to the committee
24 of Governors unless he finds, and publishes his reasons there-

1 for in the Federal Register, that guidelines not satisfactory
2 to the committee are necessary to carry out the purposes of
3 this Act, including the mandate to permit the States maxi-
4 mum flexibility to achieve the purpose of this Act.

5 (d) The Administrator shall invite the Governor of each
6 State to develop a proposal for a State energy conservation
7 implementation program and to submit such proposal to the
8 Administrator for review as promptly as possible after the
9 date such guidelines are established.

10 FINANCIAL ASSISTANCE

11 SEC. 104. (a) The Administrator is authorized, in ac-
12 cordance with such rules as he shall prescribe, to provide
13 financial assistance to States whose proposals, submitted
14 pursuant to section 103, satisfy the Federal criteria enumer-
15 ated in section 108. Such financial assistance may be in the
16 form of loan guarantees, interest subsidies, or grants, as
17 provided in this section. All contractual commitments of the
18 Administrator to provide financial assistance shall be general
19 obligations of the United States backed by its full faith and
20 credit.

21 (b) In determining the total amount of Federal assist-
22 ance in the form of loan guarantees, interest subsidies, and
23 grants to be allocated to a State for implementation of a
24 State plan submitted under this Act the Administrator shall
25 take into consideration—

1 (1) the contribution to energy conservation which
2 can reasonably be expected;

3 (2) the rate of recovery of the costs of implement-
4 ing energy conservation measures included in such plan;

5 (3) the number of persons affected by such plan;

6 (4) the consistency of such plan with the purposes
7 of this Act; and

8 (5) such other factors as the Administrator deems
9 appropriate;

10 except that no State shall receive more than 12.5 percent
11 of the total amount available nationally in each category of
12 financial assistance provided by this Act.

13 LOAN GUARANTEES

14 SEC. 105. (a) The Administrator is authorized, in
15 accordance with such rules as he shall prescribe, to guarantee
16 the payment of interest on, and the principal balance of,
17 bonds, debentures, notes, and other obligations issued by
18 or on behalf of any borrower (including obligations issued
19 by States, their instrumentalities, or political subdivisions)
20 for the purpose of financing energy conservation measures
21 undertaken pursuant to a State energy conservation imple-
22 mentation program approved by the Administrator. The ag-
23 gregate amount of guarantees issued by the Administrator
24 under this section shall not, at any time, exceed \$10,000,-
25 000,000.

1 (b) Except in accordance with reasonable terms and
2 conditions contained in the written contract of guarantee,
3 no guarantee issued or commitment to guarantee made under
4 this section shall be terminated, canceled, or otherwise re-
5 voked. Such a guarantee or commitment shall be conclusive
6 evidence that the underlying obligation is in compliance with
7 the provisions of this section and that such obligation has
8 been approved and is legal as to principal, interest, and other
9 terms. Subject to the conditions of the guarantee or commit-
10 ment to guarantee, such guarantee shall be incontestable in
11 the hands of the holder of the guaranteed obligation, except
12 as to fraud or material misrepresentation on the part of the
13 holder.

14 (c) If there is a default by the obligee, as defined in
15 a rule prescribed by the Administrator and in the written
16 contract of guarantee, the holder of the obligation shall have
17 the right to demand payment of the unpaid amount from the
18 agent of the Administrator, if such an agent has been desig-
19 nated pursuant to subsection (e), or from the Administrator
20 if no such agent has been designated for the State in which
21 the obligee resides or has his principal place of business.
22 Within such period as may be specified in the guarantee
23 or related agreements, the Administrator or his agent, as
24 appropriate, shall pay to the holder of the obligation the
25 unpaid interest on and unpaid principal of the guaranteed

1 obligation as to which the borrower has defaulted, unless
2 the Administrator or his agent, as appropriate, finds that
3 there was no default by the borrower in the payment of in-
4 terest of principal or that such default has been remedied.
5 Nothing in this section shall be construed to preclude any
6 forbearance by the holder of the obligation for the benefit of
7 the obligee which may be agreed upon by the parties to the
8 guaranteed obligation and approved by the Administrator.
9 Any sums paid to the holder of an obligation by an agent
10 of the Administrator pursuant to this section shall be reim-
11 bursed to such agent by the United States Treasury on a
12 timely basis.

13 (d) The Administrator may designate the Governor of
14 a State (or a person designated by the Governor) to act
15 as his agent in carrying out the provisions of this section as
16 they relate to that State.

17 INTEREST SUBSIDY FOR RESIDENTIAL AND SMALL
18 BUSINESS CONSUMERS

19 SEC. 106. (a) The Administrator is authorized, in
20 accordance with such rules as he shall prescribe, to grant
21 an interest subsidy for loans guaranteed by the United States
22 pursuant to section 105, except that such subsidies shall be
23 restricted to loan guarantees issued to residential and small
24 business energy consumers. A subsidy shall be provided to a
25 residential consumer, or small businessman (as defined by the

1 Small Business Act Amendments of 1974, Public Law 93-
2 386), when the granting of such subsidy will facilitate the
3 granting of a loan to such residential consumer or small busi-
4 nessman for the purpose of implementing energy conservation
5 measures. The rate of interest on any loan subsidized under
6 this section shall be at a level to encourage implementation
7 of energy conservation measures by a residential consumer
8 or small businessman: *Provided*, That any such rate shall
9 be no lower than 5 percent per year when averaged over
10 the term of the loan except that the rate of interest for 20
11 percent of the total amount of loans guaranteed in any State
12 may not be lower than 2 percent per year when averaged
13 over the term of the loan.

14 (b) The Administrator may designate the Governor of
15 a State (or a person designated by the Governor) to act as
16 his agent in carrying out the provisions of this section as
17 they relate to that State.

18 (c) There are authorized to be appropriated for carry-
19 ing on the provisions of this section, not to exceed \$90,000,-
20 000 for fiscal year 1977, \$180,000,000 for fiscal year 1978,
21 \$360,000,000 for fiscal year 1979, \$360,000,000 for fiscal
22 year 1980, and thereafter such sums as may be required in
23 subsequent fiscal years for subsidies made pursuant to this
24 section and which remain outstanding.

1 (d) As used in this section the term "subsidy" is to
2 mean an interest subsidy as authorized in this section, and
3 may include deferral of the repayment of interest.

4 GRANTS

5 SEC. 107. (a) The Administrator is authorized, in ac-
6 cordance with such rules as he shall prescribe, to make grants
7 to a State for the purpose of assisting the State in developing,
8 administering, and implementing a State energy conserva-
9 tion implementation program for which a proposal has
10 been approved by the Administrator. After one year of
11 the date assistance is first granted to a State pursuant to this
12 section, the sum granted to any State shall not exceed 90
13 percent of the total cost incurred by that State in developing
14 and implementing its energy conservation implementation
15 program.

16 (b) There are authorized to be appropriated for carry-
17 ing out the provisions of this section, not to exceed \$50,-
18 000,000 for fiscal year 1977, \$50,000,000 for fiscal year
19 1978, \$50,000,000 for fiscal year 1979, and \$50,000,000
20 for fiscal year 1980.

21 FEDERAL CRITERIA

22 SEC. 108. The Administrator shall not approve any
23 proposal for a State energy conservation implementation
24 program, and shall not provide any financial assistance pur-

1 suant to sections 105, 106, and 107, unless the proposed
2 State energy conservation implementation program meets
3 the following criteria:

4 (1) Procedures are established to encourage and facil-
5 itate energy audits of existing residences, buildings, and
6 plants so that the energy and operating cost savings likely
7 to be realized as the result of the implementation of an energy
8 conservation measure can be identified and certified to by a
9 person or persons qualified to provide such certification. Such
10 procedures should also provide that information relating to
11 such certification be readily available to energy consumers
12 who would participate in a State energy conservation im-
13 plementation program.

14 (2) The maximum term of any loan guaranteed or sub-
15 sidized pursuant to this Act shall be the anticipated useful life
16 of any permanent facilities installed pursuant to the imple-
17 mentation of an energy conservation measure, or 15 years,
18 whichever is shorter.

19 (3) Procedures for obtaining energy audits, guar-
20 anteeing and subsidizing loans, publicizing the availability
21 of financial assistance under this Act, and other administra-
22 tive procedures associated with a State energy conservation
23 implementation program are established that will encourage
24 and persuade energy consumers to participate in such a

1 program. A State is authorized to advertise its program as
2 necessary to facilitate such participation.

3 (4) Specific incentives are provided to encourage im-
4 plementation of energy conservation measures by owners
5 and tenants of rented homes, apartments, and buildings under
6 conditions that will assure that tenants share in the resultant
7 cost savings.

8 (5) A State energy conservation implementation pro-
9 gram is designed to achieve the maximum energy savings
10 in the shortest possible time.

11 (6) Preferences for loan guarantees and subsidies are
12 afforded to energy consumers who demonstrate the greatest
13 energy saving potential per dollar of investment and who do
14 not otherwise have ready access to necessary capital or finan-
15 cial assistance.

16 (7) Before any financial assistance is provided to a State
17 the Administrator obtains information necessary to provide
18 reasonable assurance that the purposes of this Act will
19 be achieved and that the financial interest of the United
20 States will be protected. Any State energy conservation
21 implementation program approved for funding by the Ad-
22 ministrator shall provide that records be kept and made
23 available to the Administrator in such detail and form
24 as he shall determine necessary to facilitate effective audits

1 and performance evaluations of the program. The Admin-
2 istrator and Comptroller General of the United States,
3 or any of their duly authorized representatives, shall, for
4 the purpose of audit and examination, have access to any
5 pertinent books, documents, papers, and records of any re-
6 cipient of Federal assistance under this part.

7 ENERGY CONSERVATION COOPERATIVES

8 SEC. 109. In order to facilitate the participation of resi-
9 dential consumers in State energy conservation implementa-
10 tion programs, each State may, as a part of such program,
11 encourage the establishment and assist in the development
12 of energy conservation cooperatives, whose primary mem-
13 bership shall consist of residential energy consumers. Such
14 cooperatives shall provide expertise with respect to energy
15 conservation measures, and mass purchasing power to fa-
16 cilitate and reduce the cost of energy audits, purchase of ma-
17 terials, and installation of energy conservation equipment.
18 States may assist in the organization of such cooperatives
19 and provide them with financial and technical assistance as
20 part of a State energy conservation implementation program.

21 COOPERATION OF FEDERAL AGENCIES

22 SEC. 110. All Federal agencies and all federally funded
23 entities are authorized and directed to cooperate with and
24 participate in State energy conservation implementation pro-
25 grams to the maximum extent feasible.

1 TERM

2 SEC. 111. The authority to issue loan guarantees, pro-
3 vide interest subsidies, and make grants under this Act
4 shall expire 4 years after the date of enactment: *Provided*,
5 That any loan guarantee issued, subsidy provided, or grant
6 made pursuant to this Act shall remain valid and effective
7 for the term specified in the agreement to provide such
8 financial assistance.

9 ANNUAL REPORT AND EXCHANGE OF INFORMATION

10 SEC. 112. The Administrator shall prepare and
11 submit to the Congress and the President, and shall cause
12 to be published, an annual report on the State energy con-
13 servation implementation programs established under this
14 Act. The Administrator shall encourage and facilitate the
15 exchange of information and ideas for energy conservation
16 among the States through conferences and publications de-
17 signed for that purpose.

Senator HOLLINGS. We were to start this morning, Senator Pearson, with our distinguished colleague, Senator Kennedy, who unfortunately had to attend a funeral. We will enter his statement in the record at this point, along with statements by Senator Magnuson and Senator Moss.

[The statements follow:]

STATEMENT OF HON. WARREN G. MAGNUSON, U.S. SENATOR FROM WASHINGTON AND CHAIRMAN, SENATE COMMERCE COMMITTEE

During the first session of the 94th Congress, the Senate Commerce Committee took the lead in promoting energy conservation legislation. Some of these efforts, directed at improving efficiency of energy use in automobiles, domestic appliances and industrial processes, came to fruition when the President signed the Energy Policy and Conservation Act on December 22, 1975.

I am also very pleased that in the second session of the 94th Congress, the Commerce Committee is once again deeply involved in energy conservation legislation. Enactment of S. 2932, the Energy Conservation Act of 1976, as it will be refined in this committee and on the Senate floor, would be an essential step in fashioning a workable and effective national energy policy for the United States. It is only by achieving a balance between greater conservation and expanded production from domestic energy sources that our citizens can be assured of adequate energy supplies in the future at reasonable costs.

S. 2932 recognizes certain basic facts:

(1) That there is a tremendous potential for energy conservation in this Nation which is still largely untapped;

(2) That two important reasons that this potential is not being tapped are a lack of reliable information on the energy and cost savings that could be achieved and the lack of ready access to capital at reasonable rates;

(3) That investment in cost-effective energy conservation measures is the lowest cost and most environmentally attractive means for avoiding energy shortages and dependence on imported fuel, and perhaps the only option which can achieve substantial results in the next few years;

(4) That conservation is consistent with an improving economy and increasing employment; and

(5) That primary responsibility for implementing a major energy conservation program should be lodged with the States, which could tailor such a program to local needs and opportunities.

S. 2932 responds to these facts by assigning to the States a major role in shaping and implementing a program to provide reliable information to energy consumers on the measures they can take to reduce energy use and save money, by providing for certification of anticipated energy and cost savings, by providing loan guarantees for energy conservation investments and by providing interest subsidies for residential and small business energy consumers who would have the greatest difficulty in gaining access to capital at reasonable rates. S. 2932 would also provide financial assistance to States to assist in developing and carrying out such programs.

Throughout the long national debate on national energy policy, there has been agreement that energy conservation must be a key element of that policy. The issue has never been whether or not to save money, but how to do it most effectively. In the Energy Policy and Conservation Act last year, we took the first steps toward implementing such a policy. S. 2932 represents an essential next step to implement further the intent of Congress.

By providing Federal support for energy conservation measures which make economic sense, we can save our country from many of the most basic and troublesome problems afflicting us at home and abroad. The time for action is now, and I strongly encourage my Congressional colleagues to give this legislation their most careful attention.

STATEMENT OF HON. FRANK E. MOSS, U.S. SENATOR FROM UTAH

The history of conservation efforts in this country is not exactly replete with the kind of success stories that we all like to read. Following the Arab oil embargo of 1973, energy conservation efforts received a great deal of verbal support. Way back then, all of us were ready to do whatever was necessary to avoid serious economic disruption and potential political blackmail should the producing countries ever again decide to turn off the faucet. With the disappearance of long lines at the gas pumps

and an assurance of adequate supplies of heating oil, however, most of this impetus for conservation seriously lapsed. The conservation ethic almost totally disappeared and only the rising price of utility bills stood in the way of a return to the good old days of energy foolishness. During 1974 and 1975, the average consumer showed a much greater willingness to pay the immediate price of increasingly more expensive oil and gas, than to make the costly and more difficult, forward-looking, commitment to long range development of alternate energy sources. With the will taken out of the conservation effort, and the public's unwillingness and perhaps inability to make the massive commitment to new energy research, the inevitable law of supply and demand generated another level of price escalation and an even greater dependence on foreign oil. And so conservation efforts have contributed little to a solution of our present problem. In fact, the energy conservation ratings among the 18 members of the International Energy Agency give the United States the poorest rating. We're becoming worse, not better. The situation in Utah provides a case study of the larger national picture. Now certainly the people of Utah are no less patriotic or willing to sacrifice than other Americans, or people of other countries, and yet the usage of most fuels increased in Utah during 1975. Motor fuel consumption increased by 7.8 percent per customer. Highway speeds rose to a 63 mph average in spite of the proven fuel conservation achieved by the mandated 55 mph limit, the lights of the State Capitol, important symbolically, were turned back on, and as much as I enjoy a warm reception, I haven't seen too many thermostats turned to 68 degrees.

The United States is faced with great uncertainty about its capacity to meet future demands for energy at acceptable social costs. Project Independence, much-heralded of late, shows little hope for early success. With the current social and political impediments to energy resource development, to say nothing of the immense economic constraints imposed by long lead times and shrinking capital reserves, the chance is very slim that the nation will commit the resources and the will necessary for a successful reevaluation of our energy producing mechanisms. The conservation effort must pick up the slack. Many studies have indicated that over one-half of current U.S. energy costs are unnecessary. For the next 25 years, this country could maintain its present standard of living and still meet all new demands, simply by increasing the efficiency of our energy use. Though we must increase our ability to use alternative fuel sources, we would be seriously lacking in judgment not to take advantage of this cheapest of all fuels—conservation.

STATEMENT OF HON. EDWARD M. KENNEDY, U.S. SENATOR FROM MASSACHUSETTS

Mr. Chairman, it is a privilege for me to appear before the Senate Committee on Commerce to urge your favorable consideration of S. 2932, the Energy Conservation Act of 1976.

There are three principal reasons why this legislation should be approved in this session of Congress:

First, passage of this bill will be an explicit recognition by Congress that energy conservation is to be a major component of a balanced and comprehensive national energy policy;

Second, this legislation is the vital next step in the energy conservation legislation that has been approved during the past two years, principally the conservation provisions found in the Energy Policy and Conservation Act of 1975; and

Third, this bill will make possible badly-needed financial relief from high energy costs for millions of American consumers and businesses while simultaneously reducing this country's demand for petroleum, natural gas, and other energy sources.

Stated most simply, S. 2932 is designed to launch this country on a serious effort to change the way we use energy in residential and commercial buildings and in manufacturing and industrial processes. Implementation of its provisions will bring about far greater efficiency in the use of energy in our homes, commercial buildings, and industrial plants. This, in turn, will mean considerable savings in the amount of energy we use and in the money we spend for this energy.

Many Senators and House Members have been working diligently on many fronts to advance the goal of energy conservation. But it is also accurate to suggest that our principal efforts in Congress for the past several years have focused on the price of domestic oil and natural gas and on a variety of proposals to increase domestic energy production. This emphasis can be traced to the Administration's initial energy strategy as presented in the Project Independence Report.

In these circumstances it has been difficult to give proper recognition of the role that energy conservation can play in securing adequate supplies of energy for the

United States at reasonable prices. However, many of the issues that have dominated the energy debates in Congress since the oil embargo are resolved. We now have the opportunity to draw up a new energy agency. It only makes sense to give energy conservation—our most unexploited energy resource—a prominent place on this new agenda.

The Subcommittee on Energy, which I chair, of the Joint Economic Committee has completed four days of hearings on energy conservation. We have heard testimony from public officials and citizens, from economists and engineers, and from corporate officials and scientists. This testimony, which I commend to the members of the Committee on Commerce, stresses the importance of distinguishing between the process of increasing energy efficiency—obtaining greater work from a unit of energy—and that of cutting back on the amount of energy available to accomplish a given job—energy curtailment. It is a regrettable fact that many persons mistakenly equate energy conservation with curtailment and ignore the far more significant dimension of energy efficiency.

Estimates of the energy that is needlessly wasted in the United States are mind-boggling. The most recent forecasts from the Energy Research and Development Administration indicate that energy demand in the United States by 1990 can be reduced 20 percent to 40 percent over what was estimated before the embargo, simply through greater energy efficiency. A recent analysis by the Worldwatch Institute argues that fully one-half of present energy demand in the United States results from gross inefficiencies in energy use.

Witnesses before the Energy Subcommittee have testified to a number of important propositions. For example, the more efficient use of energy is the least expensive, most environmentally safe, and quickest way to increase energy supplies. It is also the only way, in the foreseeable future, to reduce the adverse effects that high energy prices have on our national economy.

Equally significant is the proposition that these energy savings can be achieved in a manner that neither diminishes our economic growth rate nor alters our traditional life styles. To the contrary, greater energy efficiency will play a major role in maintaining high levels of production and prosperity in the face of energy scarcity and rising energy costs. Moreover, the process of transforming inefficient energy systems—in homes, buildings, and factories—is a source of jobs for many years to come. The President of the American Institute of Architects, Louis de Moll, recently estimated that a nationwide energy conservation effort would provide an estimated two-to-three million job opportunities annually in construction and related industries.

Most of our existing homes, commercial buildings, and manufacturing plants were built when energy was relatively cheap. In these circumstances, high levels of energy waste did not involve any significant economic penalties. But today's high energy prices have totally changed this situation. We can no longer afford *not* to take advantage of every cost-effective opportunity to expand energy efficiency.

From an economic perspective, greater energy conservation requires substantial capital investments. Capital must be available to provide the insulation, storm windows, steam boilers, or industrial machinery that operate in an energy-efficient manner. In recent testimony before the Subcommittee on Energy, FEA Administrator Frank Zarb estimated that over \$2 billion will be required for energy conserving investments over the next ten years. Mr. Zarb emphasized that these would be cost-effective investments; that is, investments that save more money than they cost.

The Energy Conservation Act of 1976 is designed to accelerate present levels of capital investment in energy conservation, even though it will provide, by itself, only about 5 percent of the total amount of capital that Mr. Zarb estimated would be needed. In this sense, S. 2932 is a very modest proposal.

On the basis of the best evidence to date, energy conservation in the United States has lagged for three major reasons:

- (1) Individuals and businesses have often found it difficult, or impossible, to borrow the necessary front-end capital at economically attractive terms;
- (2) Reliable information has been lacking about the potential energy and dollar savings associated with greater energy conservation; and
- (3) Easily activated delivery mechanisms for installing energy conserving materials in homes and buildings have existed only on a pilot basis in a limited number of geographical areas.

Since a failure to remove any one of these barriers would limit the prospect of accelerating the rate of energy conservation activity, S. 2932 strives to deal simultaneously with these three interrelated problems:

First, the bill authorizes Federal loan guarantees not to exceed \$10 billion for financing energy conservation improvements, with priority given to homes and

small businesses. Industrial energy users not able to obtain financing from commercial sources could also qualify for Federally guaranteed loans. Interest rate subsidies for residential consumers and small businesses are authorized to reduce the lending rate to 5 percent, with not more than 20 percent of the loans to be subsidized at a 2 percent rate.

Second, the bill designates State governments as agents of the Federal government in preparing and carrying out State energy conservation implementation programs to provide consumer information, energy audits, borrowing procedures, installation of energy conserving materials, and other activities to achieve the bill's purpose.

Third, the bill authorizes Federal grants-in-aid of \$50 million annually for four years to assist States in designing and carrying out their State energy conservation implementation programs.

The legislation specifies that loans must be made solely for the purpose of reducing the amount of energy used in residential, commercial, and public buildings and in manufacturing plants and small businesses. Only permanent improvements, such as insulation, storm windows, solar energy equipment, revamping of ventilation systems, heat pumps, and heat exchangers, can qualify for Federally guaranteed loans. Also, loans must be repayable with the projected savings that are realized over the life-cycle of the energy conserving materials.

States will submit to the Administrator of the Federal Energy Administration an energy conservation implementation program designed to achieve the act's objectives in the most cost-effective manner. Once a State program is approved, the Administrator will allocate among the States the Federal loan guarantees and interest rate subsidies, with no State permitted to receive more than 12.5 percent of the total authorized amounts. States with approved programs will also receive Federal grants-in-aid—with a 10 percent matching requirement after the first year—to assist them in designing and carrying out the program.

This reliance on State governments is necessary for several reasons. Of most importance, the Federal government is ill-suited to carry out a nationwide energy conservation effort where savings must be realized in millions of end-use situations. Differing climatic conditions and patterns of energy use among States and regions also require the development of differing conservation strategies to achieve maximum energy savings. Although S. 2932 contains broad criteria that must be met by all State programs, there is considerable latitude for developing energy conservation programs that are suited to local conditions and that can take advantage of local institutions, such as utility companies and fuel oil distributors, in designing implementing mechanisms. I should also note that S. 2932 was drafted to take advantage of the State energy conservation programs authorized by the Energy Policy and Conservation Act of 1975.

I should add, Mr. Chairman, that it may well be possible for the Committee to improve the financing and administrative provisions of S. 2932.

We have learned, I believe, that achieving the potential of energy conservation requires both flexibility and imagination in dealing with millions of energy end-users. The Energy Conservation Act was written from this perspective and it is, therefore, most appropriate to consider alternatives to the detailed provisions of the legislation to advance the basic goal of encouraging the widespread implementation of energy conservation actions.

What are the results that can be anticipated by passage of S. 2932? The FEA has estimated that the equivalent of about 3 million barrels of oil per day can be saved by 1980 through a national program of energy conservation in existing residential and commercial buildings and in industrial plants. Energy reductions of this magnitude translate into annual savings of about \$16 billion in 1975 prices. The Energy Conservation Act will achieve about 2 million barrels per day of this potential or annual savings of \$10.5 billion. In supply terms this is more than the projected capacity of the Alaskan pipeline.

Maximum direct federal expenditures would total \$140 million in fiscal year 1977, \$230 million in fiscal year 1978, and \$410 million in fiscal years 1979 and 1980.

As I noted in my statement accompanying the introduction of S. 2932, these energy conservation investments will pay for themselves many times over. Individuals and businesses will realize immediate financial benefits from the money they borrow to make energy conservation improvements. And the Nation will benefit from significant net reductions in our total energy demand. In so doing, the United States will serve notice on OPEC that we intend to stop our nearly open-ended reliance on imported oil.

It comes to this: the longer we postpone achieving the reality of greater energy efficiency in the United States, the longer we will suffer the consequences of needless energy waste. For this reason I urge prompt and favorable consideration of S. 2932.

I welcome any questions you might have.

Senator HOLLINGS. We then are glad to welcome our distinguished friend, Ralph Nader. I am glad to find you in town. You are a moving speaker. We also are glad to hear from you, particularly if you have any misgivings or criticisms about this bill, because we are still working it over.

Somebody at the conference yesterday asked who opposed it. I really don't know; I just can't see where there is anything wrong. It saves jobs, it saves money, it saves energy, it helps us with our balance of payments. It is a natural and should receive support from all ends of the spectrum.

In capsule I think the only 25 cent-a-gallon heating oil being manufactured today in this country is Johns-Manville's.

With that we will be glad to hear from Mr. Nader.

**STATEMENT OF RALPH NADER; ACCOMPANIED BY GARRY
DeLOSS, ATTORNEY**

Mr. NADER. Thank you, Mr. Chairman, members of the Senate Conference Committee.

With me today is attorney Garry DeLoss. He has been working on energy matters. I suppose the best way to begin the testimony is to reflect on a rather unique historical phenomena.

In what country in the world would thrift be a controversial issue? That is the situation that the energy and electricity production industries have brought us to in this country, where thrift in the use of energy is a controversial issue.

Although many in industry give lip service to it, in point of fact the extension of energy conservation is another way of saying the sales reduction of electricity and fuel.

Sales reduction of fuel or electricity is something which is not particularly to the liking of the electric utilities or the oil companies. That, in a nutshell, is why there are a whole host of nontechnical obstacles, institutional obstacles to energy conservation and why there has been so little advance in energy conservation both before October, 1973, and in the light of that situation of that fall, not very much conservation since.

This legislation, S. 2932, which is the Energy Conservation Act of 1976, is an attempt to address this problem. I think before we go into the provisions of the legislation, it is worthwhile giving some idea of just how much energy can be saved in our country.

Using traditional methods that have their parallels in other industrialized countries, like Sweden and West Germany, this country could cut its energy consumption in half without affecting the standard of living in any way other than to reduce inflation, increase the value of the consumer dollar, reduce pollution and reduce the need for capital investment in energy producing facilities.

Those are the only changes. Any rational society I would think would welcome those changes. We are not dealing with a rational course of action when Exxon and Consolidated Edison and others of their industry are dominating so much of both the communications flow to the public about energy problems as well as the public policy decisionmaking.

Unfortunately, for the Nation's energy situation and economic well-being, the energy industry and its indentured servants in the Nixon and Ford administrations have used the past 2 post-embargo years to simply reiterate their view that increased production of nonrenewable fossil fuel energy and atomic energy at whatever cost is the only way to keep the economy safe from another oil embargo and OPEC price increase.

This view is sometimes dressed up with rhetoric about the need for energy conservation, but basically the energy in the U.S. Government is going toward subsidies and other policies to increase supply rather than to reduce consumption.

Somehow it is considered a step backward to reduce consumption in anything. I think that has to be noted with great emphasis, that we are dealing here with clear opportunities to save energy, and it is not happening at a rapid enough pace.

I would like to give some illustrations of how the opportunity to save energy is so spectacular that it even surpasses the expectation of those who are engaged in the programs outright.

For example, the Federal Government decided to save energy a couple of years ago. The result was a roughly 28 percent reduction in energy consumption by the Federal Government over projected levels. That has held true right down to the present date.

Yet, I just got a letter the other day from a Government employee in a leased building in Virginia complaining that the heat was up to 78 degrees routinely in the winter even on days when it is really quite warm.

So, although the lights are still on in great abundance and the heat is up and the air-conditioning comes on automatically regardless of the outside temperature at various seasons, there is still a reduction of 28 percent with a savings of over \$1 billion of the taxpayer's money every year.

It is really remarkable to note that here there is a success achievement and you really have to probe the bureaucracy to get the details about it apart from one or two subdued press releases that have been issued.

I don't know what is wrong with a government that refuses to recognize when it has done some very good things the need to toot its own horn so that it can show industry, both commerce and factory industry, what can be done, because much of the Federal Government savings are able to be reproduced by industries like the insurance industry, banking industry and other office buildings where the range of waste borders on the outrageous.

I have in my testimony a considerable amount of detail, Mr. Chairman, about the kinds of savings that could occur, particularly in the building area of the economy. I hope that my entire statement will be read into the record and I will summarize it in that interest of time.

Senator HOLLINGS. It will be so included in its entirety.

Mr. NADER. In my statement there is the example of what the Federal Government has been able to achieve.

There is also an example of what Los Angeles was able to achieve with an ordinance requiring cuts in electricity use during the oil embargo and that comes from a city that has probably set new records

for wasting energy. There is still a great opportunity to reduce energy consumption, even though they have made a probably stronger effort than most places around the country, due to their fear that the low sulphur oil which they were importing from abroad would be cut off after the embargo.

One office building in Los Angeles achieved a 45-percent reduction in electricity use by reducing lighting levels through removal of half of its fluorescent light tubes, cutting indoor parking lot lighting, eliminating exterior sign lighting, operating air-conditioning equipment 5 hours less per day, lowering heating thermostats by 5 degrees Fahrenheit and removing one of the three elevators from service except during rush hours.

A department store in Los Angeles spent \$7,000 to \$9,000 to convert from incandescent to fluorescent lighting and expected to recoup its investment within a few months as its electricity bill fell by 16 percent or \$800 per month in spite of a 25 percent increase in electric rates.

A bank reported that electricity use for air-conditioning was cut by 64 percent through equipment modifications which paid for itself through electricity savings in less than 3 months.

By the way, this country uses more energy to power its air-conditioning systems than all the energy used by Mainland China for its 800 million people.

Although the operation of the ordinance and its threatened but never exercised penalties was suspended May 22, 1974, averaging electricity use in Los Angeles in the summer of 1974 was 14 percent below the prior summer.

Let's take another area of wasteful energy, our universities and colleges, all of whom are complaining about budget deficits, curtailing curriculum, laying off teachers as they permit incredible waste in the expenditure of energy on campus. One university decided to do something about it. It was Ohio State. Here is what they have accomplished.

Their plan demonstrated the carefully calculated investments in energy saving modifications that tailor a building's energy use to the needs of its users can reduce electricity's use by over 50 percent and heating needs by up to 75 percent.

You see, these are the kinds of figures which make the discussion of nuclear power with all its catastrophic risks truly something that should be rendered moot.

We don't need nuclear power. We can save much more electricity than nuclear power in its most optimistic dimension, without any problems, shutdowns or accidents, could give us in the next 25 years.

The American Institute of Architects has produced a very careful, conservative study showing that energy efficient standards for new buildings and retrofitting old buildings will save us more electricity at less capital cost than what nuclear power will give us through 1995.

Of course, it does so in a marvelously more equitable manner, that is, the employment consequences of conservation are spread out throughout the economy from a geographical standpoint. Jobs are available at every town, village, city, level in the country.

The AIA is continuing its inquiry here and I would urge the committee to probe the depths of their data collection and their model examples in order to further benefit from that source behind the energy conservation effort.

Returning to Ohio State, I would like to just describe briefly what this university accomplished because we have some very hard data. This is not a speculation, it is not a hypothesis, it is actually happening.

Ohio State spends about \$5 million per year for energy utility services. By 1973, a survey revealed that the university's utility bills had been rising at a rate of 15 percent per year for 5 years during a period of stable utility rates due to addition of new high energy buildings and addition of air-conditioning, brighter lighting and educational equipment to older buildings.

Faced with the projected doubling of utility costs by 1980 at pre-embargo prices the university began to study how it was using energy and what it would cost to reduce energy use.

The study projected the results of a 5-year program of surveying and retrofitting 50 major energy-using buildings to save energy. At pre-embargo energy prices the study predicted \$2 million in cumulative energy savings over the 5-year period at a cumulative cost of \$950,000.

By the end of the 5-year period, utility costs were projected to fall by \$800,000 per year. Given the energy price increases since 1973, the potential dollar savings have risen greatly and the payback period for the retrofitting expenses has shortened considerably.

One of the buildings studied was the Allied Medical Services Building, a five-story building with offices, laboratories, classrooms and a two-story wing used for audio and television studios. A study of the building estimated that total energy use could be cut by 39.9 percent, gas by 52.5 percent and electricity by 25.25 percent, through reduced lighting, reduced ventilation rates during occupancy, shut-down of main air-handling systems when the building was unoccupied, and variable ventilation in the studio wing.

The study's projected energy savings would also save \$29,050 per year at a projected cost of \$30,000 in building and equipment modifications, for a payback period of 1 year, just about 1 year to pay themselves back in this kind of effort.

Based on the above analysis, the university approved an investment in retrofitting the medical building to save energy. The results have exceeded expectations. A full year of monitoring energy use by the retrofitted medical building showed a 78-percent reduction in gas consumption and a 43-percent reduction in electricity consumption for a cost savings of about \$40,000 per year.

Hence, the retrofitting cost of about \$30,000 was paid back in about 6 months and the university is now netting \$60,000 annually from its investment. To date, equipment modifications have been performed on five more buildings after careful analysis of energy consumption patterns and estimation of modification costs, energy savings and dollar savings.

Several months of monitoring energy use in the total of six modified buildings has verified energy savings displayed in table 6 in my testimony which range from 19 percent to 63 percent for reductions in electricity use and 31 to 78 percent for reductions in natural gas use for average savings of 36 and 61 percent, respectively.

There are some energy conservation efforts that can be taken in certain periods of the year without any capital investment whatsoever.

For example, the lights in this room could be shut down right now and we could use the solar energy for adequate lighting. As a matter of fact, Mr. Chairman, just to throw down a challenge to your colleagues, if you will let us have full access to the Capitol data base, we will show you how the Capitol of the United States can reduce energy conservation over 25 percent with the only result being reducing the high temperature setting in the winter.

[Lights turned off.]

There you are, as an example of the kind of sensitivity which we all have to redevelop because our fathers and forefathers used to talk about thrift, Benjamin Franklin used to talk about thrift. We can say that a barrel of oil saved is a barrel of oil earned in the best sense of the term.

I do have some data on the various buildings at Ohio State campus, and there is an example for you. It is really quite remarkable, Mr. Chairman, how when you monitor, say, the news programs on the energy situation, they are almost entirely on the crisis of supply. Here is a great story in Ohio State. I may be mistaken but as far as I know it hasn't been given the national coverage that it deserves. So, a little more effort on the triumph of conservation instead of just focusing on the crisis of supply might be contagious, causing other institutions following suit.

At a recent elementary and high school administration gathering they had a panel on energy conservation, but they weren't really aware of the Ohio State situation. High schools and grammar schools and colleges all over the country which waste energy in a legendary sense could learn from the Ohio State example and really display a model performance in the community which might spread to other buildings.

Senator HOLLINGS. In that Ohio State example, was there any special incentive or did it result from just leadership on the campus?

Mr. NADER. The only incentive was that they knew that they would pay back in a year or so their capital investments or their modification of equipment investments, and from then on it was profit.

Senator HOLLINGS. I wonder whether we have a problem with the average college president thinking "Look, if I start saving they will take it out of my budget and then if I get in trouble you know I won't get the money back."

Maybe if the booster club said all the money saved would go to get football scholarships you would really have some energy saved.

Mr. NADER. Anyway, it is an internal cost benefit calculation that came out strongly on the side of the benefit from an economic point of view.

Incidentally, there is another group that hasn't been heard from that you might want to tap. That is the ophthalmologists. They have some good information on how the Illuminating Engineering Society, which is the fixed lighting fixtures industry, has jacked up from year to year the illuminating standards so that what was 20-foot candles 20 years ago is now 60-foot candles and in some buildings it has gone to 120-foot candles.

The ophthalmologists will show you that 50-foot candles are perfectly adequate for visual acuity and comfort. And that anything above that is not only a waste; but if you get over a 100-foot candles, there is some thought that it actually may damage your visual acuity.

Senator HOLLINGS. As I interrupted on Ohio State, Mr. Nader, what about the technical expertise readily available? They had it there on campus, I take it, and that is probably one of the great reasons it's not accomplished elsewhere. Until you came around we didn't think about turning out the lights. Maybe we need the technical expertise or at least the planning at all the State levels that this bill would provide so that the average homeowner and small industry would then know how to really save.

Mr. NADER. There are a number of commercial firms that specialize in advising companies and office buildings on exactly how to save energy. The information provided is very detailed and in manual form with technical assistance.

DuPont has one of the largest ones. They have a subsidiary that in effect advises industry how to save fuel and electricity, so there are these firms around.

Furthermore, there are materials around. The National Bureau of Standards, for example, has put out materials that could be used. There are really three kinds of stages of energy conservation for any building.

One is just thrift, shutting off the lights when you don't need them, which is just commonsense.

The second is minor capital modifications of equipment, shifting things around in a different way. For example, when you have a loading dock you can shift the hours perhaps so that trucks don't have to idle for 30 minutes or an hour.

Then the third is, of course, capital modification of a substantial nature, architectural standards for new buildings as well as retrofitting old buildings.

The Ohio State University program in dollar savings can be replicated for commercial buildings in general. Energy savings achieved in the university's buildings do not depend on modifications that alter the building's functions. Under the program,

The environmental needs of the operations performed in the building are evaluated and systems modifications are proposed within the limits set by those requirements.

Moreover, the calculations required to evaluate the energy and dollar savings potential of building modifications are performed manually using information available from ASHRAE and the National Oceanic and Atmospheric Administration rather than with sophisticated computer analysis.

Engineers are now specializing in energy conservation who say we haven't even begun to tap the frontiers of energy conservation, that all we are really talking about is a combination of thrift, minor modification of equipment and some structural changes.

But what they are claiming is that in the generation of the electricity itself, right back to the source, tremendous modifications can be made, dealing with waste heat recovery, for example, as well as many other intersections along the flow of energy where there is substantial waste.

The same is true in designing a house. A house can be designed in this country to consume 20 percent of the energy it now consumes if we are really serious about energy conservation.

A recent Oak Ridge laboratory study showed that with relatively modest modifications a home could cut its natural gas consumption by 35 percent or more. So on and on.

I mean—the real issue is not can we make a case for energy conservation. The real issue is the psychological one and the non-technical opposition by the suppliers of electricity and fuel, who don't want to see their sales go down.

The success of the Ohio State University energy conservation program indicates that we can correct our past errors by following the example set by Ohio State. Energy use in existing commercial buildings can be reduced by at least the 41 percent suggested by Ross and Williams, which is a study referred to in my testimony, prepared for the Institute for Public Policy Alternatives, and probably by more, since more investments in energy savings modifications will be justified for buildings which use heating fuels other than the natural gas used by Ohio State.

In other words, other fuels are more expensive on a Btu comparison basis so that it pays even more to save and invest in equipment modification.

Mr. Chairman, here is another sector of energy conservation which is just an illustration of how everywhere you look in this area you stumble upon new futures for energy conservation. The single greatest opportunity for improving the energy efficiency of industrial processes is available from cogeneration of industrial steam and electricity. In one form of cogeneration, the temperature and pressure of usual industrial process steam is raised enough to first power a steam turbine which generates electricity and then the turbine exhaust steam is used for the lower temperature process steam needs.

Since the energy costs of generating electric power is only the additional fuel required to increase the quality of the process steam far enough to power the turbine, industrial generation of electricity is twice as efficient as central powerplant generation.

Thus industry generation of electricity requires only half the fuel and half the capital required by central powerplants. It is always this threat, Mr. Chairman, which has gotten the electric utilities to give these promotional discounts to big industry, where the more they consume the lower the rates are because they don't want the industry to say, well, let's generate our own with this process.

A study prepared for the NSF by Dow Chemical Company suggests it would be profitable for industry to construct 71,000 megawatts, that is equivalent to 71 nuclear powerplants, 71,000 megawatts of electric generating capacity by 1985, enough to supply all industrial electricity needs and sell some to the electric utilities.

The industrial generating capacity would permit utilities to forgo \$38 billion of new investment but would require only \$19 billion investment by industry due to the greater efficiency of industrial generation of electricity. Of course, there is another opportunity for profitably improving efficiency. It involves direct heat processes which account for 11 percent of national energy consumption.

Prof. John Holdren of the University of California, Berkeley, has been compiling information as to why Sweden, for example, only uses half the per capita consumption of energy that we use, even though they are industrialized and live in a north temperate zone and have a higher per capita gross national product, and if the committee is interested in obtaining that information I am sure Professor Holdren would be very happy to supply the materials as well as to answer any detailed questions.

The same is true for West Germany which consumes a little less or about half the per capita energy that we consume in this country.

Now, the barriers to economically feasible energy conservation. One, of course, is the anticonservation interest of producers of energy and electricity. While the oil companies will try to cut down their own oil consumption in their own operations, they clearly are not going to be happy with the prospect, if it should ever occur, of having cars that go 38 miles on a gallon. With cars that go 38 miles on a gallon, Exxon is going to sell less gasoline. That has to be always in the forefront of any policymaking effort because that is one of the problems. Electric utilities have encouraged energy waste by advertising the joys of all-electric living, providing rate discounts for large users of electricity, including all-electric homes, and relishing the peak load problem.

The use of electric resistance heating for homes is the least efficient means for heating a home.

Residential and commercial building developers encourage energy waste less directly, but with no less impact. Due to tax laws and financing practices, developers have a substantial financial incentive to hold down their initial cost regardless of the effect on the operating cost over the life of the building.

The result of these incentives is that developers typically maximize short-term gains on a building, then sell it and use the proceeds to repeat the process with a new building.

The developer is in a position to make the most economically efficient investment in energy conservation while the building is being built but such investments aren't profitable for the developer when he plans to sell the building soon.

The subsequent owner, the tenants, and society would benefit over the life of the building from investments in energy efficiency but they don't design the building.

As far as government research and development priorities and tax policies regarding energy, they have concentrated on energy production, especially nuclear power development, while generally ignoring work on efficient consumption of energy or on non-nuclear and non-fossil fuel energy sources.

The estimate of one prominent commentator on energy efficiency, Charles Berg, whom I would advise the committee to be in touch with if they are not already, is that the energy research budget for the past decade has allocated about 95 percent to research on fuels or power generation.

Even the recent increases in funding for energy conservation and solar energy research are insignificant when compared with funding for the breeder reactor program.

The breeder reactor cost overruns alone outweigh total Federal spending on energy conservation and solar energy research. Furthermore, the first annual report of ERDA revealed ERDA's plans to continue its distorted allocation of resources.

The ERDA report has been sharply criticized by the Congressional Office of Technology Assessment for its overemphasis on energy supply as opposed to energy conservation. The OTA analysis concluded that ERDA's energy conservation plans are, "timid and underfunded despite strong congressional encouragement."

I would question the last part of that sentence, but what do you expect from an arm of the Congress? I don't think there has been sufficiently demanding congressional support and requirements for energy conservation. Indeed, that's why this bill is before the committee because that's an attempt to really reinforce the congressional determination here.

Senator HOLLINGS. We got bogged down, Mr. Nader, last year. We ran around all year long on price. That diverted public attention from conservation. In fact, we lost the drive on 55-mile-an-hour speed limit. You are right, we haven't done much on conservation.

Incidentally, since you were emphasizing rate reform, we have S. 2502, sponsored by Senator Moss and others, providing lower rates for less electric power consumption. We also have S. 2063 which would require energy labeling for new residences. We are going to play a little catchup football here this month and next month and see if we can't get some of these in law.

But you are right, we haven't done much of anything last year.

Mr. NADER. There always seems to be, whether it is conscious or unconscious on the part of the executive branch and industry an attempt to embroil Congress in dealing with the most difficult issues of the energy spectrum and avoiding the most simple issues of the energy spectrum.

The most simple issues include obviously conservation. But they also include what is called biomass energy supply. This is the use of waste wood and plant life which is an annually renewable supply of energy and very old fashioned but increasingly viewed by specialists in energy supply as a very realistic source of energy.

I might say that even General Motors put out a technical paper in July 1975, after burning some agricultural residue in its plant in Michigan, mixing it with coal, you know, what is left over when they harvest the corn and the wheat. And it worked very well for them. Then they wrote a technical paper loaded with references saying that if we used two-thirds of our agricultural residues, leaving one-third for soil, we would not only supply the farmer with a supplementary source of income, we would not only reduce pollution, but we would have enough equivalent energy to equal one-third of our coal consumption.

If we double our food production in 25 years as is expected, we double the agricultural residues. This is what I mean. This is an example of a relatively easy energy policy move, along with conservation, which Congress has not paid enough attention because it has been embroiled in the issues that are much more difficult, much more speculative.

By the way, there is going to be a national biomass conference in Washington, D.C., in mid-March where specialists on biomass are going to come in for 3 days to talk about that form of solar energy that we call waste wood and plant life and plant waste.

If your committee staff has any time it would be very worthwhile participating there and bringing that material back for the Senate Commerce Committee's deliberations.

Senator HOLLINGS. Waste could be our greatest natural resource, and growing.

Mr. NADER. That is right.

I don't know, maybe you can explain it, Senator Hollings. I don't know what the psychology is here. I mean the psychology of saying yes, there is conservation, but let's go on to other things like breeder reactors and supply.

Senator HOLLINGS. The pinch hasn't been felt. The reason we can run with this particular measure at the present time was brought out by one of the candidates on an interview program Sunday. The candidate said he had learned out on the trail not only about the unemployed but also the employed. He related how a fellow making \$6.30 an hour up in New Hampshire was going to sell his home and move out in the forest. The candidate said, "You know what he is going to do? He is going to burn wood." He was just amazed. He said the fellow couldn't pay his power bill.

Mr. NADER. Wood is coming back, waste wood. There are reports out of Maine and Vermont showing the enormous amount of waste wood which could supply electricity for those States as well as for other States. But again, the thing you will hear from the true and genuine opponents of energy conservation is the following: Oh, sure, we can conserve. But that is not a long term solution. That is only 1 or 2 years and then we would have squeezed all the waste out of the economy.

Well, let me put it another way. If our economy was as efficient in energy utilization as Sweden or West Germany—and that is no big deal, we should at least be as efficient as Sweden and West Germany; they waste energy, too—we could double the size of our economy and still use the same amount of energy we are using now.

What would that mean? That would mean that for the next 25 years the growth of the economy and energy demand could be absorbed by continual energy conservation.

Senator PEARSON. How widespread is the use of agricultural waste as a fuel commodity?

Mr. NADER. Very, very little. Except on the farms, Senator.

Senator PEARSON. Did you ever hear of a place called Pratt, Kans.?

In Pratt we fire municipal power generation with wheat stubble. If wheat stubble in Kansas isn't a long term proposition we are out of business.

Mr. NADER. That is true. It is a very secure, reliable form of energy, is it not?

Senator PEARSON. Yes, sir.

Mr. NADER. The General Motors paper, by the way, was written by a gentleman called Farno Green, it is available from the GM headquarters, one of the few GM technical papers that I recommend.

Quite interestingly they talk about converting agricultural residues to methanol which can be obviously used for transportation purposes.

Senator HOLLINGS. Are there any problems Mr. Nader, with the Clean Air Act in burning up all the wood and the residues?

Mr. NADER. Burning wood produces far less of a pollution problem than burning coal or nuclear fuel. There is a factory in Alabama that is just about going to start burning wood for its industrial applications. We can bring that information to your attention because that will be a good example of how it works from both sides, economic and environmental.

Senator HOLLINGS. At this point in the record I would like to point out, as I said in the opening remarks, that we did pass an automobile fuel economy mileage act. But generally speaking, the first conservation act we enacted was vetoed by President Nixon. When we got to the tax credits, the administration was opposed to that, opposed to the automobile efficiency standards, and opposed to the increased funding of ERDA for conservation.

I just want to put that in the record. We have got our ranking minority member, my friend here on my right, Senator Pearson, who is a cosponsor of this bill. I hope he can prevail over there with that group.

Senator PEARSON. That hope isn't very strong.

Senator HOLLINGS. No.

Mr. NADER. Senator, in speaking with the former staff members of the FEA's office of conservation, one of the reasons why some of them left was because they didn't think that the White House was serious about energy conservation, and I am sure your staff has been in touch with some of them.

But there is not a very high morale in that office at the present time as well. They are just not getting the high level backing that they think the research that they have done merits in pursuing energy conservation.

I believe the White House did send to the Congress, though, mandatory conservation standards for buildings.

Senator HOLLINGS. Right.

Mr. NADER. Which hopefully will get through before the end of the year.

The tax policies have reflected a similar governmental encouragement of energy production and energy use as opposed to energy conservation. Obviously, tax subsidies to fossil fuel producers are the most obvious example.

Another example is the role of accelerated depreciation in encouraging building developers to focus on first cost versus life cycle costs.

The failure to save money by saving energy sometimes is traceable to a lack of awareness or less charitably, ignorance. The housing industry is notoriously slow to adopt new technologies. Thus, an innovative package of new ideas that reduces heat loss by 65 percent over conventional homes with no additional construction costs was not developed by the housing industry, but rather by an electric utility in Arkansas seeking a market for the use of electric heat pump. Individual homeowners and commercial building owners suffer from their share of ignorance as well. They may be generally aware that they could save energy and money by modifying their buildings but such general awareness is often insufficient to generate the confidence to make energy saving investments.

Industry's lack of awareness can be traced to two basic sources. First, potential energy savings from housekeeping measures, such as reducing lighting, heating, cooling, that are overlooked because they usually focus on the cost of capital, labor, labor raw materials and energy directly consumed by the manufacturing process. Other energy uses tend to go unnoticed in the background.

Second, some of our most energy intensive industries, such as basic metals, do not engage in vigorous price competition due to their non-competitive industry structure and practices. Lacking price competition as a spur to efficiency leads to inefficient production in general, which includes inefficient use of energy.

Then there is the subject of lack of capital for energy conservation. For example, typically, lenders limit a home construction loan so that a monthly shelter cost which includes repayment of principal, insurance and maintenance cost will not exceed 25 percent of family income.

If fuel and power costs are excluded from this calculation, investments that lower energy costs by raising the cost of the home only make home financing more difficult.

Strategies to overcome barriers to energy conservation——

S. 2932 and suggested changes, a few comments. It is clear from an examination of energy conservation opportunities and the institutional barriers to their adoption that the existing market mechanism is an insufficient vehicle for assuring that economically profitable energy saving measures are widely or universally adopted. This weakness of the market mechanism is primarily the product of private priorities and government programs that create a real world that differs greatly from the idealized impersonal marketplace.

Given the inadequacy of the market mechanism as a means for maximizing already profitable energy conservation due to various market distortions, proposals to encourage energy conservation, by simply raising the price of energy through a tax or decontrol of domestic oil and gas prices so that they will rise to the OPEC cartel prices or its Btu equivalent, are incongruous.

The proposal of such a price rationing policy is grounded on the belief that market mechanism will efficiently transform the price rises into energy savings. However, if the market mechanism is already failing to transform profitable energy saving opportunities into accomplished fact, across-the-board energy price increases to more artificially high levels will not be the efficient agent of energy conservation claimed by proponents of price rationing.

A general increase in the price of energy would instead be economically disruptive and inefficient, leading to inflation, unemployment, et cetera. The need to devise interventions in the energy market other than across-the-board price increases to encourage energy conservation is clear.

Some people say, well, the higher the price, the more elastic the demand. To some degree that is true but not when you are stuck with inefficient technology which can't be changed overnight.

If you have got yourself an air-conditioning unit that is inefficient, you can cut down on your air-conditioning in terms of hours, yes. But there is not much you can do about the inefficiency of the air-conditioning system unless you invest in equipment modification.

In short, the recipient technology that consumes and transmits the energy is not as quickly elastic as simply turning off the lights on a sunshiny day.

Senator PEARSON. Let me interrupt you. We have a bill on the Floor this afternoon concerning daylight savings. The central thrust is to take it from a 6-month period into an 8-month period. But the energy savings studies in the last 2 years, and I can't remember exactly what they are in the report that the DOT made, but they are remarkably small. That is a reflection, I assume, on the habit of the American people of turning on lights during the daytime.

Mr. NADER. Yes.

They turn the lights on in the morning.

Senator PEARSON. Go ahead.

Mr. NADER. Yes. It is a very important point, though, it is just automatic. All the buildings are turned on in the morning regardless of what kind of day it is. S. 2932 is a step in the right direction with its proposals for cost efficient permanent energy conserving modifications of homes, small businesses and manufacturing plants and other proposals which have already been summarized.

A step in the right direction doesn't mean that the right direction is going to be reached. This is why I think our comments from now to the end of the testimony bear on the realistic likelihood that these measures are going to work or not work. A major problem with loan guarantees and interest subsidies is that such programs can be abused by unscrupulous persons. The Federal program of home mortgage loan guarantees, for example, was characterized by an infamous amount of corruption.

Recent scandals in the medicaid and food stamp programs are evidence that similar dangers are presented by direct subsidies, including vouchers for specific purposes. The problem here is basically one of policing the distribution of the incentives to assure that they are used as intended. One problem with the loan guarantee is that in overcoming the lender's resistance to loaning money to certain borrowers, the loan guarantee also removes the lender's incentive to keep the borrower honest.

If the borrower spends the money on something unrelated to energy conservation or defaults on the loan, the lender is not harmed, Uncle Sam pays.

As for monitoring of compliance by a State or Federal agency, that would require before and after visits to the borrower's home, business or factory to confirm that he was using the guarantee or subsidized loan as intended. The cost of such supervision might be higher than the value of the subsidy.

The act's provision for the development of guidelines for the loan guarantee and interest subsidy program indicates an assumption that the compliance problem will be resolved at that time. That attitude is much too sanguine. The act should be altered to include some specific policy or set of alternative policies to assure use of incentives for their intended purpose, energy conservation. If the act's drafters cannot invent such policies they should not be so sure that subsequent drafters of guidelines under the statute in the executive branch will be able to fill the void.

In short, if the loan guarantee and interest subsidy programs can't be constructed to discourage abuse, maybe they should be forgone in favor of other aspects of S. 2932 and approaches not included in S. 2932.

One possible guide to insulating an energy conservation loan guarantee and interest subsidy program from abuse is provided by the Federal Housing Administration's property improvement loan insurance program, which has not suffered the abuse and scandals associated with the home mortgage loan insurance program.

One reason is that the property improvement loans are "co-insured" by FHA and lenders, while the home mortgage loans were solely insured by FHA. In the case of the improvement loans, lenders are required to assume 10 percent of loan losses. The lenders' role as co-insurers of the property improvement loans gives them an incentive to avoid loan losses by exercising some prudence, though, of course, the loan insurance is designed to encourage property improvement loans. The satisfactory experience with FHA property improvement loan insurance, which has a very low rate of loan losses, indicates that S. 2932 should also mandate co-insurance, with energy conservation loan guarantees limited to a fixed fraction and lenders required to assume the remainder of loan losses. If the banks have a risk they will be more careful about their loans. That is what it all amounts to. If the banks are loaning under a no-risk situation because the government is going to pay the freight if the borrower defaults, then the banks are not going to care about the borrower or what is happening to their loans.

Another aspect of the FHA program that should be considered for adoption is its requirement that lenders investigate the originators of most of the insured property improvement loans, the dealer-contractors who specialize in such work. Lenders are required to investigate dealer-contractors who bring in loan insurance business and certify that they are, "(1) reliable, (2) financially responsible, (3) qualified to perform satisfactorily the work to be financed, and (4) equipped to extend proper service to the customer."

Lenders must also supervise the operation of approved dealer-contractors by keeping a record of their loan history and making spot checks of their work. Similar requirements of lender approval and supervision of dealer-contractors should be attached to guaranteed and subsidized energy conservation loans.

In addition to the compliance problem with the loan guarantee and interest subsidy approach, it may be unfair in principle to restrict the Federal subsidy of energy conservation improvements to energy users who are willing to finance their improvements on credit. We should ask whether it is fair to force people into debt to receive a subsidy. Adding the option of a direct grant for energy conservation would, of course, resolve this problem, but it would intensify the problem of assuring that the subsidy is used as intended.

A point in favor of loan guarantees and interest subsidies is that they may be needed to overcome the effect of redlining by lenders, or banks, which prevents homeowners in many neighborhoods from borrowing money for even the most profitable energy saving improvements.

Pending the development of policies which prohibit lenders from redlining whole neighborhoods, loan guarantees and/or interest subsidies may be the best way to assure that residents of redlined areas can find a willing lender. To the maximum extent possible, any energy conservation loan guarantees and subsidies should be designed to prevent or overcome redlining by lenders.

Then, of course, there is consumer education which I will skip in the interest of time. It is obvious what is involved here, and turn to what I think is the most imaginative portion of the legislation, particularly if it can be further refined, that is the encouragement of energy conservation cooperatives at the community or neighborhood level.

The act suggests but does not require that States encourage residential energy users to establish energy conservation cooperatives to provide needed expertise and to aggregate purchasing power as a means of reducing the cost of energy audits, materials and equipment, and installation charges.

The idea of encouraging energy conservation through consumer cooperatives is the best part of S. 2932, but the act is weakened by permitting State governments to decide whether energy conservation cooperatives should be encouraged.

Clearly the act's authors hope by generally delegating responsibility to the States to bring government closer to the citizens it serves.

This is now a very popular refrain on the political campaign trail. Somehow it is assumed that the Federal Government is automatically further from the people than the State government. That may be true geographically. But I am still waiting for evidence that the States have developed structures of responsiveness that are in ways superior to the Federal Government. They both have the same problem in that respect.

In the case of energy conservation cooperatives, however, State governments may become a barrier to citizen action by failing to encourage the development of the cooperatives. This problem can be cured by altering S. 2932 to provide direct Federal aid to parties willing to form energy conservation cooperatives.

In addition to providing more direct encouragement for the creation of energy conservation cooperatives, the act should expand the scope of activities which the cooperatives are permitted to pursue.

For example, the act should permit cooperatives to provide rather than merely purchase the needed energy audit and installation services and to become lenders of the guaranteed and subsidized energy conservation loans (if these incentives are retained). The cooperatives should be limited to a scale that will facilitate control by members. Given cooperatives that are truly controlled by and responsive to their member/customers, they could be expected to provide reliable energy audits and installation services.

In addition, since the borrowers (cooperative members) would be known to the lender (cooperative management), assurance that the loans are used for permissible purposes is easier to achieve.

One problem with the act that could limit the role of cooperatives is its requirement that energy conservation measures be permanent modifications of homes. This requirement would foreclose another potential role of energy conservation cooperatives—as lessors of solar water heaters.

If energy conservation cooperatives are instead encouraged to use the subsidized interest rates to purchase solar water heaters for rental, the use of solar water heaters could be greatly accelerated. The opportunity for homeowners to rent solar water heaters from a reliable lessor will encourage their use because it will eliminate three present obstacles to consumer acceptance:

- (1) lack of availability of a reliable supplier,
- (2) high initial cost, and
- (3) lack of assured maintenance service.

While incentives for individual users to purchase rather than rent solar water heaters can help overcome the obstacle of high initial cost, the lack of a reliable supplier and maintenance service would remain as obstacles to wider use of solar water heaters.

Another advantage of encouraging cooperatives to get into the business of leasing solar water heaters is that mass manufacturing will be stimulated by the aggregation of markets provided by the cooperatives.

The likelihood of the development of long-lived conservation cooperatives is increased if they are encouraged to undertake continuing energy conservation roles such as lending and leasing. Energy users are less likely to go to the trouble of creating cooperatives for the one-shot task of mass purchase and installation of insulation.

If long-lived energy conservation cooperatives are created, a spirit of competition among the cooperatives can be encouraged by creating national energy conservation goals and allocating additional Federal aid among the cooperatives on the basis of demonstrated achievement of energy saving goals.

Making individual energy users part of a team effort to save energy will make them more aware that their individual efforts can contribute to community and national goals of reducing energy consumption and therefore provide an additional incentive for them to conserve energy.

Two years ago, Mr. Chairman, I was talking to Margaret Mead, the anthropologist, about her experience in advising government how to get more voluntary citizen activity during World War II. I said to her, "What will really be needed to get energy conservation programs going in terms of kind of a consciousness factor?"

She said,

Three things. One that people should know that if they do cut back someone else isn't cheating, so they have to have a sense of equity, in effect.

Second, there has to be a discernible measure of progress from time to time, every month, every quarter, nationally.

And, third, there should be competition. Competition between communities, competition between States, competition between regions.

This is well known in the sports arena, it is well known sometimes in the arts, and it needs to be looked into here. I know that she would be very pleased to advise the committee about her experience in these areas and she has some very pragmatic advice to give.

The other day on television millions of people were witness to the spectacle of two 250-pound giants sitting at a table for the world champion arm wrestling contest. And they grunted and groaned for about 3 minutes as millions watched on pins and needles to see who was going to win.

The competition is a very, very motivating aspect, both for the participants as well as the viewers, and onlookers. I think that has got to be cranked in somehow.

Do you know how food canning was first developed? Napoleon offered a prize for the person who could develop a process to can food so that his armies could travel on their bellies with canned food rather than having to always go to the area and develop their food.

In the old days in our country we used to utilize that practice more, and I think it needs to be revived. It probes a very common motivational theme among human beings. We should have done it in the automobile area for example, you know. A million dollars goes to anybody who can develop a car with the following requirements.

So that the inventive impulses of unorganized individuals called inventors can get a hearing and get a decent evaluation of their ideas.

Right now if you are an inventor and you push your invention, you are called a crackpot. But if you are a company and push your invention you are called a research and development enterprise.

So, I think we have to go back to recognizing those kinds of motivations and those kinds of individual efforts.

Senator HOLLINGS. Why don't you incorporate?

Mr. NADER. We would like to license a patent on how to generate citizen action groups because if you—you see you are operating in a vacuum now. If you had citizen action groups all over the country on energy, your proposals would speed through Congress and get implemented much faster. We put out an energy waste hunt manual for students around the country to survey their cities and energy waste. And the Massachusetts Student Public Interest Research Group funded and run by students, as well as a couple of others around the country, did that survey. I would urge your staff to get a copy of those surveys because not only did they produce interesting information about particular cities, but they show how important it is to have citizen backing for what you are doing.

This manual which we will submit for the record by the way, Senator, provides details, in terms of what to look for, for the kind of energy waste audit to get an idea of how and what a city is consuming.

As far as Federal grants to the States are concerned, we would recommend that Federal grants be conditioned in more detail to the States. This is not revenue sharing that we are talking about. These are Federal grants for a particular purpose.

I would suggest the following conditions, particularly in the State utility regulation areas, that Federal grants will be extended to those States where public utility commissions are willing to establish regulatory policies that encourage conservation.

As a minimum, seven policies should be delineated. One, all utility advertising promoting energy use should be banned, regardless of whether the shareholders pay for it.

Two, the utilities should be required to finance energy conservation advertising to help counteract the pro-consumption influence of their prior advertising over the years.

Three, declining block rates should be discontinued so that electricity users pay rates that are closer to the true incremental cost of their extra electricity use.

Four, electric resistance heating in new homes should be banned due to its inherently low efficiency, except in limited cases.

Five, the lifeline rate concept should be adopted for residential users. Under a lifeline rate, which California is on the verge of implementing, residential users are guaranteed a minimum amount of electricity or gas, say, 400 kilowatt hours a month, at a stable price. If users exceed that minimum consumption level, their extra consumption is priced at higher rates. In effect, then, residential users would confront an inverted rate structure which is a constant reminder and incentive to conserve by modifying homes and wasteful habits.

Six, the utility regulation policy upon which Federal assistance should be conditioned is the adoption of a conservation policy similar to that pioneered by the Michigan Public Service Commission, which basically is to get customers to insulate the attics.

Finally, an extension of the energy conservation cooperative concept is called for to provide a watchdog against promotion of wasteful use of electricity and construction of excess generating capacity by electric utilities. S. 2932 should condition aid to State energy conservation programs on enactment of State legislation that enables residential ratepayers to form their own consumer action groups and voluntarily contribute a supporting fee via a monthly checkoff space on their utility bill, which State law would require utilities to provide.

A checkoff space on the monthly utility bill, that is, to provide a communication link for residential utility consumers. In fact, the Congress should consider every time it develops a program that requires effective administration, what is that program doing to facilitate the building of citizen institutions, the building of civic, consumer, taxpayer institutions to monitor these programs and to be so structured that anybody can join and participate and the most active citizens will obviously have the greatest say.

This proposal to develop a monthly checkoff system for residential utility consumers on their electric, telephone, and gas bills is outlined in this supplementary statement which I would like to include in the record, with your permission.

Senator HOLLINGS. It will be included by reference.¹

Residential users organized into RUCAG's will be a strong force in favor of energy conservation.

In conclusion, in the largest context, the energy waste that has developed in this society is a product of the default of public policy-makers at all levels of government who have permitted energy policy to be guided by a few vested interests. The rising debate over oil and gas regulation, strip mining, nuclear power, and energy conservation policy is the product of an aroused public that wants to replace an autocratic energy policy with an energy policy governed by democratic processes. These are the kind of pressures you are reflecting in raising questions that were not raised just a few years ago about our energy policy.

We should adopt these policies which encourage an efficient economy, a less polluting economy, a superior value for consumer dollars

¹ See Congressional Record Mar. 25, 1975, p. E1447.

returned and a more equitable allocation of capital for other areas of our economy so we don't let the energy area devour the capital investment dollars when there is no need for this kind of excess capacity to be developed in the first place.

Thank you.

Senator HOLLINGS. Well, Mr. Nader, we are very much indebted to you as usual. Since we are running a little behind, we have two other panels we will have to get on before lunch. I can go along with the coinsurance and the other ideas and suggestions you made about the bill itself.

With respect to the cooperatives, we are going to be very careful with that one. We don't want the money all sopped up by administration. That was a great criticism of communication programs, that everybody was employed to administer.

I am talking selfishly now, but you are always telling government how to work. If I could get Ralph Nader to put his time just on conservation rather than having a problem for every solution—

Mr. NADER. Are you sure you don't mean a solution for every problem?

Senator HOLLINGS. No, you have got a problem for every solution. You spread yourself thin. I am trying to get you in on conservation, so you think about that for us for a while.

Mr. NADER. I would be delighted.

Senator HOLLINGS. You and I just work on that. I think we can get it done without cooperatives and everything else. This government is ready to move if we move with this bill, you see. Consumers can't go out in the parking lot and cut back on the fluorescent tubes and run the elevators only a certain time and everything. They don't have those kinds of options. They have got a home, period.

Brother, when that electric bill comes in, it is just really prohibitive. Consumers can't pay it any more. If Congress passes the decontrol of natural gas, we know that with the large use of natural gas by the utilities, even with the 5-year phase out, the cost of gas is going to double, or triple, or quadruple the way it did in the unregulated intrastate contracts made during the shortage months in November and December. They averaged out \$2.62 per McF.

So, the utilities' costs double, triple, quadruple, and the power bill triples and quadruples, and as the cost goes up consumers will all be running down to the public service commission, there will be a real crunch here this next winter. We can see as a result tremendous cooperation now just through economic necessity. We must provide the leadership necessary to just permeate the entire society and industry and reassess and reorient our everyday lives toward the conservation of energy, as you indicate.

We very, very much appreciate your presentation here this morning. Senator Pearson?

Senator Pearson. No. Thank you, Mr. Nader.

Senator HOLLINGS. Is there anything you wish to add?

Mr. NADER. Just that we are definitely going to make a priority out of energy conservation.

Now, that these pricing bills are somewhat out of the way, that the concentration can be on the conservation program.

Senator HOLLINGS. It can really save for us, and we are going to work with you and your staff on that cooperative end and on the coinsurance and various other suggestions you have made. The staff has been in contact with you and they say we can make those improvements and they think they are valid ones.

Thank you very much.

Mr. NADER. Thank you very much.

Senator HOLLINGS. We appreciate it.

[The statement follows:]

STATEMENT OF RALPH NADER; ACCOMPANIED BY GARRY DELOSS

Mr. Chairman: Thank you for the opportunity to testify on S. 2932, the Energy Conservation Act of 1976.

You and this committee are to be commended for focusing on one of the most important opportunities for energy conservation, modifying or "retrofitting" existing homes, commercial buildings, and manufacturing processes to save energy.

Unfortunately for the nation's energy situation and economic well being, the energy industry and its indentured servants in the Nixon and Ford Administrations have used the past two post-embargo years to simply reiterate their view that increased production of nonrenewable fossil fuel energy and atomic energy at whatever cost is the only way to keep our economy safe from another oil embargo and further OPEC price increases. This simplistic view is sometimes dressed up with rhetoric about the need to maximize energy conservation as well as energy production, but the Ford-EXXON cartel's estimate of the potential role of energy conservation is always notably pessimistic compared to their faith in the efficacy of such exotic technologies as atomic fission power plants.

The ostrichlike refusal by President Ford to seriously confront the real dangers and costs of atomic power and the real potential of alternatives such as energy conservation was illustrated in December when, after months of indecision, the White House stated that the President was too busy to meet with a group of distinguished scientists who have expressed concern about the spread of atomic power. Though, of course, he was not too busy to visit Jacksonville, Florida in October where he was warmly received by William Staten who is President Ford's campaign finance chairman in Florida as well as Executive Vice President of a nearly bankrupt Westinghouse subsidiary there which wants to manufacture floating atomic power plants and is seeking a federal bailout.

So we are left with essentially a one dimensional energy policy from the Ford-EXXON-Westinghouse cartel, a policy of full speed ahead on production of finite fossil fuels and unreliable and uneconomic atomic power, with a token pat on the head for energy conservation. The recent resignations of three senior engineers from General Electric's nuclear energy division and a Nuclear Regulatory Commission project manager highlight the need to scrap the bankrupt policy of energy production at any cost and reallocate our energy priorities from unsafe atomic power to safe, more economical, and more available energy conservation.

The bill being discussed here today, S. 2932, is a step in the right direction—the creation of a public policy which actively promotes energy conservation rather than just giving it lip service.

My testimony on S. 2932 will be divided into three parts. First, I will explore the potential for saving energy profitably by modifying existing residential and commercial buildings and manufacturing processes. Second, I will discuss some of the reasons for the development of energy waste in the face of its bad economics for energy users. Third, I will offer some criticisms of S. 2932 and suggest ways to strengthen the bill.

I. POTENTIAL FOR ECONOMICALLY FEASIBLE ENERGY SAVINGS IN RESIDENTIAL AND COMMERCIAL BUILDINGS AND MANUFACTURING PROCESSES

A. Residential Energy Savings

A 1974 study of the potential for economic measures to reduce energy use in existing homes, conducted by the National Bureau of Standards (NBS) in cooperation with the Federal Energy Administration (FEA), estimated that most of the 40 million homes built prior to 1960 and up to half the homes built since then are inadequately insulated.¹

The NBS study varied its calculations of the value of various measures for cutting energy use in existing wood frame homes according to climate and the cost of a

See footnotes on p. 56.

household's energy source (e.g., oil heating versus gas heating or electric resistance heating). The dollar value of energy saved through seven basic improvements (attic insulation, wall insulation, floor insulation over unheated areas, insulation of ducting in unheated areas, storm windows, storm doors, and weather stripping) was then compared with the cost of retrofitting the improvements to existing homes. The results in every case were that some share of energy saving improvements could be cost justified, with the most extensive improvements justified for homes in northern climate regions heated by electric resistance heating and cooled by electric air-conditioning.

For houses in the Washington, D.C. area which use oil for heat and electricity for cooling, for example, the study suggested that energy savings would justify 9 to 10 inches of attic insulation, 6 inches around ducts in the attic, 6 inches under floors over unheated areas, and 3.5 inches of wall insulation (the maximum feasible improvement through blowing insulation into existing walls; thicker wall insulation might save energy but it would entail expensive reconstruction of the walls). A minimum of 12 inches of ceiling insulation was cost justified for homes using electric resistance heating.

A similar study prepared by the Department of Housing and Urban Development (HUD) in 1975 and aimed at do-it-yourself retrofitting concluded that, if \$300 were invested in retrofitting of every energy wasting home, the investment would be repaid through energy savings in 5 years (and that the national energy savings would be the equivalent of 223 million barrels of oil per year, or one-third of 1974 oil imports).² A 1250 square-foot home located in Washington, D. C. and using natural gas heat and electric air-conditioning was cited as an average combination of house size, climate, and fuel costs. For such a home the first year costs for energy saving measures were compared to the annual savings in energy costs. As displayed in Table 1 below, the first year cost for retrofitted materials (the labor is donated by the homeowner) ranges from \$265-427 and the annual savings range from \$140-390, for a paycheck period of 2 to 3 years.

TABLE 1.—*Estimated retrofit costs and savings*³

	1st year cost	Yearly savings
Service oil furnace	\$25	15-40
Put on plastic storm windows	5-7	15-55
Caulk and weatherstrip	75-105	50-125
Insulate attic	160-290	60-170
Total	265-427	140-390

Additional savings at no extra cost were projected from turning thermostats down in the winter and up in the summer.

Another way to conserve nonrenewable energy sources is to substitute energy from a renewable source such as solar energy. The most practical use of solar energy in existing homes would be to retrofit them with water heaters which depend on the sun alone or the sun * * * or natural gas. Today solar water heaters have become an economical investment when compared with electric water heating in all areas but the Pacific Northwest, where low-priced electricity comes from hydro sources. Some electric utilities are growing curious about the claimed economic advantage of solar water heaters over electric water heaters. Massachusetts Electric Company, Narragansett Electric Company, and Granite State Electric Company are co-sponsoring a solar water heating demonstration program which will eventually reach 100 homes in Massachusetts, Rhode Island, and New Hampshire.⁴ The first unit was recently installed in a home in Meaker, Massachusetts. It is expected to supply 50 percent of water heating needs per year. If the demonstration program yields economically attractive results, the electric companies are expected to begin leasing solar water heaters to their customers.

In regions where the price of oil is highest, solar water heaters can be an economical alternative or supplement to oil-fired water heaters. With this prospect in mind, the New England Fuel Institute, supported by 1300 fuel oil dealers who supply 85 percent of New England's fuel oil, is investing \$30,000 in its own experiment with water heaters that use solar energy for "preheating" and oil for the final temperature boost.⁵ To date, seven solar/oil water heaters have been installed in New England homes for testing and more will be installed soon.⁶ As in the case of the electric companies, the fuel oil dealers are evaluating the potential for becoming lessors of solar assisted water heaters. They foresee a potential market for 75,000 solar water heaters in New

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England within five years if tax laws and building and appliance codes are changed to accommodate their use.

The Southern California Gas Company, Caltech, and NSF are working on a project to test the potential for commercialization of gas-supplemented solar water heating systems for new multiple family dwellings in southern California. Their work, titled Project SAGE (solar assisted gas energy),⁷ has included several months of operation of a solar/gas system retrofitted to two 16 unit, two story apartment buildings.⁸ The Project SAGE goal is to provide 80 percent of annual water heating needs from solar energy (60-70 percent in winter and 90-100 percent in summer) in southern California, where 11 percent of residential energy use goes to heat water. Experience to date indicates that the gas supplemented system is less expensive than electric water heating but more expensive than gas or oil alone, although the solar/gas system is expected to be less expensive than a gas system fueled by imported LNG or by gas derived from coal. The latter comparison is the reason the gas utility is co-sponsoring Project SAGE. If gas supplies are supplemented with the expensive LNG or coal gas, the gas company might protect its market from competing sources by leasing the solar/gas water heating systems, given favorable results from Project SAGE and a positive reaction by the California utility regulators.

In their report "Assessing the Potential for Fuel Conservation,"⁹ Dr. Marc H. Ross, co-author of the American Physical Society's 1974 summer study on energy efficiency, and Dr. Robert H. Williams, senior scientist of the Ford Foundation's Energy Policy Project, have estimated that residential energy use would have been reduced by 53 percent in 1973 if the economically feasible energy saving opportunities discussed above and others had been widely adopted in previous years.

Their calculations are displayed in Table 2.

TABLE 2.—Potential fuel savings in the residential sectors¹⁰

[In 10 ¹⁵ BTU]	
Conservation measures	Potential Savings
Replace resistive heating with heat pumps having COP=2.5	0.60
Increase air conditioning COP to 3.6	.40
Cut water heating energy requirements in half (better insulation, lower temperature setting, use of solar energy, heat recovery from appliances)	1.07
Reduce heat losses 50% with better insulation, improved windows, reduced infiltration	3.30
Reduce air conditioning load by reducing infiltration to 0.2 exchange/hour	0.42
Introduce total energy systems into 1/2 multi-family units with a net 30% fuel savings	0.31
Use microwave ovens for 1/2 cooking, with 80% savings	0.25
Total potential savings	6.62
Actual fuel use in 1973	14.07
Hypothetical fuel use with conservation	7.45

B. Commercial Energy Savings

Commercial buildings are virtually designed to be energy gluttons. The air-conditioning systems in some buildings, for example, must use "terminal reheat" in the form of electric resistance heating to warm circulating air as it enters work areas from cooling ducts because the air has been cooled more than necessary. This practice of overcooling and then reheating air is ostensibly justified because it permits temperature controls to be simplified.¹¹ Another common occurrence is buildings which simultaneously require air conditioning for internal areas and heating for perimeter areas.¹² Due to these energy wasting practices and others, commercial buildings have become less efficient energy users over the years rather than increasing their energy efficiency. This trend is well illustrated by a 1971 study of energy use by large office buildings in New York City.

Confronted by "brown outs" of electricity during peak demand periods in 1970, the New York City mayor's office created an advisory group, the Interdepartmental Committee on Public Utilities, to investigate the sources of peak electric demand.¹³ In 1971, the committee surveyed the energy use of 86 post-World War II high-rise

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office buildings. The range of energy use per square foot of rental space, displayed in Table 3, varied by a factor of 5.5 for a total energy use, a factor of 6 for steam use, and a factor of 4 for electricity use.

TABLE 3.—*Energy consumption range*¹⁴

	High	Low	Average
Total energy used (1000 Btu/ft ² /yr.)	403.0	72.0	210.7
Steam (1000 Btu/ft ² /yr.)	298.6	51.0	141.4
Electricity (kwhr/ft ² /yr.)	45.0	10.8	20.3

Such extreme variations demonstrated that some buildings were using energy much more efficiently than others. Further analysis of the survey data revealed a strong correlation between building age and energy use. The older buildings, as displayed in Table 4, used only half as much energy as the newest buildings.

TABLE 4.—*Energy consumption versus building age*¹⁵

Age grouping	Total energy (1000 Btu/ft ² /yr.)	Steam (1000 Btu/ft ² /yr.)	Electricity (kwhr/ft ² /yr.)
1950-54	128.9	78.4	14.8
1955-59	164.4	108.1	16.5
1960-64	214.5	154.1	17.7
1965-69	266.4	188.0	23.0

In other words, over the 20-year period from 1950-1970, energy use per square foot in New York City office buildings has doubled.

The committee made field visits to a few buildings covered by the survey to look for explanations of the higher energy use by newer buildings. They found the following pattern of energy wasting features in the newer buildings: (1) ostentatious design features such as excessive use of glass in exterior walls, (2) failure, in every building visited, to use heating and cooling systems that transfer heat from a building's core to its periphery during the winter, (3) terminal reheating of air chilled by the air-conditioning systems, (4) duct systems that require high energy use to power ventilation equipment, (5) crude control systems for the heating, cooling, and ventilation systems, and (6) much higher lighting levels than in older buildings, including an inefficient trend toward extensive incandescent lighting in lobbies.

The lighting of commercial buildings deserves special mention. Energy used for lighting is the second largest ingredient in commercial energy use, less than heating but more than air conditioning.

Moreover, the energy use caused by lighting is more than the electricity used to provide light because the heat from lighting accounts for much of the air-conditioning load. In a typical new New York office building (one million square feet, 10 stories) on a hot summer day, over half of the air-conditioning load is due to heat from lights.¹⁶ If lighting is reduced, then, energy will be saved in two ways: by reducing energy use for lighting and by reducing energy use for air conditioning.

In considering whether reductions in lighting are feasible, it is helpful to recall that minimum lighting standards have risen by a factor of 2 to 4 over the past 20 years.¹⁷ Since the lighting standards are set by the Illuminating Engineering Society, whose members and sponsors have a vested interest in promoting the sale and installation of lighting fixtures, the trend toward higher illumination requirements was predictable. The result has been, as Richard Stein described in one case, "lighting . . . distributed indiscriminately, or should we say uniformly, over banks of files, desks, corridors, storage spaces, and aisles."¹⁸ Because lighting in commercial buildings is uniform rather than task oriented, a large part of the energy used for lighting is undeniably wasted as it is absorbed in the fixture or by the walls and is used to illuminate non-work areas.¹⁹ As the APS study points out, "the average illumination in homes, where lighting is governed by personal choice, is well below the average level in commerce and industry, where lighting is governed principally by established standards."²⁰ Indeed, the APS study calculates that "on the average, each person encounters 10 times as much artificial light . . . outside the home as inside the home (even though most of us work during the day and spend our nights at home)."²¹

In the typical office building cited above, electricity use for lighting is about 6 watts/ft².²² According to an energy conservation guide prepared by a private architec-

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tural firm for the U.S. Government Services Administration, an electricity load of 1 to 2 watts/ft² would provide sufficient lighting.²³ An average of 1.5 watts/ft² would cut energy use for lighting to one-fourth of that usually designed into new office buildings. In addition, the need for air-conditioning would be reduced as waste heat from excessive lighting is reduced. According to Stein, "every two excessive watts of lighting requires one excessive watt of cooling."²⁴

A calculation of the energy savings from reducing lighting levels has been made for a typical high-rise office building in New York City, with walls assumed to be 40 percent glass.²⁵ As Table 5 shows, energy use for heating rises slightly to replace lost waste heat, but energy use for cooling and lighting drops 43 percent and 50 percent respectively.

TABLE 5.—Annual energy requirements of office buildings as lighting varies ²⁶

[1,000 Btu/ft.²/yr.]

Lighting level	Heating	Cooling	Lighting
4.3 Watts/ft. ² -----	14.4	71.5	56.0
2.15 Watts/ft. ² -----	17.9	40.6	28.0

As in the case of lighting, the rate of ventilation of outside air into commercial buildings is generally governed by standards which have no basis in physiological needs.²⁷ The average New York City office building cited above would use energy to provide mechanical ventilation at the rate of 20 cubic feet per minute (cfm) per person. ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) standards require 10 cfm per person in buildings where smoking is allowed. A reduction in ventilation to 5 cfm, with smoking restricted to specific sites, would reduce the air conditioning load in the hypothetical average office building by 15 percent.²⁸

Although commercial buildings are literally designed to waste energy through inefficient heating and cooling systems, excessive use of glass, bad siting, and excessive lighting and ventilation, building users can fight back. Heating, cooling, lighting, and ventilation levels can be reduced, insulation can be increased, windows can be shaded from the sun's heat and leaks can be plugged. Several cases of substantial reductions in commercial energy consumption which have been achieved at little or no cost illustrate the economic feasibility of cutting energy use in existing commercial buildings.

Federal Energy Management Program. The Federal Energy Management Program was established in the summer of 1973 with the goal of cutting the federal government's energy use by 7 percent during fiscal year 1974. The program achieved a 24 percent savings in total energy use by 16 federal agencies during fiscal year 1974.²⁹ A breakdown of the savings shows that energy use to operate buildings was reduced by an average of 13.6 percent.³⁰ In fiscal year 1975 the energy management program was expanded to cover 26 federal agencies and the most recent results show a total energy savings of 28 percent in the third quarter of fiscal year 1975 over the third quarter of fiscal year 1973.³¹ Energy use for "buildings and facilities" was reduced by 20.4 percent.³² These savings were accomplished primarily by reducing lighting, heating, air conditioning, and ventilation levels, and buying more efficient air conditioners.³⁴ It is noteworthy that sufficient remaining energy saving opportunities were found in the second year of the federal energy management program to increase average energy savings in federal building operations from 13.6 percent to 20.4 percent. Evidently, the more one looks, the more energy saving opportunities one finds.

The Los Angeles Experience. When the 1973 oil embargo caught the Los Angeles Department of Water and Power (DWP) without an assured supply of sufficient oil for electricity generation, the city government enacted an ordinance which required electricity users to reduce their consumption. The initial phase of reductions required residential and industrial customers of DWP to cut their use by 10 percent over the corresponding period one year earlier and commercial users to cut back by 20 percent. A second phase of reductions of 12 percent for residential users, 16 percent for industrial users, and 33 percent for commercial users was never applied because the response to the first round of reductions exceeded expectations. Total electricity consumption fell by over 17 percent during the first two months under the ordinance, compared with a 5 percent reduction nationally.³⁵

The largest reductions in electricity use, an average of 28 percent, were made by commercial users, who consume about half of the electricity generated by DWP. The

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Federal Energy Administration commissioned a Rand Corporation study of the experience of commercial energy users under the Los Angeles ordinance.³⁶ The study found that almost all commercial users were able to reduce electricity use substantially without economic hardship.³⁷ One office building achieved a 45 percent reduction in electricity use by reducing lighting levels through removal of half of its fluorescent light tubes, cutting indoor parking lot lighting, and eliminating exterior sign lighting; operating air-conditioning equipment five hours less per day; lowering heating thermostats by 5 degrees F.; and removing one of three elevators from service except during rush hours.³⁸ A department store spent \$7,000 to \$9,000 to convert from incandescent to fluorescent lighting and expected to recoup its investment from electricity savings within a few months, as its electricity bill fell by 16 percent, or \$800 per month, in spite of a 25 percent increase in electric rates.³⁹ A bank reported that electricity use for air-conditioning was cut by 64 percent through equipment modification which paid for itself through electricity savings in less than three months.⁴⁰

Although the operation of the ordinance, and its threatened but never exercised penalties, was suspended May 22, 1974, average electricity use in Los Angeles in the summer of 1974 was 14 percent below the prior summer.⁴¹ It is fair to assume that many of the reductions in electricity use persist due to the economic benefits discovered by electricity savers.

The 20 Percent energy savings achieved in federal government buildings and the 28 percent electricity savings achieved by commercial energy users in Los Angeles are substantial but they do not exhaust the potential for energy savings in existing commercial buildings. An energy conservation program being applied to Ohio State University buildings has demonstrated that carefully calculated investments in energy saving modifications that tailor a building's energy use to the needs of its users can reduce electricity use by over 50 percent and heating needs by up to 75 percent.

The Ohio State University Energy Conservation Project. Ohio State University spends about \$5,000,000 per year for energy utility services.⁴² By 1973 a survey revealed that the University's utility bills had been rising at a rate of 15 percent per year for five years, during a period of stable utility rates, due to addition of new high energy buildings and addition of air conditioning, brighter lighting, and educational equipment to older buildings. Faced with a projected doubling of utility costs by 1980, at prebargo prices, the University began to study how it was using energy and what it would cost to reduce energy use. The study projected the results of a 5-year program of surveying and retrofitting 50 major energy-using buildings to save energy. At prebargo energy prices, the study predicted \$2,000,000 in cumulative energy savings over the 5-year period at a cumulative cost of \$950,000.⁴³ By the end of the 5-year period, utility costs were projected to fall by \$800,000 per year. Given the energy price increases since 1973, the potential dollar savings have risen greatly and the payback period for the retrofitting investments has shortened accordingly.

One of the buildings studied was the Allied Medical Services Building, a five-story building with offices, laboratories, classrooms, and a two-story wing used for audio and television studios. A study of the building estimated that total energy use could be cut by 39.9 percent (gas by 52.5 percent and electricity by 25.5 percent) through reduced lighting, reduced ventilation rates during occupancy, shutdown of main air handling systems when the building was unoccupied, and variable ventilation in the studio wing.⁴⁴ The study's projected energy savings would also save \$29,050 per year at a projected cost of \$30,000 in building and equipment modifications, for a payback period of one year.

Based on the above analysis, the University approved an investment in retrofitting the medical building to save energy. The results have exceeded expectations. A full year of monitoring energy use by the retrofitted medical building showed a 78 percent reduction in gas consumption and a 43 percent reduction in electricity consumption for a cost savings of about \$60,000 per year.⁴⁵ Hence, the retrofitting cost of about \$30,000 was paid back in about six months and the university is now netting \$60,000 annually from its investment.

To date, equipment modifications have been performed on five more buildings after careful analysis of energy consumption patterns and estimation of modification costs, energy savings, and dollar savings. Several months of monitoring energy use in the total of six modified buildings has verified energy savings, displayed in Table 6, which range from 19 percent to 63 percent for reductions in electricity use and 31 percent to 78 percent for reductions in natural gas use, for average savings of 36 percent and 61 percent respectively.

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TABLE 6.—Energy consumption reduction in Ohio State University Buildings ⁴⁶

Building	Electricity reduction (%)	Natural gas reduction (%)	Months monitored
Allied Medical	43	78	12
McC Campbell Hall	63	72	12
Health Science Library	20	76	6
Electronics Lab	48	31	6
Biological Sciences	19	49	6
Howlett Hall	24	60	6
Average reduction	36	61	

The dollar savings derived from the energy savings are so great that payback periods for the modification costs, displayed in Table 7, are exceptionally brief, ranging from 4.5 months to 11.6 months.

Table 7.—Dollar savings in the Ohio State University energy conservation program ⁴⁷

Building	One-time modification cost	Achieved savings of electricity and natural gas *	Payback period (months)	Months monitored
Allied Medical	\$30,000	\$59,221	6.0	12
McC Campbell Hall	57,200	53,551	13.0	12
Health Science Library	27,500	42,971	8.0	6
Electronics Lab	25,750	26,385	11.6	6
Biological Sciences	37,156	99,424	4.5	6
Howlett Hall	31,738	57,386	6.5	6
Total	\$209,344	\$338,938	7.4	

* Based on monitored energy use over the period shown and projected to total yearly saving at current utility rates.

The dollar savings displayed in Table 7 would be even greater, and the payback periods much shorter, if the savings were calculated for oil as the heat source rather than natural gas. Even the present calculations, based on natural gas, show the University recovering its total investment in modifying the six buildings in 7.4 months and netting \$538,938 per year on its investment thereafter. Encouraged by such results, the University is proceeding to modify six more buildings and is studying 16 others for later modification.

The Ohio State University program energy and dollar savings can be replicated for commercial buildings in general. The energy savings which have been achieved in the University's buildings to not depend on modifications that alter a building's operational function. Under the University's program, "the environmental needs of the operations performed in the building are evaluated, and systems modifications are proposed within the limits set by those requirements."⁴⁸ Moreover, the calculations required to evaluate the energy and dollar savings potential of building modifications are performed "manually," using information available from ASHRAE and the National Oceanic and Atmospheric Administration, rather than with sophisticated computer analysis.⁴⁹ Finally, to the extent that other commercial buildings depend on oil or electricity for heat instead of the natural gas used in the University buildings, the economic feasibility of modifying such buildings to save heating energy is even greater than that demonstrated by the University's successful program.

Ross and Williams have calculated that 1973 commercial energy use could have been cut by 41 percent if energy saving measures such as those described above had been widely practiced. Their calculation of potential savings is displayed in Table 8.

See footnotes on p. 56.

TABLE 8.—Potential commercial fuel savings⁵⁰

[In 10 ¹⁵ Btu]		Potential savings
Conservation measures		
Increase air conditioning COP 30%	-----	0.37
Increase refrigeration efficiency 30%	-----	.20
Reduce water heating energy 50%	-----	.31
Reduce building lighting energy 50%:	-----	
Direct savings	-----	.82
Increased heating needs	-----	-.21
Decreased air conditioning needs	-----	.34
Net savings	-----	.95
Reduce heating needs 50% by building changes	-----	2.25
Reduce air conditioning need 10% with insulation	-----	.08
Reduce air conditioning need 15% by reducing ventilation rate 50% and by using heat recovery apparatus	-----	.10
Save 30% by using total energy systems in 1/3 of all units	-----	.64
Use microwave ovens for 1/2 of cooking	-----	.06
Total savings	-----	4.96
Actual fuel use in 1973	-----	12.06
Hypothetical fuel use with conservation	-----	7.10

The example of the Ohio State University energy conservation program indicates that we can correct our past errors. If we follow the example set by Ohio State, energy use in existing commercial buildings can be reduced by at least the 41 percent suggested by Ross and Williams and probably by more, since more investments in energy saving modifications will be justified for buildings which use heating fuels other than the natural gas used by Ohio State.

C. Industrial Energy Savings

Unlike commercial energy use, which has grown less efficient over the past 20 years, industrial energy use has been gradually increasing in efficiency. Energy use per unit of manufactured product declined 1.6 percent per year on the average from 1954 to 1967. Nevertheless, substantial energy saving opportunities in industry remain.

Ross and Williams estimate that the single greatest opportunity for industrial energy conservation is represented by low cost "housekeeping" measures such as reducing lighting, heating, cooling, and ventilation levels and plugging steam leaks.⁵¹ The DuPont Company's Energy Management Services team, which has helped DuPont . . . claims that most industrial plants with annual energy bills exceeding \$500,000 can cut energy use by 7 percent to 15 percent with little effort.⁵² The Raytheon Company, which is an electronics manufacturer and therefore not an energy intensive industry, achieved substantial energy savings almost immediately when it began an energy conservation program in October, 1973. For Raytheon plants during the period November, 1973 to July, 1974, fuel oil consumption was reduced by 30 percent, natural gas by 17 percent, and electricity by 15 percent.⁵³ Similarly, Cheesebrough-Pond's, Inc., a diversified manufacturer of consumer goods, was able to cut fuel use by 40 percent and electricity by 20 percent in the first six months of 1974.⁵⁴

Beyond housekeeping measures, energy can be saved by increasing the efficiency of industrial processes.

Ross and Williams estimate that the greatest opportunity for improving the efficiency of industrial processes is cogeneration of industrial steam and electricity. In one form of cogeneration the temperature and pressure of usual industrial process steam is raised enough to first power a steam turbine which generates electricity and then the turbine exhaust steam is used for the lower temperature process steam needs. Since the energy cost of generating electric power is only the additional fuel required to increase the quality of the process steam far enough to power the turbine, industry generation of electricity is twice as efficient as central power plant generation. Thus industry generation of electricity requires only half the fuel and half the capital required by central power plants. A study prepared for the National Science Foundation by Dow Chemical Company (and coauthors) suggests that it would be profitable for industry to construct 71,000MW of electric generating capacity by 1985, enough to

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supply all industrial electricity needs and sell some to the electric utilities.⁵⁴ The industrial generating capacity would permit utilities to forego \$38 billion of new investment but would require only \$19 billion investment by industry due to the greater efficiency of industrial generation of electricity.

Another opportunity for profitably improving industrial energy efficiency with existing technology involves direct heat processes, which account for 11 percent of national energy consumption.

One way to increase the efficiency of certain types of heat treating furnaces and incinerators is to add a recuperator, which is simply a heat exchanger which uses heat from the exhaust gas to preheat combustion air. Recuperators added to radiant tube furnaces (gases and heat from combustion circulate through a hot tube which radiates heat to the process and then are exhausted) can reduce fuel use by up to 30 percent.⁵⁵ Since few of the 900,000 radiant tubes in heat treating furnaces presently use recuperators, the potential for saving energy by retrofitting existing industrial plants with recuperators is substantial.

The economics of installing recuperators are attractive. One expert suggests that a recuperator costing \$1,000 to \$1,500 can save fuel equal to 1/2 barrel of oil per day (for a 450,000 barrels per day saving if all 900,000 radiant tubes are equipped with recuperators).⁵⁶ At today's average oil price of close to \$11, the recuperator could pay for itself in 1 to 2 years. A more detailed cost analysis provided by the Ford Foundation study on the fuel effectiveness of industrial technology, displayed in Table 9, suggests that installation of recuperators on a new 15-tube furnace to cut energy use by 23 percent would provide a return on investment of 13.9 percent to 43.5 percent, depending upon fuel costs.⁵⁷

TABLE 9.—Cost analysis for recuperators on radiant tube heat-treating furnace⁵⁸

Additional first costs:			
15 recuperators			\$ 10,500
Piping, installation costs and larger blower			1,600
Increased engineering and design changes			250
Total			12,350
Fuel Cost Savings:			
Fuel cost (\$/million Btu)	\$0.60	\$0.90	\$1.20
Fuel saving per year	3,172	4,757	6,343
Increased maintenance expenses for recuperator	-840	-840	-840
Net saving per year	2,332	3,917	5,503
Rate of return on investment: (10-year life and \$500 salvage value, percent)	13.9	29.4	43.5

Table 9 shows that at energy costs of \$1.20/million Btu, an investment in a recuperator is repaid at a 43.5 percent annual rate, for a payback period of 2.5 years. Since today's average oil price of \$11 converts to \$1.90/million Btu, it is clear that a factory which burns oil to power a radiant tube furnace should invest in recuperators. Even the added cost of retrofitting existing furnaces with recuperators is economically feasible at such prices.

Ross and Williams have calculated that 1973 industrial energy use could have been reduced by 38.4 percent if feasible energy conservation measures had been widely adopted. Their calculations are displayed in Table 10.

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TABLE 10.—Potential fuel savings by industrial users⁵⁹
[In 10¹⁵ Btu]

Conservation measures	Potential savings
Good housekeeping measures (save 15%)	3.85
Fuel instead of electric heat in direct heat applications	.17
Steam/electric cogeneration for 50% process steam	3.54
Heat recuperators or regenerators in 50% of direct heat applications (save 25%)	.74
Electricity from bottoming cycles in 50% of direct heat applications	.49
Recycling of aluminum in urban refuse	.10
Recycling of iron and steel in urban refuse	.11
Reduced oil throughout at oil refineries associated with reduced use of oil (refining process consumes 10% of oil refined)	.70
Reduced field and transport losses associated with reduced use of natural gas	.80
Total savings	11.38
Actual fuel use in 1973	26.95
Hypothetical fuel use with conservation	18.27

About 71 percent of the suggested potential energy savings are available from the housekeeping measures, cogeneration of steam and electricity, and use of recuperators discussed above.

II. BARRIERS TO ECONOMICALLY FEASIBLE ENERGY CONSERVATION

Many of the energy saving opportunities described above cost nothing or very little. Others require a financial commitment which is quickly repaid by energy savings. Moreover, virtually all of the cited examples were economically feasible at pre-embargo energy prices. The fact that profitable energy conservation opportunities have existed for years without being exploited by energy users suggests that there are barriers to technically and economically feasible energy conservation, which can be characterized as institutional barriers. Several such institutional barriers to energy conservation are discernible.

A. Anti-Conservation Policies of Vested Interests Historically, at least three vested interests have directly and indirectly encouraged energy waste in residential and commercial buildings.

Direct encouragement of energy waste has been the specialty of the Illuminating Engineering Society (IES), an arm of the lighting industry which has steadily increased its recommended lighting levels over the years. The IES lighting standards stress quantity over quality or effectiveness. Hence large areas are lighted uniformly rather than tailoring light to user needs. Following IES standards, the New York City Board of Education tripled its lighting standard for schools from 20 to 60 footcandles over a twenty year period (1952 to 1971).

Electric utilities have encouraged energy waste by advertising the joys of all-electric living and providing rate discounts for large users of electricity, including all electric homes. The all electric homes usually include electric resistance heating, which is the least efficient means for heating a home.

Residential and commercial building developers encourage energy waste less directly, but with no less impact. Due to tax laws and financing practices, developers have a substantial financial incentive to hold down their initial costs regardless of the effect of operating costs over the life of a building. The result of these incentives is that developers typically maximize short term gains on a building and then sell it and use the proceeds to repeat the process with a new building. The developer is in a position to make the most economically efficient investment in energy conservation but such investments aren't profitable for the developer when he plans to sell the building soon. The subsequent owner, the tenants, and society would benefit over the life of the building from investments in energy conservation measures, but they don't design the building.

B. Government Research and Development Priorities and Tax Policies.

Government research and development expenditures regarding energy have concentrated on energy production, especially nuclear power development, while generally ignoring work on efficient consumption of energy or on non-nuclear and non-fossil fuel energy sources. In the estimation of one prominent commentator on energy efficien-

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cy, Charles Berg, the energy research budget for the past decade has allocated about 95 percent to research on fuels or power generation.⁶⁰ Even the recent increases in funding for energy conservation and solar energy research are insignificant when compared with funding for the breeder reactor program. The breeder reactor cost overruns alone outweigh total federal spending on energy conservation and solar energy research. Furthermore, the first annual report of the Energy Research and Development Administration (ERDA) revealed ERDA's plan to continue its distorted allocation of resources. The ERDA report has been sharply criticized by the congressional Office of Technology Assessment (OTA) for its overemphasis on energy supply as opposed to energy conservation. The OTA analysis concluded that ERDA's energy conservation plans are "timid and underfunded, despite strong congressional encouragement."⁶¹ The OTA report pointed out that "the lack of an aggressive conservation program is also reflected in ERDA's budget requests, which allocate less than 2 percent of its total budget for conservation."⁶²

Tax policies have reflected a similar government encouragement of energy production and energy use as opposed to energy conservation. Tax subsidies to fossil fuel producers are the most obvious example. Another example is the role of accelerated depreciation in encouraging building developers to focus on first costs versus life cycle costs.

C. Lack of Awareness.

The failure to save money by saving energy is sometimes traceable to lack of awareness or, less charitably, ignorance. The housing industry, for example, is notoriously slow to develop and adopt new technologies. Thus, an innovative package of home design and construction ideas that reduce heat loss by 65 percent over conventional homes with no additional construction cost was not developed by the housing industry, but rather by an electric utility in Arkansas seeking a market for the use of electric heat pumps. Individual homeowners and commercial building owners suffer from their share of ignorance as well. They may be generally aware that they could save energy and money by modifying their buildings, but such general awareness is often insufficient to generate the confidence to make energy saving investments.

Industry's lack of awareness of energy saving opportunities can be traced to two basic sources. First, the potential for energy savings from housekeeping measures such as reducing lighting, heating, cooling, and ventilation levels is overlooked because industry management usually focuses on the cost of capital, labor, raw materials, and energy directly consumed by the manufacturing process. Other energy uses tend to go unnoticed in the background.

Second, some of our most energy intensive industries, such as basic metals, do not engage in vigorous price competition due to their noncompetitive industry structure and practices. Lacking price competition as a spur to efficiency leads to inefficient production in general, which includes inefficient use of energy.

D. Lack of Capital for Energy Conservation.

Although individuals building their own homes have considerable financial incentive to make investments that will conserve energy and therefore reduce operating costs over the life of their homes, they face the contrary consideration of keeping their initial cost down so that they can afford to finance construction. Typically lenders limit a home construction loan so that a "monthly shelter cost" which includes repayment of principal, interest, insurance, and maintenance costs will not exceed 25 percent of family income. If fuel and power costs are excluded from this calculation, investments that lower energy costs by raising the cost of the home only make home financing more difficult.

Financing energy conserving improvements in existing homes is often difficult because lenders are reluctant to provide unsecured home improvement loans. More insidiously, "redlining" policies of avoiding home loans to certain neighborhoods deny capital for energy saving improvements in precisely the homes that are most energy wasteful.

III. STRATEGIES TO OVERCOME BARRIERS TO ENERGY CONSERVATION — S. 2932 AND SUGGESTED CHANGES

It is clear from an examination of energy conservation opportunities and the institutional barriers to their adoption that the existing market mechanism is an insufficient vehicle for assuring that economically profitable energy saving measures are widely or universally adopted. This weakness of the market mechanism is primarily the product of private priorities and government programs (R&D funding, tax policy, regulatory policy) that create a real world that differs greatly from the idealized impersonal marketplace.

Give the inadequacy of the market mechanism as a means for maximizing already profitable energy conservation due to various market distortions, proposals to encourage energy conservation by simply raising the price of energy through a tax or decontrol

See footnotes on p. 56.

of domestic oil and gas prices so that they will rise to the OPEC cartel prices or its Btu equivalent are incongruous. The proposal of such a "price rationing" policy is grounded on the belief that the market mechanism will efficiently transform the price rises into energy savings. However, if the market mechanism is already failing to transform profitable energy saving opportunities into accomplished fact, across the board energy price increases to more artificially high levels will not be the efficient agent of energy conservation claimed by proponents of price rationing. A general increase in the price of energy would instead be economically disruptive and inefficient. The need to devise interventions in the energy market other than across the board price increases to encourage energy conservation is clear.

S. 2932 is a step in the right direction with its proposals, which include: (1) loan guarantees for cost efficient permanent energy conserving modifications of homes, small businesses, and manufacturing plants; (2) interest rate subsidies for some of the guaranteed loans to residential and commercial borrowers; (3) consumer education on the potential for energy and dollar savings; (4) encouragement of the development of energy conservation cooperatives by residential energy users; and (5) federal grants to finance state energy conservation programs which conform to S. 2932.

Some comments on these aspects of S. 2932 and other issues follow:

A. Loan Guarantees and Interest Subsidies

A major problem with loan guarantees and interest subsidies is that such programs can be abused by unscrupulous persons. The federal program of home mortgage loan insurance, for example, was characterized by an infamous amount of corruption. Recent scandals in the medicaid and food stamp programs are evidence that similar dangers are presented by direct subsidies, including vouchers for specific purposes.

The problem here is basically one of policing the distribution of the incentives to assure that they are used as intended. One problem with the loan guarantee is that in overcoming the lender's resistance to loaning money to certain borrowers, the loan guarantee also removes the lender's incentive to keep the borrower honest. If a borrower spends the money on something unrelated to energy conservation or defaults on the loan, the lender is not harmed. As for monitoring of compliance by a state or federal agency, that would require "before and after" visits to the borrower's home, business or factory to confirm that he was using the guaranteed and/or subsidized loan as intended. The cost of such supervision might be higher than the value of the subsidy.

The Act's provision for the development of "guidelines" for the loan guarantee and interest subsidy program indicates an assumption that the compliance problem will be resolved at that time. This attitude is much too sanguine. The Act should be altered to include some specific policy, or set of alternative policies, to assure use of the incentives for their intended purposes and avoid corruption. If the Act's drafters cannot invent such policies, they should not be so sure that subsequent drafters of guidelines will be able to fill the void. In short, if the loan guarantee and interest subsidy programs cannot be constructed to discourage abuse, perhaps they should be foregone in favor of other aspects of S. 2932 and novel approaches not included in S. 2932.

One possible guide to insulating an energy conservation loan guarantee and interest subsidy program from abuse is provided by the Federal Housing Administration's property improvement loan insurance program, which has never suffered the abuse and scandals associated with the home mortgage loan insurance program. One reason is that the property improvement loans are "co-insured" by FHA and lenders, while the home mortgage loans were solely insured by FHA. In the case of the improvement loans, lenders are required to assume 10 percent of loan losses. The lenders' role as co-insurers of the property improvement loans gives them an incentive to avoid loan losses by exercising some prudence, though, of course, the loan insurance is designed to encourage property improvement loans. The satisfactory experience with FHA property improvement loan insurance, which has a very low rate of loan losses, indicates that S. 2932 should also mandate co-insurance, with energy conservation loan guarantees limited to a fixed fraction and lenders required to assume the remainder of loan losses.

Another aspect of the FHA program that should be considered for adoption is its requirement that lenders investigate the originators of most of the insured property improvement loans, the dealer-contractors who specialize in such work. Lenders are required to investigate dealer-contractors who bring in loan insurance business and certify that they are, "(1) reliable, (2) financially responsible, (3) perform satisfactorily the work to be financed, and (4) equipped to extend proper service to the customer."⁶³ Lenders must also supervise the operation of approved dealer-contractors by keeping a record of their loan history and making spot checks of their work.⁶⁴ Similar require-

See footnotes on p. 56.

ments of lender approval and supervision of dealer-contractors should be attached to guaranteed and subsidized energy conservation loans.

In addition to the compliance problem with the loan guarantee and interest subsidy approach, it may be unfair in principle to restrict the federal subsidy of energy conservation improvements to energy users who are willing to finance their improvements on credit. We should ask whether it is fair to force people into debt to receive a subsidy. Adding the option of a direct grant for energy conservation would, of course, resolve this problem, but it would intensify the problem of assuring that the subsidy is used as intended.

A point in favor of loan guarantees and interest subsidies is that they may be needed to overcome the effect of redlining by lenders, which prevents homeowners in many neighborhoods from borrowing money for even the most profitable energy saving improvements. Pending the development of policies which prohibit lenders from redlining whole neighborhoods, loan guarantees and/or interest subsidies may be the best way to assure that residents of redlined areas can find a willing lender. To the maximum extent possible, any energy conservation loan guarantees and subsidies should be designed to prevent or overcome redlining by lenders.

B. Consumer Education

The Act mentions two kinds of consumer education. First, it says that state energy conservation programs must establish procedures to encourage "energy audits" by certified parties to provide to homeowners, small businessmen, and manufacturers reliable information on potential energy savings and dollar savings (Sec. 108(1)). Second, it authorizes the use of federal funds by states to advertise the existence of the energy audit service and the loan guarantee and interest subsidy programs (Sec. 108(3)).

The encouragement of reliable energy audits is desirable because it will convert the general awareness of potentially profitable energy savings into more precise terms that are more likely to stimulate energy users to invest in energy saving measures. The importance of this service suggests a way to redirect the financial incentives represented by loan guarantees and interest subsidies. Perhaps the subsidy should go to pay most or all of the cost of energy audits by certified parties. Energy users could then pay for recommended energy saving measures with confidence that their investment would soon be repaid from their predicted energy savings. The compliance problem would be reduced to one of policing the parties certified to perform the subsidized energy audits rather than the whole universe of energy users benefitting from the federal subsidy. Also, the problem of forcing people into debt to qualify for a subsidy is eliminated.

The Act's suggested use of federal funds to pay for advertising the availability of energy audits and the loan guarantees and interest subsidies raises a serious equity question when applied to the broadcast media. Radio and television broadcasters are permitted to use the public airwaves for private profit. In return they are expected to provide some nonprofit community services. One way they have discharged this duty is through public service advertising which is generally broadcast during hours of minimum audience levels when such ads will displace the least paid advertising. This tactic is more an evasion than a service of community interests. It is time to require that community interest messages such as the energy conservation advertising envisioned in S. 2932 be broadcast during prime time, when the maximum audiences are listening and watching.

C. Energy Conservation Cooperatives

The Act suggests but does not require that states encourage residential energy users to establish energy conservation cooperatives to provide needed expertise and to aggregate purchasing power as a means of reducing the cost of energy audits, materials and equipment, and installation charges (Sec. 109).

The idea of encouraging energy conservation through consumer cooperatives is the best part of S. 2932, but the Act is weakened by permitting state governments to decide whether energy conservation cooperatives should be encouraged. Clearly the Act's authors hope by generally delegating responsibility to the states to bring government closer to the citizens it serves. In the case of energy conservation cooperatives, however, state governments may become a barrier to citizen action by failing to encourage the development of the cooperatives. This problem can be cured by altering S. 2932 to provide direct federal aid to parties willing to form energy conservation cooperatives.

In addition to providing more direct encouragement for the creation of energy conservation cooperatives, the Act should expand the scope of activities which the cooperatives are permitted to pursue. For example, the Act should permit cooperatives to provide rather than merely purchase the needed energy audit and installation services

and to become lenders of the guaranteed and subsidized energy conservation loans (if these incentives are retained). The cooperatives should be limited to a scale that will facilitate control by members. Given cooperatives that are truly controlled by and responsive to their member/customers, they could be expected to provide reliable energy audits and installation services. In addition, since the borrowers (cooperative members) would be known to the lender (cooperative management), assurance that the loans are used for permissible purposes is easier to achieve.

One problem with the Act that could limit the role of cooperatives is its requirement that energy conservation measures be permanent modifications of homes. This requirement would foreclose another potential role of energy conservation cooperatives—as lessors of solar water heaters. If energy conservation cooperatives are instead encouraged to use the subsidized interest rates to purchase solar water heaters for rental, the use of solar water heaters could be greatly accelerated. The opportunity for homeowners to rent solar water heaters from a reliable lessor will encourage their use because it will eliminate three present obstacles to consumer acceptance: (1) lack of availability of a reliable supplier, (2) high initial cost, and (3) lack of assured maintenance service. While incentives for individual users to purchase rather than rent solar water heaters can help overcome the obstacle of high initial cost, the lack of a reliable supplier and maintenance service would remain as obstacles to wider use of solar water heaters. Another advantage of encouraging cooperatives to get into the business of leasing solar water heaters is that mass manufacturing will be stimulated by the aggregation of markets provided by the cooperatives.

The likelihood of the development of long lived conservation cooperatives is increased if they are encouraged to undertake continuing energy conservation roles such as lending and leasing. Energy users are less likely to go to the trouble of creating cooperatives for the one shot task of mass purchase and installation of insulation. If long lived energy conservation cooperatives are created, a spirit of competition among the cooperatives can be encouraged by creating national energy conservation goals and allocating additional federal aid among the cooperatives on the basis of demonstrated achievement of energy saving goals. Making individual energy users part of a team effort to save energy will make them more aware that their individual efforts can contribute to community and national goals of reducing energy consumption and therefore provide an additional incentive for them to conserve energy.

D. Federal Grants to States

The provision of federal grant-in-aid funds to help states administer the Act (and the availability of the loan guarantees and interest subsidies) is conditioned on the development of approved energy conservation plans by the states. This practice of using the federal carrot to induce state action is not new. The only problem with S. 2932 is that it doesn't go far enough with this concept. Major improvements in the encouragement of energy conservation measures could be achieved by adding further federal grants with attached strings that require state action. Specifically, such conditional federal aid should be aimed at state utility regulation, since the state regulatory power over gas and electric utilities presents several opportunities for innovations that would encourage profitable energy conservation by gas and electricity users.

E. Energy Conservation Through Gas and Electric Utility Regulation

The authors of S. 2932 should consider redrafting it to provide federal grants to promote conservation of gas and electricity in those states where public utility commissions are willing to establish regulatory policies that encourage conservation. At a minimum, the following seven utility regulation policies that encourage conservation of gas and electricity should be required by this or companion legislation. Several states have already enacted some of the suggested changes.

First, all utility advertising that promotes energy use should be banned, regardless of whether shareholders pay for it. Second, the utilities should be required to finance energy conservation advertising to help counteract the pro-consumption influence of their prior advertising. Third, declining block rates should be discontinued so that electricity users pay rates that are closer to the true incremental cost of their extra electricity use. Fourth, electric resistance heating in new homes should be banned due to its inherently low efficiency, except in limited cases. Fifth, the Lifeline rate concept should be adopted for residential users. Under a Lifeline rate, residential users are guaranteed a minimum amount of electricity or gas at a stable price. If users exceed that minimum consumption level, their extra consumption is priced at higher rates. In effect, then, residential users would confront an inverted rate structure which is a constant reminder and incentive to conserve energy by modifying homes and wasteful habits.

The sixth utility regulation policy upon which federal assistance should be conditioned is the adoption of a conservation policy similar to that pioneered by the Michigan Public Service Commission. In 1974 the Michigan PSC required all gas utilities to become promoters of attic insulation in the homes of their customers. The gas utilities were required to arrange with contractors to insulate the attics of all customers who requested the service. The gas companies financed the insulation and billed the cost to their customers at the rate of 1 percent per month spread out over three years, which is a lower annual rate and longer payback period than most consumer loans. All customers who had paid their gas bills qualified for the insulation financing service, regardless of other credit ratings. Monitoring of the program disclosed that in most cases the monthly financing charge was less than the cost of conserved gas and therefore monthly gas bills declined.

The Michigan program also required the gas utilities to advertise the savings available from improved insulation. A significant increase in the sale of insulation to do-it-yourselfers occurred during the period of the advertising campaign. The Michigan PSC is now considering policies that would provide incentives for the do-it-yourself installation of insulation.

Finally, an extension of the energy conservation cooperative concept is called for to provide a watchdog against promotion of wasteful use of electricity and construction of excess generating capacity by electric utilities. S. 2932 should condition aid to state energy conservation programs on enactment of state legislation that enables residential ratepayers to form their own consumer action groups and voluntarily contribute a supporting fee via a monthly checkoff space on their utility bill, which state law would require utilities to provide. Such a consumer group, run by the consumers of utility services, would finance its own full-time attorneys, economists, and lobbyists to gain a voice in utility legislation and regulation. We call such groups Residential Utility Consumer Action Groups or RUCAGs.

Residential electricity users organized into RUCAGs will be a strong force in favor of energy conservation because they will be working to require large energy users to pay their own way rather than be subsidized by residential ratepayers. When forced to pay the true cost of their electricity, the large electricity users will become more efficient users.

IV. Conclusion

In the largest context the energy waste that has developed in this society is a product of the default of public policy makers at all levels of government who have permitted energy policy to be guided by a few vested interests. The rising debate over oil and gas regulation, strip mining, nuclear power, and energy conservation policy is the product of an aroused public that wants to replace an autocratic energy policy with an energy policy governed by democratic processes. We cannot afford an energy policy dictated by vested interests who encourage energy waste and reliance on finite and hazardous energy sources. We must adopt policies that encourage development of safe and renewable energy sources and the efficient consumption of energy. If we work hard at reducing our energy waste, we might someday catch up to other industrialized nations which maintain a standard of living equal to our own while using one-half as much energy per person.

Thank you.

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Senator HOLLINGS. We next have a panel of Mr. David Stevens, assistant to Gov. Daniel J. Evans, for Energy and Transportation, State of Washington, and Mr. Forrest E. Orr, director, Energy Office, State of Vermont.

STATEMENTS OF DAVID STEVENS, ASSISTANT TO GOV. DANIEL J. EVANS, FOR ENERGY AND TRANSPORTATION, STATE OF WASHINGTON; FORREST E. ORR, DIRECTOR, ENERGY OFFICE, STATE OF VERMONT; AND EDMOND F. ROVNER, ENERGY PROJECT, NATIONAL GOVERNORS CONFERENCE, WASHINGTON, D.C.

Mr. ORR. Good morning.

Senator HOLLINGS. We appreciate your presence this morning. Is it your desire to read those statements?

Mr. ORR. Mr. Chairman, I am Forrest Orr, representing Governor Salmon. I don't think I will read the statement, I will just highlight it.

Senator HOLLINGS. It will be included in its entirety in the record.

Mr. ORR. A few personal comments first. Governor Salmon apologizes for having to alter his schedule. But our legislature is in session, he discovered our budget is up for grabs and thought it would be more prudent for him to be at his desk this morning.

Senator HOLLINGS. He's been down here several times already. As chairman of the National Governors Conference he has been most active and concerned and has already had certain input in this particular measure.

I expect you are going to endorse the bill, support it. I would welcome any criticisms you have.

Mr. ORR. With respect to the committee which you mention, which the Governor chairs, as of yesterday the committee, the National Governors Conference on Environment and Natural Resources, which also handles energy for the National Governors Conference, the committee yesterday at the Governors did consider the contents of the bill and did vote unanimously to endorse this initiative.

Senator HOLLINGS. They voted unanimously?

Mr. ORR. That's right, Mr. Chairman.

Senator HOLLINGS. I might state, too, here for the record, and I said it in my prepared comments and also perhaps should emphasize it a little more with Mr. Nader, I have great confidence in the States and their programs.

The one thing we have found working on this problem during the last 2 years is the tremendous leadership at the State level. They have energy policy councils. We have struggled and strained to get one here in the national government and still are lacking in that regard, which you have back at the State levels.

They have been voluntary, they are high level, they are interested. In this sense the States have been ahead of the national government.

Go right ahead and proceed. I am glad to see, and am not a bit surprised that they unanimously endorse it because they have been working and studying and urging us in this direction.

Mr. ORR. One or two personal comments before I go into the Governor's statement.

There have been quite a few references this morning to cities, fairly sophisticated institutions like Ohio State.

I would like to point out that I am going to take a very parochial view. I come from a State, the most rural State in the Nation, bordering on Canada in which the climate is minus 30 to 40 degrees in the wintertime, not a unusual phenomena, a State in which we have discovered that over 80 percent of our homes are heated by oil, we have discovered we have quite an inventory of old homes as you would imagine, being in the New England area, we have discovered over 60 percent of our buildings and homes in Vermont were built prior to 1939.

I can testify personally, my first home in Vermont was over 150 years old when I bought it and it had absolutely no insulation in it at all.

So a good stock of our homes in Vermont were built prior to the emergence of insulation at the national level. We are concerned about people in our State and the ability of our society to survive in terms of the new energy era.

With those personal comments, Mr. Chairman, I will just highlight the comments of Governor Salmon.

The Nation's Governors have long been on record in support of a national energy policy and have concluded that a major focus of any policy must be to upgrade the function of energy conservation programs. We do not suggest that all future growth and maintenance of our society can be achieved from conservation. But neither can it be supported solely from expansion of supply and from imports. Perhaps, when renewable fuels have been perfected technically—and economically—and all the problems of nuclear power have been satisfactorily resolved and we have made the investments in development and technology to exploit our coal reserves we can again plan activities without concern about availability of energy. And or all of these are contingent on scientific advances and are decades away.

In the short run—the next 5 to 10 years—there can be no significant expansion of supply (except for Alaskan oil and gas which will serve mainly to replace declining domestic production and restricted imports.)

A few steps have been taken to effect this reduction in per capita energy usage. The 55-mile-an-hour speed limit (which is honored no less than was the previously higher limit); modification of daylight savings schedules; mandatory improvements in auto efficiency (which will take a few years to show up on the production process and several years beyond that to affect the average of the fleet of cars in use on our highways); mandatory labeling of efficiency of appliances (which suffers even more limitations than does the new regulations regarding auto efficiency); and some efforts at public education.

We hope that Congress will mandate efficiency standards dealing with new building construction and will fund a program of helping to finance the purchase of materials to weatherize the homes of low income families to make them more energy efficient.

The States have played a major role in energy conservation and look forward to an even more expansive role in the quest to counter the mounting rate of dependence on foreign supplies and increasing prices. Net energy costs not only feed the flames of inflation but also places unbearable burdens on the less affluent. The retrofit program for the poor originated in Maine, Vermont, and Pennsylvania. Many States have adopted thermal efficiency building codes even while recognizing that the state of the art in this area does not meet our long-term objectives.

The bill before you today goes one step beyond previous legislation, to address itself to the bottleneck in the conversion process from energy waste to energy efficiency. We are convinced that this bill can make a major contribution and must be a national quest.

Many of the self-financing changes in the way we do things that use energy are ignored because people do not have the front-end capital to invest. This is true even where they will recoup the capital plus interest in 2 to 5 years and will thereafter have economic gains. For the family which has an income of \$10,000 a year, \$1,000 to buy attic insulation and storm windows may be beyond its current means even though it will be a sound investment. Monthly mortgage payments and installment debts may be so high that the local bank or savings and loan association will not extend credit to a family. A small business may be faced with a 10- or 11-percent interest rate for any money borrowed and the lines of credit may be exhausted—even for prudent modification of the building or the processes.

We have carefully read the bill before us and are convinced that the Governors can effectively utilize the capacity this would add to the States' energy conservation efforts. We are particularly pleased that there will be flexibility because not only are there differences between the States but there are differences within many States that should dictate a range of programs.

We have done some analysis in the State of Vermont as to the possible benefits of this program. A typical single family home of about 1,500 square feet in Vermont should, under current revised standards, have 12 inches of attic insulation and have storm doors and windows as well as caulking and weather-stripping.

The cost of the insulation alone we have calculated to be somewhere between \$700 and \$1,000 per household, assuming there is someone in or available to the household who could install it.

This is just the cost of the material. This family is supposed to come up with roughly \$1,000 or more and I am using very conservative figures based upon our analysis. The value of the home may be such that the thermal quality does not raise the net value of the house.

Please don't hold me to the exact figure, but I believe that the average value of household in Vermont is somewhere around \$15,000.

So we are not talking about high-priced homes in our State. A subsidized interest rate can make the difference between being able to swing the deal and foregoing it.

It can tip the scale on whether to undertake a new debt.

The same is true for small businesses. Over a period of 5 or 6 years, the average savings in fuel may be equal to the cost of the new materials or machines (including normal interest). However, climate variations from week to week or year to year means that there can be no guarantee that there may not be a period where repaying the loan will take more than that month's utilities savings. If we can reasonably reduce those payments, we should be encouraged to do so.

We are convinced that our primary goals in energy conservation should be those which are self-financing and which do not diminish life style. There may be risks in the program, and these risks have been pointed out, there may be risks in the program contemplated by this bill, but they are not greater than in drilling for oil or gas.

In any event, they are less than the risks in remaining so vulnerable to our present energy supply situation. Speaking for Governor Salmon, may I ask, Mr. Chairman, that the record be kept open in case other Governors may wish to enter comments on this bill.

Senator HOLLINGS. The record will be open.

[The statement follows:]

STATEMENT OF HON. THOMAS P. SALMON, GOVERNOR, STATE OF VERMONT

Mr. Chairman and Members of the Committee. My name is Thomas P. Salmon. I am the Governor of Vermont and also serve as Chairman of the National Governors Conference Committee on Natural Resources and Environmental Management. This is the NGC Committee which deals with energy problems. I am grateful for the opportunity to appear before you today in support of S. 2932, the *Energy Conservation Act of 1976*.

The Nation's Governors have long been on record in support of a national energy policy and have concluded that a major focus of any policy must be to upgrade the function of energy conservation programs. We do not suggest that all future growth and maintenance of our society can be achieved from conservation. But, neither can it be supported solely from expansion of supply and from imports. Perhaps, when renewable fuels have been perfected technically—and economically—and all the problems of nuclear power have been satisfactorily resolved and we have made the investments in development and technology to exploit our coal reserves we can again plan activities without concern about availability of energy. Any or all of these are contingent on scientific advances and are decades away.

In the short run—the next five to ten years—there can be no significant expansion of supply (except for Alaskan oil and gas which will serve mainly to replace declining domestic production and restricted Canadian imports). This lack of expanded domestic production would be the case even if we were to suspend all environmental and other societal protection laws. Therefore, the only way to reduce dependence on imports—and a significant way to reduce the impact of rising prices—is to reduce the energy used to heat and cool our buildings, to move people and materials, and to produce our goods and services.

A few steps have been taken to effect this reduction in per capita energy usage. The 55-mile-an-hour speed limit (which is honored no less than was the previously

higher limit); modification of daylight savings schedules; mandatory improvements in auto efficiency (which will take a few years to show up in the production process and several years beyond that to affect the average of the fleet of cars in use on our highways); mandatory labeling of efficiency of appliances (which suffers even more limitations than does the new regulations regarding auto efficiency); and some efforts at public education.

We hope that the Congress will mandate energy efficiency standards dealing with new building construction and will fund a program of helping to finance the purchase of materials to weatherize the homes of low income families to make them more energy efficient.

The States have played a major role in energy conservation and look forward to an even more expansive role in the quest to counter the mounting rate of dependence on foreign supplies and increasing prices. Net energy costs not only feed the flames of inflation but also places unbearable burdens on the less affluent. The retrofit program for the poor originated in Maine and Pennsylvania. Many States have adopted thermal efficiency building codes even while recognizing that the state of the art in this area does not meet our long term objectives. States have worked with their private citizens and with their businesses to help them capitalize on self-financing opportunities to reduce energy use. Education programs for the public and in the school systems can be found in virtually every State in the Union.

The energy legislation enacted last December recognizes the potential role of the States when it provides authorization for funds to help each State plan, and then implement, an energy conservation program. The bill before you today goes one step beyond previous legislation to address itself to a bottleneck in the conversion process from energy profligacy to energy efficiency. We are convinced that this measure can make a major contribution to what must be a national quest.

American merchandising has always focused on first cost. We are a society that "throws it away" rather than fixes it up. We stress the down payment on the house more than the total cost of the dwelling. Unfortunately, we Americans do not think in terms of life cycle costs.

Many of the self-financing changes in the way we do things that use energy are ignored because people do not have the front end capital to invest. This is true even where they will recoup the capital plus interest in two to five years and will thereafter have economic gains. For the family which has an income of ten thousand dollars a year, a thousand dollars to buy attic insulation and storm windows may be beyond its current means even though it will be a sound investment. Monthly mortgage payments and installment debts may be so high that the local bank or savings and loan association will not extend credit to a family. A small business may be faced with a ten or eleven percent interest rate for any money borrowed and the lines of credit may be exhausted—even for prudent modification of the building or the processes.

We can regulate new construction by building standards. We can provide the materials and do the work on homes of low income families. However, the impact on total national energy use will take generations to be realized on any significant scale. A bill passed by the House is still pending in the Senate which would give tax credits for a portion of the investments made by homeowners and small business to make their buildings and processes more efficient. Even if the bill were enacted, it would not answer the problem of the people for whom the capital is not easily available. To tell them that this is a wise investment for them and for their nation is simply to tantalize them because they cannot take advantage of the opportunity.

We have carefully read the bill before us and are convinced that the Governors can effectively utilize the capacity this would add to the States' energy conservation efforts. We are particularly pleased that there will be flexibility because not only are there differences between the States but there are differences within many States that should dictate a range of programs.

For example, in many States, a Governor may secure a working relationship with utilities in metropolitan areas so that the utility could offer to its subscribers an opportunity to have the subscriber authorize the utility to put in the insulation and add the carrying charges to the bill for a period of years sufficient in duration so that the monthly savings of electricity or gas would offset the carrying costs. Many States have housing authorities which can make loans directly to home owners. These can be used. Cooperatives exist in many communities and others could be formed which could use the credit made available to offer insulation programs. Savings and loan companies could be used to reach home owners with a new type of offer which would not require replacing an existing mortgage.

These are a few of the mechanisms now in place which could be used to stimulate weatherization buildings. There are many which could be used for small businesses. Many States have economic development loan funds which could be broadened to offer these opportunities to their constituents. Trade associations might be induced to accept this program as part of their operations. Larger enterprises could be reached through State agencies to make them aware of the fact that they can safely plan to upgrade their processes without worry that they would be forced to make a choice between borrowing for business expansion or for making their existing operations more efficient.

In many parts of the country, local governments have built factories and warehouses for the purpose of inducing location of new industry with its new tax base and new employment opportunities. They could be induced to participate in this program without worry that they would be exceeding their tax exempt bond authority. In fact, it would make their facilities even more attractive to potential new employers.

I think that many of the lending institutions, particularly in smaller communities, are caught in a tight squeeze as to how much they can lend out and the experience of soaring interest and rediscount rates have made them uneasy about long term loans. They give preference to secure loans so that their portfolio will show a balance of reliability among borrowers. As a nation, we need lenders to add energy conservation expenditures to their portfolio. I think it wise policy to provide some cushion for the lenders who we want to draw into a new aspect of home and business loans.

Let me put in a special endorsement of the authority to provide subsidized loans for home-owners and small businesses. These are two groups in the worst economic vise. The homeowner is caught between mounting mortgage rates and rising property taxes. Utility bills mount monthly as the product of higher interest rates and fuel costs are built into the utility rates. Savings are evaporating and the family budget is so closely balanced that undertaking a new major expenditure is a carefully made judgment.

A typical single family home of about 1500 square feet in Vermont should have twelve inches of attic insulation and have storm doors and windows as well as caulking and weather-stripping. The cost of the insulation, alone, is about \$700, assuming there is someone in, or available to, the household who can install it. Storm doors and windows require a mechanic for installation. This family is supposed to come up with roughly \$1,000. The value of the home may be such that the additional improvement in thermal quality does not raise the net value of the house. A subsidized interest rate can make the difference between being able to "swing the deal" and foregoing it. It can tip the scale on whether to undertake a new debt.

The same is true for small businesses. Over a period of five or six years, the average savings in fuel may be equal to the cost of the new materials or machines (including normal interest). However, climate variations from week to week or year to year means that there can be no guarantee that there may not be a period where repaying the loan will take more than that month's utilities savings. If we can reasonably reduce those payments we should be encouraged to do so. I am convinced that our primary goals in energy conservation should be those which are self-financing and which do not diminish life style. These criteria clearly are met by heating and cooling efficiency. For example, the heat pump uses half the electricity to produce space heating than does electric heating through the traditional means. Wrapping steam pipes in a small assembly plant may save not only some of the energy required to produce the steam but the energy required to cool the work areas through which the pipes pass.

I would like to see building permit offices have literature on hand so that when a small business operator comes in with plans to renovate the premises, they could be encouraged to add energy savings modification as well. I would like to see community colleges and vocational schools train people to install energy savings items and have a local lending institution ready to provide quick turn-around processing of applications to fund work by new small businesses which might be certified by the schools.

There may be risks in the program contemplated by this bill but they are no greater than in drilling for oil and gas. In any event, they are less than the risks in remaining vulnerable.

Senator HOLLINGS. We will now hear from Mr. Stevens.

Mr. STEVENS. Thank you.

Before I start, I would like to have you be aware of Ed Rovner's presence on our left. Mr. Rovner is the director of the energy project for the National Governors Conference.

Senator PEARSON. What has happened with the building codes in the last 4 or 5 years in your State? I am interested in what is happening across the country. Do you know what your local building codes have been doing in this direction?

Mr. STEVENS. Senator, in our State we have had very little attention to building codes.

Senator PEARSON. I suspect they have had very little attention in my State, too.

Mr. STEVENS. We have addressed ourselves in the past few years to, I think, reinforcing the application of general building code standards throughout the State in both the urban and rural areas.

Senator HOLLINGS. But that is really a local responsibility and they are very jealous of it. Of course, this is what foregoes even a national thrust, with respect to construction and things of that nature, local building codes.

Mr. STEVENS. Right.

Senator HOLLINGS. I know there are much more economical ways to construct homes. By the time we get through with local building codes and everything else, we don't even get a start in that particular direction. You can't, as a State, really mandate a building code on a municipality or local community, can you? You couldn't get that through the legislature.

Mr. STEVENS. There are problems, yes, there are. We do have the uniform code, which does provide an apparatus, which gives some uniformity and that has been helpful.

Senator HOLLINGS. Mr. Rovner?

Mr. ROVNER. Yes. Senator, one of the problems with the building codes in terms of energy conservation is the fact that there was no standard that could be adopted. Most building codes adopt a national standard, whether its on electrical safety or plumbing or anything else. There are experts on the national level who devise the standards. Then the States or localities, depending on whose got the building code, adopt them.

Several years ago the State building code organization, which is the National Conference of States' Building Codes and Standards, asked that the standard be developed for energy efficiency. The impetus for it came from the State building code officials as they worked very closely with the National Bureau of Standards, and they worked with ASHRA, which is the private code-writing organization for the heating and air-conditioning engineers.

It took an awful long time for anything to come forth, but finally it was late last year that finally the code, which was known as 90-75 was finally issued. A number of States have adopted it, a number of localities have adopted it and are moving—it is being more widely adopted. It is a national standard for which hardware and technique is clearly available, which does save—a little company did a study and found out that following the ASHRA of 1975 would not increase the initial cost of the building because the added cost for better insulation and better caulking and so on, on the one hand, is a cost to the building, but it is compensated for, even initial cost, by a reduction in the heating and air conditioning equipment.

Senator PEARSON. I am concerned that we pour energy conservation efforts in one end and they come out the other through the local

building codes. Localities ought to consistently improve their codes to facilitate our coming in on top, so to speak, and our asking for all these conservation improvements to be made and providing the incentive for them. Is that concern justified or are we making that kind of progress?

Mr. ROVNER. I think a substantial amount of progress is being made, Senator. In the building code areas, it was the building code officials who have asked for the better standards. They are expensive, they are difficult to derive and, in fact, one has been prepared, the 90-75 Standard. They have supported, asking that the Federal Government develop the performance standard, which is the ultimate standard but very expensive to do. The efficiency standards are being adopted right across the country. But there was no standard to adopt up to this point. It is only with the issuance of the standard, they can adopt it.

Senator PEARSON. I am sorry.

Senator HOLLINGS. No, this is just by way of an aside. This is really a function of the Housing and Urban Development Committee of our Congress. I used to serve on it, got interested in housing, 26 million units. This was 7, 8 years ago, we were 26 million units behind. We looked and found that the DOD had contracted for an efficient, insulated, economical 3-bedroom, 2½-bath home, and I think GE Corp. won the bid. They constructed them at Vandenberg Air Base out on the West Coast, and they are ready to economically start building them all over America.

Now they ran straight into the building code. They could do it at that time at around 14,000 or 15,000. With inflation it would still only be about 20,000, a terrific bargain. There are all kinds of economies in there, rather than copper piping, you go to the average building code, they are still mandating copper piping.

Mr. ROVNER. I don't think they are any more, they are using plastic pipes.

Senator HOLLINGS. Well, follow that through, rather than just theorizing. They are marketing that home like hotcakes in Japan and in Iran. But not in the United States because of the building code. Rather than fight it they go ahead selling it. It is working. The ingenuity, technology and everything else is there but the hang-up on building codes is what has forestalled any development on that kind or marketing that kind of product in this country.

Mr. ROVNER. At the risk of pre-empting Dave Stevens, you will find, I think, if you do an examination that many States are now preempting all local building codes with regard to factory-built housing. Those codes are performance codes, they are modern, they are intended to encourage the introduction of the kind of efficiency and economies that come—bearing in mind they have to be safe and they have to meet minimum standards, that factory-build housing can provide.

I know full well of Washington's, because when I worked for the State of Maryland, I stole half our statute from the State of Washington, so I know they have at least as good a code as we do but you will find this increasingly across the country.

Senator HOLLINGS. Very good.

Mr. Stevens, you may proceed, please.

Mr. STEVENS. Thank you.

I am employed as an assistant to Governor Evans, State of Washington, in the area of energy.

Governor Evans is in the building this morning, but had scheduled previously to meet with the Foreign Relations Committee. That is really the only reason he wouldn't be here himself.

I would like to stick pretty close to the prepared statement preparatory to any possible questions you might have.

I am gratified that the committee is addressing itself to a proposal which can help to stimulate greater activity by our citizens in energy conservation programs.

The earlier action of Congress, in the recently created Energy Policy and Conservation Act (Public Law 94-163) provides a beginning for emphasizing the promise and the practicability of energy conservation as a priority goal of the Federal Government.

For far too long there has been far too much rhetoric about the value of energy conservation, and too little concrete action to enable practical and substantial reductions in energy use by individuals and businesses. Legislation such as that proposed would provide a needed additional declaration of national intent as well as initiating an important and practical means of achieving savings.

The information available to us in Washington State indicates that a comprehensive program of energy conservation measures in housing, commercial and public buildings could reach from 25 to 40 percent of existing levels. This can be one of the most significant single applications of energy policy available, and is undoubtedly an energy efficient course of action. We need a policy action, such as contained in this bill, to insure that it happens.

There have been Federal voices in the past few months and years writing off voluntary conservation programs as either unworkable or impractical. Some have indicated that the citizens are incapable of working to achieve energy savings unless compelled to or unless sanctions, in terms of increased price and other repressive measures, are instigated.

Our experience in the Pacific Northwest and in Washington State challenges the conventional wisdom about the reluctance of our citizens to participate in conservation measures, given the need and a means of contributing to the solution of the problem.

During 1973 the Northwest, 85 to 90 percent dependent on hydroelectricity, experienced a drought situation which impacted heavily upon the levels of water needed to furnish adequate electrical energy. It became evident that the region would be substantially short of electrical load requirements for the forthcoming winter, that is, the winter of 1973-74. Mandatory curtailments seemed inevitable unless an unprecedented amount of cooperation from the public reduced or eliminated the need of governmental restriction on the use of electrical energy.

With the strong cooperation of industry, the public utilities, and the media, specific suggestions for lessening electrical use were widely disseminated and heeded. The voluntary response from the citizens was overwhelming. During the most critical stage, the savings in Washington State reached 10 percent under anticipated projections, well beyond the amount needed to avoid a mandatory curtailment program. It proved to all of us that effective action in surmounting

energy shortages can be taken if the facts are clear and understood and if there are adequate means available for use.

Those figures may seem somewhat modest in terms of the savings that Mr. Nader suggested were possible, which were based primarily on individual examples of large energy savings. Those were also paralleled by the experience in our State. Within State government in a very short period of time, we achieved a 30-percent energy savings in the capital buildings around the capital of the State in Olympia. On a statewide basis we had a 20-percent savings in electrical use by State government alone. But to reach a 10-percent figure on a statewide basis meant the involvement of millions of people of our State, making millions of individual decisions to voluntarily conserve. That resulted in a savings program which obviated the need for a governmental action which would mandatorily restrict the use of electricity.

Since our success with an actual crisis situation, we have detected a lessening of the public will to carry on continuing conservation activities. Still, a substantial reservoir of support and willingness of our citizens to cooperate, remains largely untouched. It appears that the missing ingredients to date have been the establishment of overall energy policies enunciated at the Federal level, and the instigation of specific plans and programs that will allow and encourage broad individual involvement. The development of clear goals and matched programs to reach those goals will make the difference between lip-service to conservation and concrete ways in which results can be realized.

This particular approach to energy-saving recognizes that insulation activity will be stimulated by the provision of front-end money to those willing to participate in energy reduction activities. The technique of providing incentives and financial assistance bridges the gap that States have discovered between citizen concern and their willingness and ability to take actions to conserve on a continued basis.

The reliance on State governments to implement objectives of the bill recognized the capacity that many States have developed during the past few years to develop, carry out and monitor energy management programs. This proposal should also relate closely to the joint State/Federal conservation programs authorized under the Energy Policy and Conservation Act of 1975. These two programs must be closely coordinated with State governments.

I am encouraged by the language of the proposal providing for the direct participation of the Governors in developing the program guidelines and in relying on the expertness of the States to cooperatively carry out the purposes of the act.

The flexibility in preparing program proposals and in the actual administration will aid measurably in carrying out the stated objectives.

I strongly support the emphasis of this proposal and the flexibility in approach which will pay rich dividends in energy savings and thusly, will contribute to the Nation's energy supply in the next critical years ahead.

Senator, our staff is now preparing some reactions from some of the technical questions that have been raised on the bill. We will be submitting that to our staff hopefully within a few days.

Senator HOLLINGS. We will be happy to receive that, too.

Do we get a reaction, Mr. Orr, or from Mr. Stevens, relative to cooperatives?

You obviously did a pretty good job out there in the State of Washington, all the participation and not a single cooperative.

I am very cautious that we don't sop up all the funds in bureaucracy, as I stated before.

Yet I think it is an excellent idea and we ought to foster it. How far can the States control this or what observations, if any do you have about the cooperative section of the bill?

Mr. ORR. We would have no basic objection to the language of the bill as it is now worded. We have cooperatives in our State, we have milk cooperatives. It is a worthwhile feature. We would not like to see the thing mandatory because we believe that here again you have got to have a program of flexibility. In listening to testimony this morning, and here again I was trying to visualize my associate in Vermont.

While it is possible to have cooperatives in certain industrial ventures such as milk, I look at a cooperative based upon home owners, we are talking to the very, very rural, highly dispersed society. It may very well work in some other State but I would doubt in the State of Vermont, except in a possibly—a few small concentrated localities that the cooperative way in Vermont would be very successful. But in some other State, some more highly urbanized, more developed State, it might be a very successful route. I would doubt its applicability in my State, but that does not kill the concept.

Senator HOLLINGS. That is the reason for the flexibility of the bill. Is Vermont experimenting with the rate structure changes?

Mr. ORR. Yes, sir, Senator. There again, referring to some of the testimony this morning, we would hate to see some of those points—we would like some of the points, obviously, at the present time. We are experimenting, as you know, with load management in the State of Vermont, with the storage of electricity, especially electrically heated homes to move the demand from on-peak hours to off-peak hours. I have been personally involved, my own personal home, in one of these rate structures. So, the lifeline concept, I think, the idea, I think, originated in Vermont.

But our present view is the lifeline concept should be modified, if it is going to be considered at all, in terms of on-peak/off-peak demand.

I personally, as I said, have been experimenting and I live in a middle-income home. I have my electrical consumption now; I don't live in an electrically heated home. I have my consumption down now to less than 400 kilowatts a month. Only half of that is on on-peak time during the day. So, I am beginning, I am cautioning those who are taking a look at the old lifeline concept.

And the figure was mentioned here this morning of 400 kilowatt hours, unless that lifeline concept was geared to the on-peak procedures going forth now, you could very well destroy some of the efforts being made in the utility area to move some of the demand to off-peak hours.

Senator HOLLINGS. We thank you both very much this morning.

We may submit some other questions to the both of your Governors for that record.

Thank you very much.

The next two witnesses we have on the panel are Mr. James A. Thorpe, president and chief executive officer of the Washington Natural Gas Co., Seattle, and Mr. William F. Kenny, president of Meenan Oil Co. of Jericho, N.Y.

STATEMENTS OF JAMES A. THORPE, PRESIDENT AND CHIEF EXECUTIVE OFFICER, WASHINGTON NATURAL GAS CO., SEATTLE, WASH.; AND WILLIAM F. KENNY, PRESIDENT, MEENAN OIL CO. OF JERICHO, N.Y.

Mr. KENNY. Good morning.

Mr. THORPE. Good morning, I am Mr. Thorpe.

Senator HOLLINGS. You can go first.

Mr. THORPE. I appreciate the opportunity to come and present what I think is a pretty good conservation story of Washington Natural Gas Co. of Seattle, Wash.

Our company was founded 103 years ago and now serves nearly a quarter million customers in the Puget Sound area of Western Washington.

Today I would like to share with you some of the recent successes that our company has achieved in the vital area of energy conservation.

It is our hope that portions of these programs may be adapted to other parts of the country to assist other utilities in their conservation efforts.

Back in 1973, when the national energy crisis first loomed on the horizon, most utilities and government agencies spent a great deal of time studying the situation to death rather than striking forth with positive programs.

At first, almost everyone published lists of well-intended energy-saving tips, then sat back and confidently waited for the country to respond. For the most part, it didn't.

In our view, the missing ingredients were realistic programs that truly involved the ultimate consumer and gave him (or her) practical ways to implement these conservation techniques.

During this same period, our company opted to attack, rather than retreat, by approaching the whole situation as a true marketing opportunity.

As an example, we found that well over half the homes in our service area had inadequate or no insulation at all.

In other words, we discovered one whale of a market that was ready and waiting. With this in mind, Washington Natural Gas became the first utility in the country to actually get into the insulation business.

Through a program called the "Conservation Kit" we started selling attic insulation to gas customers. We installed it, guaranteed all of the work, and even offered to finance the purchase for up to 3 years. The average cost was right around \$200.

Senator HOLLINGS. Has anybody else done that?

Mr. THORPE. Others are getting into it. I think Michigan is also included.

Senator HOLLINGS. Yes, but just in a slight fashion.

I don't find any natural gas companies running around putting in insulation and volunteering to finance it. We commend you for it. It's so unusual, it's surprising.

Go right ahead.

Mr. THORPE. Our studies showed that customers with previously uninsulated attics were suddenly saving an average of 22 percent of their heating energy through our program.

The selling point of the program was that it would cost the customer less to buy it, than not to buy it.

We later expanded our scope and offered our attic insulation service to all homeowners within our service area, regardless of what fuel they used for heating.

Since the inception of the program, we have insulated around 5,000 attics. In addition, we have reason to believe that for each sale we generated, approximately three jobs were sold by insulation contractors as a direct result of our advertising program (for a combined total of 20,000 homes).

We also expanded our overall insulation program to include applications for commercial buildings.

What all of that meant was that we had been sitting atop a new gas field for years, and didn't recognize it. As an example, the 20,000 homeowners that I mentioned are now saving around 546 million cubic feet of natural gas each year, simply because of proper attic insulation. Putting it another way, we can now supply gas to an additional 5,720 insulated homes without the necessity of any increased gas supply.

Our next step was to enter the sidewall insulation business. We formed a wholly-owned subsidiary which now distributes foam sidewall insulation for the Borden Co. throughout the 13 Western States.

We also retail the Borden product through our own outlets. Our studies have shown that the potential energy savings with this product actually exceed those of attic insulation. Up until a couple of years ago, many people in Western Washington believed that you should have your head examined if you had sidewall insulation.

Today, quite the reverse is true, as people discover that our foam insulation saves around 28 percent of their heating energy and also provides them with a quieter and more comfortable home.

The current levels of energy prices now make it more than practical to fully insulate almost any home where in past years the "payback" period could rarely be justified. This is, I guess, where human nature enters the picture, because it surely appears that the more expensive (and scarce) something gets, the smarter we all seem to become.

Last fall, we augmented our insulation services by aggressively marketing a three-part conservation kit to area homeowners. The "Heat Keeper Kit," as it is called, consists of attic insulation, a pilotless natural gas furnace, and an automatic day/night thermostat called a "Chronotherm."

This package saves up to 37 percent of home heating energy. We have also actively marketed a new type of gas water heater that uses 20 percent less energy, plus several other gas appliances that also use considerably less fuel.

This very week we are introducing a new device in our market area that can convert most existing gas furnaces into pilotless models for under \$90.

Part of the appeal for many of these products is that they will literally pay for themselves in energy savings, well within their warranty periods.

We have also spend a considerable amount of time and money working with architects and mechanical engineers, helping them to design new structures that are more energy-efficient. But once again, we have approached the subject from a marketing standpoint, rather than just listing ideas that may or may not be followed.

Our Technical Services experts sell their energy expertise on an hourly basis along with a highly sophisticated computer program called ECUBE (an acronym for Energy Conservation Using Better Engineering). Through ECUBE, an engineer can compare the hypothetical monthly energy performance of several types of heating or air conditioning systems in his new structure while the building is still in the blueprint stage. This system allows the engineer to choose the best equipment currently available to meet the specific needs of his new building. The potential savings in both energy and dollars over the life cycle of the building is tremendous.

We also have specialists who work directly with large industrial customers and help them to get the most from their energy dollar.

We have recently implemented an aware program called CONCERN (an acronym for Conserve Our Nation's Crucial Energy Resources Now) which recognizes outstanding conservation efforts by these customers.

As an example, we recently presented such an award to the Port of Seattle for reducing its energy consumption by 44 percent.

Last month, the Scott Paper Co., of Everett, Wash., also received a CONCERN award for saving enough gas energy in 1975 to heat 15,000 homes for 1 year.

We are also involved in such things as solar energy. On the 29th day of this month, the first solar-gas heated home in Western Washington will be completed and go on the open market. This particular home is a joint venture between Washington Natural Gas and a local builder, Swanson-Dean Corp. Once again, conservation has been approached in the marketing sense.

We surely do not have all of the answers for firmly implanting the conservation ethic in people's minds. However, we do feel that what we have accomplished has largely been the result of going on the offense rather than the defense.

In this spirit, we feel we must now accelerate our "marketing of conservation" concept even further, especially in view of the pending severe shortage of electrical energy that will strike the Pacific Northwest late next year.

As you may know, the Bonneville Power Administration, which serves much of the Northwest, has predicted that this new electrical shortage will be much more acute and long-lasting than the shortage experienced by the region in 1973.

Now that I have completed my testimony about Washington Natural's energy conservation efforts, I would like to respond to your request for comments concerning S. 2932.

Congress is to be congratulated for undertaking a plan to implement a greater energy conservation effort throughout the nation.

If financial aid is needed to give impetus to the conservation efforts of those who otherwise (for economic or other reasons) have not made much of an attempt in the past, perhaps Federal funds are required.

I must start my specific comments, however, by constructively criticizing the Declaration of Policy, section 101, paragraph A(1) which indicates, "... including a shift from nonrenewable to renewable sources of energy such as solar energy."

This I feel, is a most misleading introduction to this bill. Other implications in that same paragraph are that "solar energy would be the lowest cost, shortest term means of effecting environmentally attractive means for avoiding shortages of energy and further dependence on vulnerable foreign sources of energy."

I believe that solar energy is in our future, but I think that the short-term alleviation of our problems can be accomplished for a much lower cost and over a shorter span of time if we also direct our attention to the development of those nonrenewable sources that are available to us. Then, complement this program by applying sound conservation methods to the utilization of our nonrenewable sources.

There are many so-called "exotic" means of supplying energy needs of this Nation in the future, one of which is solar energy. I believe, however, the all-out effort of this Nation has to be directed toward proper utilization of known energy sources until time and money allowances are sufficient to develop other sources.

In that same section 101(2)(C), I would like to refer back to the programs undertaken by Washington Natural to refute the apparent completeness of that statement in (C) . . . "There is no organized program that enables consumers to undertake such efforts easily and with confidence that they are economical."

I believe those consumers of ours who have availed themselves of the many programs that I have previously outlined, have found them justified economically.

Senator HOLLINGS. Do you think you are typical?

Mr. Thorpe, the Washington Natural Gas Co., do you think your company and you are typical?

Mr. THORPE. No, I don't.

Senator HOLLINGS. I find you to be a rarity. You are the first oil or gas fellow I have found around here who wasn't bribing somebody in the last 2 years.

I want to commend you. If there is somebody writing a headline, they ought to take a picture and put you on the front page of the Washington Post.

You are the first fellow I have seen around, talking sense. I am really impressed.

You are a rarity, indeed, and deserve the gratitude of this Congress.

I can go along with you about that misgiving. We were wording that about solar energy to try to attract a little bit more attention.

We have the old joke about the mule, hit him on the head and get his attention first.

If you say conservation, it is difficult to attract attention. But if you say solar energy, then they all brighten up and want to act intelligent, so they will identify with that.

But I think your point is well taken.

On the other hand, maybe we could save section 101(2)(C), there is certainly no widely available organized program. Yours is the first I have heard of.

We are going to hear from Mr. Kenny, too, he might have a program. We will listen. I just want to point out at this point in the record, that you are a rarity.

You are not the typical gas company in this country, by any manner or means.

Mr. THORPE. Thank you, sir.

Senator HOLLINGS. To hear your expression that your company was sitting atop a new natural gas field for years and didn't recognize it, that opens my eyes and mind, and it's very, very helpful to approach this idea of conservation from that angle. The possibilities are staggering when you take the approach you are taking right now out there.

Go right ahead, proceed, I am with you.

Mr. THORPE. Thank you very much for your compliment, Senator.

Senator HOLLINGS. Yes, sir.

Mr. THORPE. I know that all areas of this Nation have not undertaken conservation programs similar to those in Seattle, but I believe that the private enterprise system is capable of doing most of this job—if the public wants to do it—and, in reality, only minor reinforcement by Federal help should be necessary so that all of our citizens are enabled to undertake sound conservation measures.

The average cost of insulating an attic, as previously stated, is about \$200. While not all of our citizens are able to raise the \$200 in cash, I assume it would still be necessary for that money to be paid by the purchaser.

If a subsidized interest program were made available, the cost, then, would be lower. We should, however, strive to develop a method that is as foolproof as possible to protect the Government, that is, the taxpayer's investment.

If the Federal Government (or State government through Federal grants) is to pay the difference in interest payments, between the 2-percent or 5-percent level quoted in the bill up to the commercial level required to make those loans available from commercial sources, the principal still should be repaid and not forfeited.

I believe the transferring of responsibility to the States is the ideal way to go; but with my State as an example, I question the availability of the funding required by State government to organize the administrative forces necessary to carry out this program.

It has been suggested that in the 90-10 formula for administration of such a program, that services "in kind" be considered. This might well be accomplished through voluntary contribution of media space, for example, and would relieve the States of having to raise taxes to support these functions.

I am also concerned that the FEA's role in this effort not be expanded to the point that its costs are increased beyond reason, to the detriment of all taxpayers.

And, as a final comment, I wonder if the \$10 billion sum outlined in the bill is realistic. The natural question occurs: Is this the better expenditure of money to achieve energy independence, or is there a combination of conservation and research and development that would do a better job for the same expenditure?

Thank you once again for giving me the opportunity to make these comments.

I will, of course, attempt to answer any questions you may have.

Senator HOLLINGS. Since you ask about that expenditure (and we have got the same cushion that you expressed), and suggest that we make certain that the principal is repaid on these loan guarantees and interest subsidies, you will want to know that we will have a witness, I think, tomorrow, relative to the Long Island study.

In the next 20 years, for example, they will have 2½ million air conditioners requiring some 1600 additional megawatts.

In order to provide that power, they are going to have to build two powerplants at a cost of approximately \$2 billion.

The Long Island study goes on to show what you could do with \$2 billion in conservation. If we were to implement the expenditure with part of this program and other types of conservation programs, we can "produce" that much energy or rather two to three times the same amount of energy as the \$2 billion would cost for the construction of the two plants.

In addition to that, when it comes to jobs, which everyone is talking about, whereas it would take some 16,000 jobs per year to build the two plants, it would require some 66,000 jobs in the insulation and building and engineering trades to implement the energy conservation design detailed in the study.

So, we have a net gain of some 50,000 jobs. It all works right out economically, and this is the first program that I have ever seen for middle American, the average fellow.

You know, they have some other program for the rich, you can come to the loophole committee in the Congress, which I don't have to identify any further, and they will take care of all kinds of tax write-offs and such.

But here is a crowd in Vermont, where 70 percent of the homes were built before the depression, are uninsulated, and now they just can't pay their fuel oil bill.

This is no handout. But it's a well-conceived program that will pay back anywhere between 3 and 6 years that particular loan to insulate that home, by saving that energy, creating the jobs, and improving our balance of payments.

It's like you sitting on top of that gas field and not realizing it.

We are sitting upon an oil field up in the Northeast that is going to produce, as I said a little bit earlier, 25 cents a gallon oil rather than the present 45 cents.

So, we know economically it will pay up. I am like you, I don't want a big, further bureaucracy with FEA. That is why this is administered by the States.

Take some of their voluntary programs in existence at the present time and employ those, rather than further bureaucracy here at the Washington level.

Do you think from your practical experience out there, you could work with a program of this kind?

Mr. THORPE. Yes, I think we could, very nicely.

Senator HOLLINGS. If we wait for all the thoughts to be delivered, all around the country to get the people aware, then we will all be freezing to death in my opinion.

I think we are going to have to just move forward at this particular level. All of my crowd inviting us around to all these beautiful dinners to tell you about free enterprise, you know, hasn't improved our

energy situation in this country at all. But this program could do just that.

Let me hear from Mr. Kenny, and see what an oil company is doing. Maybe we will join you in, too, for the good government of all.

Mr. KENNY. I certainly commend Mr. Thorpe in his program. I am not sure exactly when you started, when was that?

Mr. THORPE. 1973.

Mr. KENNY. We are on the opposite end of the country, but we must have had the same thoughts at the same time.

I am Bill Kenny, president of Meenan Oil Co.; I am down here to speak strongly in favor of energy conservation, specifically, re-insulation.

Senator HOLLINGS. Can you tell us a little bit about your company, how many employees, how many customers?

Mr. KENNY. We are a retail heating oil company operating in three States: New York, New Jersey, Pennsylvania. In the peak season, the winter, we have about 450 employees. We serve customers direct heating oil. We are about 95 percent retail customers, as opposed to businesses or industry. We are basically a peddler. We peddle oil.

We have about 450 competitors in the States that we market, and we are pretty close to the grass roots, in terms of feeling and hearing the cries of the people about the staggering fuel bills they are presently getting.

Through our trade groups, we have taken a position that a strong Government-promoted and subsidized energy conservation commitment, combined with careful development of our own fossil resources, is by far the best route to reasonable energy independence. We do realize that with that position, we are at odds with the Administration, the FEA, a majority of Congress, major oil companies, the huge equipment manufacturers, big labor, electric utility industry, big banks, and probably many others.

We are used to this type of opposition. We believe that the Government so far has been very derelict in not seriously promoting meaningful conservation, when this country is by far the biggest waster of energy in the world.

Instead, we see billions of taxpayers' dollars poured into risky, shaky, economically disastrous nuclear power. To us in the field, such an emphasis on supply with virtually no emphasis on demand is absolutely incredible.

For example, in the 1977 ERDA budget of \$5.2 billion, 78 percent is allocated to nuclear power, and 1.8 percent for conservation.

Just 2 weeks ago, we met with the No. 2 man in the FEA, who adamantly and angrily denied that energy conservation could or should play a significant role in helping us achieve energy independence. He claimed the country could not survive without a crash nuclear program.

We have not been able to understand our Government's approach, and that is why the opportunity to talk on behalf of energy conservation is so welcome.

My prepared testimony is lengthy, and I have got some very major studies in there showing the tremendous benefit of conservation, but I will skip over them and go to our practical experience.

Senator HOLLINGS. It will be included.

Mr. KENNY. February of 1973, 3 years ago, I decided to launch our company in a serious, long-term commitment to the reinsulation business. Many thought such a decision bordered on insanity because of the obvious substantial lost revenue resulting from selling customers less oil.

However, in spite of this, we decided to go with a major insulation program for several reasons. First, we saw a profitmaking opportunity. It seemed obvious then that our Government was smart enough to recognize the tremendous potential and absolute necessity for a massive consumer incentive program to conserve energy.

We wanted to be in high gear when the Government program began. We would be the company best able to take advantage of the prospective huge demand for reinsulation. Our 5-year budget projected an average 5,000 insulation jobs installed a year for an annual net profit of \$375,000.

Second, we saw this program as a tremendous competitive weapon. Our industry is highly competitive, wherein customers would switch companies for a penny a gallon discount amounting to \$15 or \$16 a year. With a program designed to save well over \$100 a year, we expected to add many new customers.

Third, we expected the savings we provided our existing customers would have a tremendously positive influence on keeping those customers.

Finally, we felt that the publicity arising from being the first energy marketing company in the country who offered to sharply cut customer consumption would create a positive image for the company, which would in turn result in new business.

We immediately embarked on the campaign in Long Island, Bucks County, Pennsylvania, in the spring of 1973. We contacted Owens Corning Fiberglas, hired managers in both States, hired and trained installation personnel, hired additional salesmen, bought several \$20,000 blowing wool trucks, and engaged in advertising with a PR firm.

I want to emphasize the hiring in 'here, because those are the jobs you were talking about earlier, Senator.

The campaign kicked off with PR releases, ads in newspapers, energy conservation declarations by local politicians, and direct mail blitzes to our customers and thousands of non-customers. Our campaign appealed to the need for the country to save energy, comfort advantages, and primarily to get the great savings available.

I am not going to take time now to show you the promotional materials but will submit them with the testimony.

This is our first ad. You can see how yellow it is; it is 3 years old.

We also worked out banking arrangements. Being a small company, of course, we could not do the interest-free situation that perhaps a large utility could do. Also, I would be less than candid if I did not say that our salesmen were telling potential customers just wait a minute and the Government will come along and give you a program here of tax deductions. I am quite sure they were saying that at that time because there were some energy bills pending at that time which would give tax deductions for reinsulation.

Senator HOLLINGS. Which was vetoed.

Go right ahead.

Mr. KENNY. Yes; it was.

With that buildup, I would like to be able to tell you about our super success story. Unfortunately, as a business venture, the program has been a big flop. In nearly 3 years' involvement, we have sold and installed 1,650 jobs for total sales of \$726,000, with direct labor and material and marketing expenses of \$722,000. The grand total profit was \$4,000. That is not counting any overhead allocations, my time or anything else.

Our problem is, we have simply had to spend too much money on advertising just to keep the program going for it to be profitable. I might say here, though, that, parenthetically, that 1,656 jobs of ours might relate to the—I think it was 5,000 done by the utility, that utility having far more customers. I am not sure of that. But we are not running at a loss.

What is even worse, we have had to lay off many of the people we initially hired. When you add in the lost oil revenue of almost \$600,000, the brilliant idea and decision to go into the reinsulation business has our board questioning my sanity as well as my business judgment.

Why has this program failed? I say failed, because we did expect 5,000 a year. Why has it failed?

It is because insulation simply does not work? Let us look at the record.

In 2 years and 8 months, our company has reinsulated 1,656 homes, mostly just the ceilings, but many complete ceiling and wall applications. Our records indicate the average savings in fuel is 20 percent. The average cost of the job being \$439 and the average annual gallonage savings being 328, these homeowners are saving \$139 per year at today's oil prices.

This represents absolutely better than a 3-year payback, assuming oil prices do not rise. In addition, this represents well over a half million gallons of oil a year the country is conserving because these people insulated their homes. Neglected in this, of course, are the dollar savings resulting from decreased air conditioning usage.

One could use this specific data to make all kinds of projections. For example, if all our 84,000 customers reinsulated their homes, oil savings alone would be 27,552,000 gallons, resulting in \$12,500,000 worth of consumer dollars saved every year, again not counting air conditioning.

If the FEA's number of 18 million homes across the country that have little or no insulation were properly insulated, the annual oil equivalent savings for heating alone would be roughly 6 billion gallons annually, or 141 million barrels.

In addition, our customers have reported being far more comfortable and, interestingly enough, report significant noise abatement. We have had not one complaint, and we have many letters such as the following letter from Mr. John D. Leck of 9 Circle Road, Levittown, Pa.

Today, it seems everyone is so quick to complain. Therefore, I feel compelled to compliment your company for the excellent insulation job you did. The temperature uniformity we experience in both the upstairs and downstairs rooms are truly amazing. Insulation offers advantageous conditions in both winter and summer. We have so far experienced at least a 50 percent savings in fuel. The thermostat is set lower than previously with much comfort.

In the summer, our home is much cooler, and this without the air conditioner working nearly as hard as in previous summers before the insulation. The comfort, not to mention substantial fuel savings, is worth the insignificant expenditure. I am only sorry we did not previously take advantage of your insulation.

Back then to the ongoing question: Why has this program not been a success?

We called in Owens Corning and asked them for their advice as to why we had not done a good job. Their response was that they, too, have found that the insulation boom that they expected simply has not occurred. In fact, they mentioned a plant they built just to take care of this. That plant is nearly idle right now.

As a matter of fact, I think in recent testimony FEA Administrator Zarb said that there is enough idle capacity in this country right now to reinsulate 2 million homes a year. Why, then, are the people all over the country not responding to what many of us feel would be obvious virtues of reinsulation?

The answer, in my opinion, is clearly the failure of Government to provide the slightest bit of leadership. Both branches have been viciously fighting each other over the oil price issue and thus effectively condoning the ongoing waste of energy.

The two basic elements necessary to start the country on a massive commitment to energy conservation are, one, a systematic, believable, unrelenting campaign to convince the public that energy conservation is absolutely necessary, easily obtainable, and financially beneficial; two, easily understandable financial incentive package designed to make conservation investments immediately feasible.

In my opinion, it borders on a national disgrace that our Government has failed miserably to provide the necessary leadership to save energy.

Senator HOLLINGS. Amen.

Mr. KENNY. To the extent S. 2932 will help do the job, I am all for it. I am also 100 percent in favor of the presently pending act to allow a tax credit for 30 percent of insulation costs in residential homes.

Please, let's get on with it now. We in the field who can and will implement energy conservation are ready and waiting to produce the results immediately.

As far as S. 2932 is concerned, I have read it several times very carefully and I do have a few recommendations which are in my written testimony.

I would actually be very glad to discuss them, too.

I would like now very briefly, though, to bring to the attention of the committee what I think is a classic example of big Government, big business bureaucratic stifling of an energy saving project which can benefit the consumer, country, and environment.

Some 10 years now, 40 or 50 small independent retail heating oil dealer, jointly provided funds to develop a new oil burner which would be much more efficient, cleaner, quieter, less polluting, and more troublefree.

In 1973, this resulted in the development of the Blue Ray oil-fired furnace in two very small sizes. It has been accepted by UL, it's been field tested, EPA tested, and accepted, accepted by Levitt & Sons and Kauffman & Broad.

After that, Blue Ray applied to FEA and ERDA for funding to develop a full line of furnaces.

Also to develop a line of boilers and retrofit burner.

After a series of meetings and after submitting the presentation precisely following ERDA's format, Blue Ray has got nothing but a degrading and insulting runaround from FEA and especially from ERDA.

The existing two Blue Ray models presently installed in over 700 homes have shown the following three main results. Oil savings over conventional equipment of 20 to 25 percent due to much higher and more more stable combustion efficiency. Far less emissions resulting from a constant zero smoke operation and, three, far quieter operation.

I am going to skip over some of the statistics I put in my testimony about the Blue Ray but I feel strongly that the answer as to why Blue Ray hasn't been looked at, not to mention funded, is the reason I stated earlier, that FEA and ERDA are influenced and pushed by the large electric utility industry, GE, Westinghouse, and Bechtel, and the major oil companies.

Therefore, they have completely ignored the potential of energy conservation while I believe literally wasting billions of taxpayers' dollars.

In the wake of this, I think that specific proposals of small business such as Blue Ray are treated with scorn, this by people whose competence I would question.

At this point the Blue Ray proposal is being referred to a yet unappointed advisory committee, which will consider yet unreceived similar proposals, then decide on whether or not the concept of saving heating oil is worthy of consideration.

Senator HOLLINGS. We can have oversight hearings on ERDA and they will hear about Blue Ray.

Mr. KENNY. Thank you.

I would like now to sum up my testimony. I feel very, very strongly from very specific in the field experience that the potential for energy conservation is both enormous and ignored.

In addition, our company and the thousands of other heating oil marketers are acutely conscious of the cries of help from the consumer as fuel bills rise.

I am pleased to be able to commend Senator Kennedy and the cosponsors of S. 2932 for recognizing the huge environmental gains available from a massive conservation program.

Further, I commend them for recognizing in S. 2932 the enormous financial benefits to the American consumer who is plagued with staggering fuel bills.

Finally, I commend the sponsors of the bill for doing something to promote a vigorous national energy program of energy conservation, which would enable America to meet all its fuel and electricity needs for the next 25 years without becoming hooked on imported oil or hazardous nuclear energy.

I would like to end with something I read on the plane coming down today. This is a statement by the same earlier mentioned No. 2 man in FEA when asked about solar energy, said the best commercial application is suntan.

I think with that kind of attitude—

Senator HOLLINGS. Let me hear that again, please. That is Mr. Hill? Zausner or Hill or who?

Mr. KENNY. Mr. Zausner. I referred to him earlier in the testimony.

Senator HOLLINGS. What did he say?

Mr. KENNY. This is in a publication, not something I have taken out of context or a private session. I will read precisely what I just read.

"Asked about solar energy, Zausner said the best commercial application is suntan."

I'm just saying that that is not a very good attitude as far as energy conservation is concerned.

Senator HOLLINGS. Well, with your permission, I am going to mail your statement around to all my gas companies in South Carolina.

Are you still the president of your oil company?

Mr. KENNY. Yes.

Senator HOLLINGS. You said it was a flop, but in other words, there is nothing wrong with the original premise. If it could be carried out, rather than losing money, it wouldn't have been a flop, it would be a tremendous success, right?

Mr. KENNY. I don't want to emphasize the flop aspect. We are still quite optimistic about the fact that the Government will do something about the situation. In fact, we have retained our equipment, continue to advertise. The easiest thing in the world we could have done was stop after the first year.

We are continuing to advertise. I have lots of examples of our ads here. The ad campaign we are running right now is based on the concept of hitting your utility and oil company where it hurts.

That is generating some enthusiasm. But we really feel the Government has to step in and give this thing a big push. When it does, you will have an industry out there in terms of small business that will pick it up, there will be a lot of jobs and tremendous benefit to the consumer.

Senator HOLLINGS. Going back to Mr. Thorpe about small business, do you have any program there for the small businesses?

Mr. THORPE. All of our work is done by small businesses. We use our sales and marketing people to secure insulation jobs, and they sell those jobs or have hired small business people to install the insulation.

Senator HOLLINGS. But do you have a program to help the small businesses to do retrofitting and other kinds of conservation contracting?

Mr. THORPE. It's available for commercial businesses and residential, yes, no matter what type of fuel they use.

There might have been one impression left incorrectly. We do not grant these loans interest free. We have to recover the cost of money for the loans.

Mr. KENNY. I would like to put in the record with your permission, Senator, too, an example of the disregarding of energy conservation which I read in a publication called "Electrical World." This is a utility in New Jersey where it—electric utility, where it sent out information to consumers about how much they were saving on electricity.

It was so successful they kept getting awards from FEA praising them for it and they couldn't drop it. This thing here says finally

they were able to drop the thing. The reason they had to keep it going, because of all the awards they got. But when they had an increase of \$10.7 million in rates, they were able to drop this program because, of course, it was stifling the sales of electricity.

I will put that in the record, too. I think that is another example of the fact that there just is not enough emphasis pushed by big business, big utilities, and the Government on conservation. I except, obviously, Washington Natural Gas.

Senator HOLLINGS. Senator Kennedy will be the leadoff witness tomorrow.

I can't emphasize my appreciation enough to you, Mr. Thorpe, and you, Mr. Kenny. I think it's one of the more interesting presentations I have heard, just from businessmen doing business and enthused about it, with the right attitude and the right leadership.

I only wish we could emulate it all over the country. I believe, frankly, that is why I could sponsor this bill, because we are going to need some national leadership. You have put your finger on it.

There is no concrete leadership in the conservation area. Some leadership has even been away from conservation, especially in the attitudes of some larger companies.

It may be different in Vermont where the emphasis perhaps is on wood-burning stoves from down in New Mexico where solar retrofit would be more practical, but wherever it is, generally speaking conservation, and the approach of your fuel oil company and your natural gas company, can work in every one of the 50 States without doubt.

I am going to have to really work on my crowd, because you ought to see the mail. They relegate you to the position of another insane Senator when you even talk conservation. They think you're against jobs. But they're wrong. This is the way for us to produce and compete. The emphasis was on competition, by Mr. Nader. Our country is not even competing with the OPEC crowd right at the present time.

In any event, thank you very, very much.

[The statement follows:]

STATEMENT OF WILLIAM F. KENNY III, PRESIDENT, MEENAN OIL CO., INC.

Mr. Chairman: Thank you very much for the privilege of appearing before you. My name is Bill Kenny. I am President of Meenan Oil Company. I have come down here to speak strongly in favor of energy conservation—specifically, re-insulation and to give first hand, specific examples of the enormous benefits obtainable from energy conservation through re-insulation. My Company, Meenan, is an independent retail heating oil marketer serving homeowners in New York, New Jersey and Pennsylvania. In the areas in which we market, the vast majority of homes are heated with oil—approximately 75 percent.

The heating oil industry, as you may know, is very diverse and highly competitive. For example, in the two Long Island, N.Y. counties of Nassau and Suffolk in which we market, there are some 300 heating oil dealers competing for the consumers' heating dollar. We are truly an industry of small businessmen. In recent years heating oil dealers and their trade associations have been faced with the need to support a national energy policy which would achieve the goals of reasonable energy independence. We've been asked our opinion by the press, our customers, our friends and occasionally by the government. Basically, our position has been, and is, that a commitment to energy conservation, strongly supported and subsidized by the Government, combined with careful development of our own fossil resources, will get the country to the point where the gap between the present and the era of solar and similar sources of energy will have been bridged. We have carefully studied the issue and are adamantly opposed to the proliferation of nuclear power; we consider it dangerous, expensive and unnecessary. We were thus very glad to read of Dennis Hayes' conservation study which, in essence, agrees with our position.

Federal Government Failure to Support Conservation

We do realize that we are at odds with the Administration, the FEA, a majority of the Congress, the major oil companies, the huge equipment manufacturers, big labor, the electric utility industry, the big banks, such as Chase Manhattan, and probably many others. We are used to this type of opposition. Despite the opinions of many of these opponents, we believe that the government has been very derelict in not seriously promoting meaningful energy conservation when this country is by far the biggest waster of energy in the world. Instead, billions of taxpayers' dollars are poured into risky, economically disastrous nuclear power projects. To us in the field, such an emphasis on increasing supply with virtually no emphasis on restricting demand is absolutely incredible. For example, in the 1977 ERDA budget of \$5.2 billion, 78 percent is allocated to nuclear power and 1.8 percent for conservation. Just two weeks ago we met with the number two man in FEA who adamantly and angrily denied that energy conservation could or should play a useful role in achieving energy independence, while claiming the country could not survive without a crash program to develop nuclear energy.

We simply have not been able to understand our government's approach and that's why the opportunity to speak here on behalf of energy conservation is so welcome.

Benefits of Energy Conservation

Since it is a well-known fact that our country wastes more than half the energy it presently consumes, we believe that a strong energy conservation program will have at least four major benefits:

1. As Dennis Hayes says, "Energy obtained through conservation is the largest source of new energy currently available to the United States". Conservation thereby would be the single most effective means of moving the country towards energy independence.
2. The dollar savings available to the nation's consumers are massive.
3. The environment benefits enormously from reduced energy usage and development.
4. Jobs are created throughout both big and small business in companies that make, market and install energy saving materials and devices.

While there are many opportunities for energy conservation, residential buildings offer the greatest potential. Through strict adherence to energy conservation measures, summer cooling and winter heating loads could be reduced by 30 to 40 percent. Considering that space heating of residences accounts for 11 percent of total energy demand while air conditioning accounts for about 3 percent, the potential is enormous.

A study by the National Mineral Wool Insulation Association which was presented to the House Task Force on Energy and Resources on April 27, 1972 concluded that potential savings in energy in residential heating and cooling over the next 10 years (1973 through 1982) was 15,300 trillion BTU—enough to heat and cool our 1972 total housing stock for over two full years. This amounts to:

Fifteen and three-tenths trillion cubic feet of natural gas, or 4.5 trillion kilowatts of electric power, or 108 billion gallons of fuel oil.

Since these savings were obtainable only by insulating all new homes and reinsulating all under-insulated old homes, the report made another projection which showed more reasonably attainable objectives. That scenario called for:

New Construction—3 of every 4 units built meet new FHA Insulation Standards.

Existing One-Family Homes—1 of 4 upgrades insulation (ceiling)—1 of 8 adds storm windows and doors.

This reasonably attainable program would result in:

Energy savings in the year 1982 of 1500 trillion Btu.

Cumulative energy savings for the 10 years of 8,200 trillion Btu.

Consumer dollar savings in 1982 of \$6.2 billion.

Cumulative consumer dollar savings for the 10 years of \$34.2 billion.

And, the projected effect on air quality by this reduction in energy usage would be an annual reduction of 2.5 million tons of pollutants.

In addition, the FEA put out a press release in February, 1975 in which they said that there were 18 million homes across the country with little or no insulation. FEA further stated:

"Fuel-saving improvements in these homes could save the nation the equivalent of 500,000 barrels of oil daily. The biggest savings, however, would be enjoyed by the individual homeowner as a result of lower fuel bills."

Unfortunately, what followed the press release was absolutely nothing!

Recently Owens Corning Fiberglass put out a promotional analysis showing dollar savings if 6" insulation were installed only in the ceilings of homes throughout the country. The projections were for one year and for 20 years and assumed the homes to be equipped with air conditioning as well as with heating. A copy is attached to my statement. (Attachment A)

It is clear from these studies from the National Mineral Wool Insulating Association, the FEA and Owens Corning that enormous social, economic, political and national security benefits can accrue from a massive commitment to upgrading residential thermal standards. Impressive as these published estimates are, I'd like to present to you some actual first-hand experience.

Meenan Insulation Program

In February 1973, well before the Arab Embargo but at a time when it was becoming obvious that energy supplies would be tighter, I decided to launch our company upon a serious long-term commitment to the reinsulation business. Many thought such a decision bordered on insanity because of the substantial revenue loss obviously resulting from selling customers less oil. However, we decided to go with a major insulation program for several reasons:

First of all, we saw profit-making opportunity. It seemed obvious then that our government would soon recognize the tremendous potential of, and absolute necessity for, a massive consumer incentive program to conserve energy. We knew it would soon happen—in fact, there were the bills pending then—HR 802 and HR 7836 which provided income tax deductions—so we wanted to be in high gear when the government program began. We would be the company best able to take advantage of the huge demand for reinsulation. Our 5-year budget projected an average of 5,000 jobs a year for an annual net profit of \$375,000.

Second, we saw this program as a tremendous competitive weapon. As I said before, our industry is diverse and highly competitive wherein customers would switch companies for a penny a gallon discount amounting to \$15 or \$16 a year. With a program designed to save well over \$100 a year, we expected to add many new oil customers.

Third, of course, we expected that the savings provided existing customers would have a tremendous positive influence on retention of their business.

And finally, we felt that the publicity arising from being the first energy marketing company in the country to offer to our customers sharply lower consumption would create a positive image and recognition for our company which in turn would also result in new business.

With the decision made in late spring 1973, we embarked on the campaign in Long Island, New York and Bucks County, Pennsylvania.

We contacted Owens Corning Fiberglass for supply, hired managers in both states, hired and trained installation personnel, hired additional salesmen, bought several \$20,000 wool-blowing trucks and engaged an advertising and public relations firm.

The campaign began with press releases, newspaper ads, energy conservation declarations by local politicians and direct mail blitzes to all customers and to thousands of non-customers. Our campaign appealed to the need for national energy savings, to the comfort of a properly insulated home, and primarily to the cost effectiveness. I'm not going to take time today to show you these materials but will submit them for the record. We worked out banking arrangements under which annual payments were lower than the annual savings for a period of three years—after which the savings were pure gravy for the homeowner. Also, I'd be less than candid if I didn't say that our salesmen were using the pitch that the Federal Government was about to offer tax incentives. In fact, the National Energy Emergency Act of 1973, S. 2589, contained very significant tax deduction and loan provisions for energy conserving residential improvement expenses. In short, we were off and flying on a program to create profits for us, save energy for the country and save dollars for our customers.

With all that buildup, I'd like to tell you all about our super success story. Unfortunately, as a business venture, the program has been a big flop. In the nearly three years we have sold and installed 1,656 jobs for total sales of \$726,805; with direct labor, material and marketing expenses of \$722,462 the grand total profit has been \$4,343 not counting allocations of my time or other overhead items. We have simply had to spend too much money on advertising just to keep the program going for it to be profitable. We are currently running at a loss for the year and what's even worse, we've had to lay off many of the people we initially hired. When you add in the lost oil revenue of almost \$600,000, my brilliant idea and decision to go into the reinsulation business has my company's board questioning my sanity as well as my business judgment.

Why has the program failed? Is it because insulation simply doesn't work? Let's look at the record.

In 2 years and 8 months our company has reinsulated 1,656 homes—mostly just the ceilings, but many complete ceiling and wall applications. Our records indicate that the average savings in fuel is 20 percent. With the average cost being \$439 and the average annual gallonage savings being 328, these homeowners are saving \$149 per year at today's oil prices. This represents slightly better than a three-year

payback assuming oil prices do not rise. In addition, this represents 543,158 gallons of oil a year the country is conserving because these 1,656 homes were insulated. Neglected in this assessment, of course, are the dollar and energy savings resulting from decreased air conditioning usage and, of course, from lower electricity usage by oil burner motors and the heat distribution apparatus.

One could use this basic specific data to make all kinds of projections. For example, if all of our current customer list of 84,000 reinsulated, oil savings alone would be 27,552,000 gallons and \$12,481,056 worth of consumer dollars every year—again, not counting air conditioning.

If the 18 million homes across the country estimated by FEA to have little or no insulation were properly insulated, the annual oil equivalent savings for heating alone would be roughly 6 Billion gallons or 141 million barrels.

In addition, our customers have reported that they are far more comfortable and interestingly enough, report significant noise abeyance. We have not had one complaint and have many letters such as the following:

"Today it seems that everyone is so quick to complain therefore, I feel compelled to compliment your company for the excellent insulation job recently completed in my Jubilee.

"The temperature uniformity we are experiencing in both the upstairs and downstairs rooms are truly amazing.

"The insulation offers advantageous conditions in both winter and summer. We have so far experienced at least a 50 percent savings in fuel. The thermostat is set lower than previously with much comfort. In the summer our home is much cooler and this without the air conditioner working nearly as hard as in previous summers before the insulation.

"The comfort, not to mention the substantial fuel savings is worth the insignificant expenditure. I am only sorry that we did not previously take advantage of your insulation."

Back then to the ongoing question—why has this program been a flop? We called in Owens Corning and said, "Tell us why we haven't made this thing work." Their response was, "You people are the most successful—we've built a plant anticipating an insulation boom and it's nearly idle".

Failure of Conservation Plans

Why then are people all over the country not responding to what many of us feel are the obvious virtues of reinsulation?

The answer is clearly the failure of our government to provide the slightest bit of leadership. The Administration, through ERDA and FEA, have directed 98 percent of their efforts and taxpayers' dollars to promoting increased supply (most nuclear) while contributing nothing but hot air and gimmickry to the demand side of the equation. The Congress, in the same three-year period—to the best of my knowledge—hasn't passed any meaningful legislation designed to restrain demand on a short-term, immediate basis. Both branches have been fighting each other over the oil price issue, thus effectively condoning the ongoing blatant wasting of energy.

The two basic elements necessary to start the country on a massive commitment to energy conservation are:

One, a systematic believable unrelenting campaign to convince the public that energy conservation is absolutely necessary, easily obtainable and financially beneficial. And,

Two, an easily understandable financial incentive package designed to make meaningful conservation investments immediately feasible.

In my opinion, it borders on national disgrace that our government has failed miserably to provide the necessary leadership to save energy.

Energy Conservation Act of 1976

To the extent that S. 2932, the Energy Conservation Act of 1976, will help do the job—I'm all for it. I'm also 100 percent in favor of the pending act to allow a tax credit for 30 percent of insulation costs in homes. But please, let's get on with it now! We in the field who can and will implement energy conservation are ready and waiting to produce results immediately!

As far as comments on the bill are concerned, I would at this point present a few general ones:

While the concept of requiring each state to develop its own specific energy conservation programs sounds advisable, it could also cause more of the same delay that is probably costing our country over a million of barrels a day of wasted energy.

Again, on the same subject, I have a lot of trouble with 50 energy conservation programs with 50 different sets of specifications which I'll guarantee you from experience, are bound to be contradictory and conflicting—thus causing inequities.

A parallel concern involves the proposals which would initiate the funding of a state bureaucracy under the guise of conservation; that bureaucracy would probably grow and might portend state regulation of the retail heating oil business. Perhaps the best way to solve these problems would be to have the FEA regional offices develop the implementation plans. The justification for organizing on a state basis is to take account of climate and other differences—but those differences are regional and not state by state.

On Section 107, I'm not sure what the purpose of "encouraging energy conservation cooperatives" is. Such a program would seem to stifle the marketplace and delay effective implementation of immediate conservation efforts.

Also, if somebody bought \$90 worth of bat insulating material for a do-it-yourself installation, how would that fit into this program? In this case, the problem also arises as to whether and how effectively it was installed.

Also, financial incentives should not be offered in a manner which would allow big companies such as electrical utilities, General Electric, Westinghouse, etc., to gain competitive advantages over small business where competition does exist.

Blueray Oil Burner Systems

Before closing, I'd like to bring to the attention of the committee what I think is a classic example of big government, big business, bureaucratic stifling of an energy saving project which can benefit the consumer, the country and the environment.

For some ten years, 40 to 50 independent retail heating oil dealers jointly provided funds to develop a new oil burner which would be much more efficient, much cleaner, much quieter, less polluting and more trouble-free than existing equipment. This effort culminated in 1973 with the development of the Blueray oil-fired furnace in two small sizes. After UL acceptance, field testing, EPA testing and acceptance by two of the country's largest builders, Levitt & Sons and Kaufman & Broad, Blueray applied to FEA and ERDA for funding for research and development of a full line of furnaces, a full line of boilers and, of course, a retrofit burner. After a series of meetings and after submitting a presentation precisely following ERDA's format, Blueray has gotten nothing but a degrading and insulting run-around from FEA, and especially ERDA.

The existing two Blueray models, which are presently installed in over 700 homes, have shown the following major results:

1. Oil savings over conventional equipment of 20 to 25 percent due to much higher and much more stable combustion efficiency.
2. Far lower emissions resulting from a constant O smoke operation.
3. Far quieter operation.

These results stem from the fact that the Blueray produces a blue flame by recirculating and reburning the products of combustion while all conventional units produce less efficient yellow flame combustion.

If fully developed and made available to the 14 million existing oil heated homes and the thousands of new oil heated homes built each year, Blueray is capable of saving enormous amounts of oil and of helping clean the environment. This can happen over the next two years—not 20 years from now.

Our request for funding for Blueray, in comparison with what's being poured into nuclear energy, amounts to absolute peanuts in the ERDA budget.

The obvious answer as to why Blueray hasn't even been looked at, not to mention funded, is the same reason I stated earlier. FEA and ERDA, influenced and pushed by the electric utility industry, the large equipment manufacturers such as General Electric, Westinghouse and Bechtel, and the major oil companies, have completely ignored the potential of energy conservation while literally wasting billions of taxpayers' dollars. Specific proposals of small businesses, such as Blueray, are treated with scorn by people whose competence is questionable! At this point, the Blueray proposal is being referred to an advisory committee—not yet appointed—which will consider yet unreceived similar proposals and then decide whether or not the concept of saving heating oil is worthy of consideration for funding. In the meantime, we have been advised to ship the Blueray to Brookhaven National Laboratory for testing, which is like appointing the fox to guard the chicken coop.

That's a very brief description of a long, frustrating and degrading experience with FEA and ERDA—an experience which convinces me that FEA and ERDA have a strong anti-oil heat and anti-small business bias. They clearly favor the giants. I would be glad to discuss this sad experience further with anybody interested.

Conclusion

Summing up my testimony, I feel from very specific in-the-field experience that the potential for energy conservation is both enormous and ignored. In addition, our

company and the thousands of other heating oil marketers are acutely conscious of the cries of help from the consumer as fuel bills rise. I am therefore pleased to be able to commend Senator Kennedy and the co-sponsors of the S. 2932 for recognizing the significant environmental gains available from a massive conservation program. Further, I commend them for recognizing in S. 2932 the enormous financial benefits to the American consumer who is plagued with staggering fuel bills. Finally, I commend the sponsors of S. 2932 for doing something to promote a vigorous national program of energy conservation which could enable America to meet all its fuel and electricity needs for the next 25 years without becoming dependent on imported oil or hazardous nuclear energy.

Thank you very much.

Estimated Annual Dollar Savings by Adding Fiberglas 6" Attic Insulation to Existing Insulation

Based on 1,000 sq. ft. Attic Floor Area (net)

Present Insulation Type and Thickness and Heating/Cooling Energy Source	Eastern Cities										Central Cities										Southern Cities					Western Cities				
	Albany	Boston	Hartford	New York	Philadelphia	Washington, D.C.	Chicago	Cleveland	Detroit	Minneapolis	Pittsburgh	St. Louis	Toledo	Atlanta	Charlotte	Greenville	Miami	Nashville	Richmond	Waco	Wichita Falls	El Paso	Denver	San Jose	Las Vegas	Portland, Oregon	Santa Ana	San Luis Obispo		
No Insulation																														
Gas Heat and Electric Cooling	259	321	305	387	339	249	234	265	174	278	210	202	218	146	171	151	152	163	235	172	174	184	153	78	141	218	81	170	113	
Oil Heat and Electric Cooling	369	314	306	346	285	291	377	284	341	433	343	343	343	343	343	343	343	343	343	343	343	343	348	171	202	242	143	347	175	
Electric Heat and Electric Cooling	483	605	393	707	1,101	540	374	382	470	536	604	539	432	253	278	218	157	139	376	220	220	204	281	368	195	165	188	188	287	218
2" Loose Fill																														
Gas Heat and Electric Cooling	62	77	76	88	82	67	63	51	52	55	69	53	55	56	45	44	53	44	68	59	56	63	40	40	18	42	51	24	45	37
Oil Heat and Electric Cooling	87	76	76	85	84	77	94	86	83	109	83	79	81	64	64	56	59	51	100	70	73	79	84	40	40	55	58	38	68	51
Electric Heat and Electric Cooling	113	142	96	167	207	133	96	94	113	128	143	129	68	105	70	74	56	59	51	100	70	62	86	89	46	49	45	48	70	61
3" Loose Fill (2" Blanket)																														
Gas Heat and Electric Cooling	39	49	49	56	43	41	40	34	33	44	34	36	36	30	32	29	40	33	65	45	45	38	42	25	11	28	32	16	29	25
Oil Heat and Electric Cooling	55	48	49	54	61	49	50	60	55	69	53	51	51	41	41	38	40	33	65	47	47	41	57	42	15	35	32	25	35	34
Electric Heat and Electric Cooling	72	90	61	105	170	85	62	60	72	81	91	81	64	67	45	48	36	41	65	47	47	41	57	57	29	31	28	31	41	40
4" Loose Fill (3 1/2" Blanket)																														
Gas Heat and Electric Cooling	24	30	30	34	37	27	26	24	20	18	27	21	22	22	19	20	18	25	17	28	25	24	27	16	7	17	19	10	18	16
Oil Heat and Electric Cooling	33	29	30	33	37	30	31	32	27	32	31	31	25	25	24	25	24	25	33	30	30	33	34	15	23	21	17	15	33	25
Electric Heat and Electric Cooling	43	54	37	63	103	52	38	36	43	49	55	49	40	40	29	29	22	26	40	40	29	26	36	34	17	19	17	15	37	25

20 Year Estimated Total Dollar Fuel Savings by Adding Fiberglas 6" Attic Insulation to Existing Insulation

Based on 1,000 sq. ft. Attic Floor Area (net) and an Annual 7% Increase in Fuel Costs

Present Insulation Type and Thickness and Heating/Cooling Energy Source	Eastern Cities					Central Cities					Southern Cities					Western Cities														
	Albany	Boston	Hartford	New York	Philadelphia	Washington, D.C.	Chicago	Cleveland	Detroit	Minneapolis	Pittsburgh	St. Louis	Toledo	Atlanta	Charlotte	Greenville	Miami	Nashville	Richmond	Waco	Wichita Falls	El Paso	Denver	San Jose	Las Vegas	Portland, Oregon	Santa Ana	San Francisco		
No Insulation																														
Gas Heat and Electric Cooling	11,351	14,091	13,329	15,889	14,890	10,929	10,081	10,277	8,982	7,611	12,201	9,213	8,979	9,583	6,416	7,800	6,625	6,667	7,147	10,902	7,531	7,621	8,489	6,731	3,186	6,181	9,551	3,954	7,484	4,971
Oil Heat and Electric Cooling	16,181	13,762	13,431	15,362	15,776	12,520	12,777	16,446	15,506	14,555	19,869	14,825	13,443	13,322	10,140	10,240	9,584	6,571	9,311	12,742	9,757	10,811	11,434	15,249	7,512	8,860	10,586	3,864	15,238	7,881
Electric Heat and Electric Cooling	21,188	20,542	17,445	21,013	48,332	23,582	16,418	16,752	20,603	23,620	26,505	23,654	11,361	16,940	11,118	12,244	9,353	6,865	8,599	16,493	9,668	8,966	12,958	18,147	8,537	7,246	8,496	8,150	12,576	9,567
2" Loose Fill																														
Gas Heat and Electric Cooling	2,726	3,389	3,332	3,843	4,051	2,927	2,776	2,884	2,897	1,955	3,097	2,937	2,931	2,445	1,973	2,158	1,950	2,549	1,918	2,881	2,580	2,465	2,768	1,750	771	1,841	2,222	1,052	1,992	1,614
Oil Heat and Electric Cooling	3,330	3,312	3,349	3,721	4,117	3,291	3,985	4,121	3,782	3,558	4,764	3,558	3,277	2,445	2,073	2,158	2,073	2,549	1,918	2,881	2,580	2,465	2,768	1,750	771	1,841	2,222	1,052	1,992	1,614
Electric Heat and Electric Cooling	4,973	6,243	4,222	7,307	11,708	5,849	4,329	4,118	4,950	5,623	6,285	5,637	3,004	4,593	3,051	3,946	4,211	2,555	2,331	4,061	3,076	2,710	3,753	3,307	1,697	2,094	1,951	2,105	3,055	2,667
3" Loose Fill (2" Blanket)																														
Gas Heat and Electric Cooling	1,729	2,151	2,131	2,442	2,637	1,899	1,811	1,733	1,469	1,259	1,916	1,493	1,554	1,572	1,312	1,418	1,272	1,750	1,245	1,582	1,475	1,458	1,458	1,129	380	1,218	1,400	695	1,291	1,293
Oil Heat and Electric Cooling	2,151	2,151	2,151	2,442	2,637	1,899	1,811	2,635	2,408	2,315	3,022	2,315	2,241	2,256	1,848	1,814	1,699	1,736	1,557	2,131	2,025	2,111	2,282	2,355	1,112	1,653	1,653	1,055	2,410	1,413
Electric Heat and Electric Cooling	2,928	3,944	3,944	4,617	7,444	3,724	2,723	2,928	3,944	4,617	5,391	3,976	3,571	1,944	2,921	1,969	2,102	1,778	1,555	2,853	2,052	1,798	2,501	2,484	1,259	1,371	1,255	1,357	1,943	1,744
4" Loose Fill (3 1/2" Blanket)																														
Gas Heat and Electric Cooling	1,043	1,298	1,295	1,476	1,626	1,168	1,119	1,082	969	833	1,163	978	969	833	681	750	705	795	705	1,021	1,019	1,044	1,174	691	226	751	810	434	791	664
Oil Heat and Electric Cooling	1,458	1,299	1,300	1,470	1,650	1,305	1,311	1,601	1,457	1,400	1,823	1,401	1,370	1,368	1,121	1,111	1,031	1,121	1,031	1,321	1,321	1,321	1,321	454	236	751	810	434	791	664
Electric Heat and Electric Cooling	1,887	2,370	1,630	2,776	4,500	2,265	1,664	1,605	1,856	2,145	2,394	2,132	1,786	1,786	1,223	1,231	1,131	1,131	1,131	1,559	1,559	1,559	1,559	756	850	756	850	823	1,176	1,030

Senator HOLLINGS. The committee will be in recess until tomorrow morning.

[Whereupon, at 12:22 p.m., the hearing was adjourned, to reconvene on Thursday, February 26, 1976.]

ENERGY CONSERVATION ACT OF 1976

THURSDAY, FEBRUARY 26, 1976

U.S. SENATE,
COMMITTEE ON COMMERCE,
Washington, D.C.

The committee met at 9:35 a.m. in room 5110 of the Everett McKinley Dirksen Senate Office Building; Hon. Ernest F. Hollings, presiding.

Senator HOLLINGS. The committee will come to order.

We are pleased to have the first sponsor of S. 2932, Senator Kennedy.

I commend you for struggling for this bill. I think this is a far more important way to achieve energy independence and we'll be glad to hear from you now.

STATEMENT OF HON. EDWARD M. KENNEDY, U.S. SENATOR FROM MASSACHUSETTS

Senator KENNEDY. Thank you very much, Mr. Chairman. First of all, I want to express my warm sense of appreciation for your commencing these hearings on this legislation.

I think I speak for all of us from my part of the country who are dependent on the petroleum product for your efforts in the area of energy.

I think the contributions you have made over the course of this last year, when the Congress was addressing the whole energy issue, was enormously appreciated and has made a great deal of difference to the standard of commercial life in my part of the country, as well as to the individuals who heat their homes with petroleum products and industries who use the other petroleum products.

Senator HOLLINGS. Your whole statement was introduced into the record as you know, yesterday.

Senator KENNEDY. Yes. Mr. Chairman, as you are very much aware, the great debate which took place this last year on energy, was on price, and I think an adjustment was made with the administration in such a way as to at least, perhaps not to all of our satisfaction, but at least we now are on track in that particular area on the petroleum product, in the oil area, and hopefully we will be able to get on track in terms of the gas issue, as well.

But it seems to us now, that it's entirely appropriate for the Congress to address the other great energy area, and that is in the field of conservation. Any review of even the 1975 act shows that even though the Congress did provide certain sections and clauses in the Energy Act of 1975, that we were really not addressing that in a

meaningful way, and I think the track record over the period of this past year in the energy conservation area, has not been a favorable one.

This legislation is focused to build upon the strengths of the States to address the issue of energy conservation in the homes and residential areas, and small businesses and farms, not only in the northeast, but in the southwest, and also in industry as well, recognizing that the cheapest source of new fuel is in conservation, that the soundest—from the environmental point of view—is in conservation, and in terms of our national interest, conservation is quite clearly the most important area.

As you are aware, we build upon the strengths and the flexibility of the States in complementing that program.

We feel their track record in the area of the allocation program was a favorable one, and we build upon that flexibility.

We are hopeful that the States will work closely with local communities in fashioning agreements in terms of complementing the legislation and obviously we welcome any improvements that will be made by this committee.

Mr. Chairman, the director or the czar of energy has estimated that we need about \$200 billion in energy conservation.

That would be a combination of public and private sources. This represents only a 5-percent movement in that direction. It's a very, very conservative, limited, but important and essential step to meeting that problem, recognizing the importance of guarantees and interest subsidies, the budget impact will be extremely modest, as the Chairman knows, approximately \$140 million the first year with \$410 million over the period of 4 years.

But what this can mean in terms of conserving energy for the American people, our estimates, which I think are extremely conservative, of 2 million barrels a day, have been made by a number of industry people.

We had Mr. Aspinson, Richard Aspinson, of the 3-M Company, who estimated that it could mean 5 million barrels a day. And we had a number of industry people who appeared before our Energy Committee of the Joint Economic Committee. We had 4 days of hearings and estimate anywhere from 2 at the minimum up to 7 million barrels a day.

So I think we have estimated a very, very conservative figure. Even so, it's completely warranted and justified.

Finally, I would just say, Mr. Chairman, I know we welcome the expressions of interest in the area of conservation, those within the Administration on energy conservation, but I want to make the point that there is no time for movement in this area other than this present time.

We are really not doing the kind of job that needs to be done in this area for new conservation, and we are just not doing it for the existing construction as well.

And this legislation, we feel, will complement some of the other approaches, which have been introduced in the Congress in terms of tax incentives, other initiatives, but it's a very essential and important effort by the Congress to deal with an extremely important area of our national political interest.

Senator HOLLINGS. On those other initiatives before the Congress, I think specifically today we have H.R. 8650 on the floor of the Senate, dealing with mandatory building code standards for conservation.

I take it deals with new construction, and S. 2932 dovetails with that particular initiative.

What is your comment on it, and H.R. 6360, with respect to tax credits for insulation expenses?

Senator KENNEDY. Well, I would support both of those approaches. I think that they can be useful and helpful.

There is other legislation, the weatherization program that the administration has supported which is a very modest program, some \$55 million.

We could use that in a quarter of Boston, quite frankly. But those are efforts that deserve to be supported. But the point of the matter is the advantage of our particular program is that it is a front-end money for many, small homeowners, farmers, small businesses that just don't have the kind of liquidity to take the tax incentives and this would enable them to get the front-end money to do the job and that would be particularly important for the homeowner, the senior citizen homeowner and it would be extremely important for the small businesses that may be particularly, given the economic climate that we are existing in, just don't have that front-end money, but nonetheless, if provided the kinds of incentives with the payback provisions which you are familiar with, that would justify it from an economic point of view.

So we feel it's complementary. The standards which are established, the tax incentives for middle-income and higher income groups, although I think we have to watch those very carefully to make sure that they are not going to be subject to abuse.

But this program as well, I think complements this approach.

Senator HOLLINGS. And even if there was that money available, there is a certain degree of stimulation or leadership needed. We do it with the industry itself, why not with the individual homeowner.

If it does conserve energy, if it does help us with our balance of payments, that's just as valid an approach as tax write-offs and every other kind of benefit.

Senator KENNEDY. That's right.

Well—now we're getting into the equity, and you are an extremely eloquent commentator on that. The administration has talked about the program for increased production, you could say this is even a \$10 billion, but only in a small percentage of that in terms of frequent outlays to try and do something for the individual and the homeowner.

I mean, in terms of allocation of resources, it makes sense dramatically, from an equity point of view, and I think that's an additional justification.

Senator HOLLINGS. Your full statement covers the creation of new jobs and we will have some dramatic testimony relative to the Long Island study and others.

This study compares the construction of new powerplants with the jobs created in conservation. And this is five times multiplied in that sense, in the creation of jobs.

Here we can work directly in the field of energy conservation and create even far more jobs.

I think in fairness to your presentation this morning, and you touched on it very well in your full statement, what about the role now of political subdivisions within a State?

I know the counties have organizations and municipalities, I think perhaps we can make it possible for all of them to have a piece of the action.

But I think the thrust of the bill would put the action within the States themselves in that the Governors and the States will appoint these councils over the country and we found that in the act last year, the States provided us with some of the finest leadership in the country, much more than what we have been doing here in Washington. But what is your comment about the participation of political subdivisions?

Senator KENNEDY. I would welcome language that would instruct the State governments to work with the local governmental agencies to maximum extent practicable. That would be a useful addition to it, and I would certainly welcome it and support it.

Senator HOLLINGS. The committee is very much indebted to you for your leadership on this bill, and the Congress will be, too.

I am convinced that this is a bill that will have bipartisan support.

We have our distinguished Senator Pearson, who was here yesterday, and had to be at another hearing this morning, he is vitally interested in it, and under your leadership I think we will pass it right on through.

Thank you very much.

Senator KENNEDY. Thank you.

Senator HOLLINGS. Our next witness is Hon. John Hill, the Deputy Administrator of FEA and Roger Sant, Assistant Administrator of Conservation and Environment, FEA.

We welcome both of you to the committee and we will be glad to hear from you at this time.

STATEMENT OF JOHN HILL, DEPUTY ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION; ACCOMPANIED BY ROGER SANT, ASSISTANT ADMINISTRATOR OF CONSERVATION AND ENVIRONMENT

Mr. HILL. Thank you, Mr. Chairman.

I have a short statement which I think I will just read if it is agreeable. I don't think it will take very long. I will leave the remainder of the time for questions and answers.

I am pleased to be here today to comment on S. 2932, "The Energy Conservation Act of 1976."

We understand the bill is designed to stimulate energy conservation in residential, commercial, and industrial establishments through a program of loan subsidies and guarantees.

That we are aware of the importance of energy conservation is shown by the numerous proposals for energy conservation put forth by the President, and by the frequent testimony of various members of the administration. Most recently, Mr. Zarb has testified before the Energy Subcommittee of the Joint Economic Committee in support of various proposals and programs initiated by the administration.

I hope that our previous testimony has been useful in dispelling the numerous misconceptions generated by both the advocates and the detractors of energy conservation. A significant long-term potential for energy savings does exist. Continued strong economic growth depends on wise use of our energy resources. And yet achievement of the potential will require major effort and a concentration of our attention over a period of several years.

Before commenting on the specifics of the bill, I would like briefly to discuss those administration proposals for decreasing our dependence on imported fuels which are still pending before one or the other House of Congress, and the conservation program contained in the recently enacted Energy Policy and Conservation Act.

Two administration proposals are of direct relevance to S. 2932. The first is the proposal for a tax credit to homeowners who take steps to improve the energy efficiency of their homes. This measure has been awaiting consideration in the Senate since it was passed by the House of Representatives last June. It would provide a tax credit for 30 percent of the cost of energy-saving home improvements, up to a total expenditure of \$5,000. We have lost an entire winter during which this credit would have spurred the improvement of thousands of homes in every part of the country.

The second administration proposal is the Weatherization Assistance Act which was part of the President's 1975 state of the Union message over 13 months ago. Had that program been enacted speedily, nearly 500,000 additional homes of the neediest families in our country would by now have received some measure of protection, and we would be saving 10,000 barrels of petroleum each day as a result. The full 3-year weatherization program will affect nearly 1,500,000 homes and save 25,000 barrels of oil each day.

The third proposal is the Building Energy Conservation Standards Act of 1975 reported by the Banking Committee as H.R. 8650. I understand this bill will be up for consideration on the Senate floor shortly. Through this proposal does not overlap with S. 2932, its speedy enactment in 1975 would have meant that we would be one year closer to the widespread adoption and implementation of energy performance standards for new buildings. This proposal would save approximately 350,000 barrels of oil per day by 1985, at little cost to the Federal Government.

Senator HOLLINGS. I don't want to interrupt your train of thoughts but I understand H.R. 8650 has that weatherization program in it, is that correct?

Mr. HILL. That is correct.

Senator HOLLINGS. Well, I am a little disappointed and impatient with the delay. So we have several conservation legislative proposals that have been sitting there since last June. You see, that is what happened. I can see President Ford starting off with Sylvia Porter and whip inflation now. WIN was a conservation program in large measure. That was a very dramatic presentation and President Ford called it WIN and he was headed down that conservation road. He talked about oil prices being too high when the President came to South Carolina and I heard him talk on the subject and we were in accord.

There has been tremendous confusion in holding the line on inflation as well as doing something for unemployment. I think the record should show just that.

Then the administration made a 180-degree turn; where the Shah of Iran was a nut in November and Kissinger was invading in December, the tune was changed. Now the Shah is a nice fellow, we met with him in April, OPEC was tiptop, prices were going up and we were going to decontrol everything. That is what happened to conservation and Whip Inflation Now.

I don't doubt your sincerity at all. But you have got to sort of overcome that impression. You just can't put a little statement in the record and forget it.

Mr. HILL. I don't know whether I should continue on with my statement or just move on to questions and answers.

Senator HOLLINGS. Go right ahead with the statement.

Mr. HILL. I might respond to your interpretation of last year at a later time. I do want to add one thing regarding the Conservation Standards Act, the question has come up in the last 12 hours regarding an effort to remove the sanctions from that bill, just to make it a standard program with no sanctions.

Senator HOLLINGS. Do you favor the sanctions?

Mr. HILL. We definitely favor the sanctions. They were in our original act and we will continue to push for those sanctions all the way through and I want to make it clear for the record this morning that we continue to favor those sanctions and hope they will not be removed on the Senate floor.

Senator HOLLINGS. I will vote with you. I think we will be voting in just a little while.

Mr. HILL. I must also commend the Senate for its encouraging action in passage of the bill to deregulate the price of new natural gas, which, if enacted, would result in substantial energy savings in the sectors affected by S. 2932. I urge you to continue to promote that measure.

The final proposal, which the President made in October of last year, is for the establishment of an Energy Independence Authority. This proposal would establish a program to provide loan guarantees for innovative energy supply and conservation projects unable to obtain private financing but which have the potential for making significant contributions to the Nation's energy needs. The proposed Energy Independence Authority is based on our recognition that the capital requirements of achieving energy independence are extremely large and that a major fraction of these investments, both for conservation and supply, would not occur if they had to rely solely on private financing. The inability or unwillingness of the private sector to undertake all of these necessary capital projects is a factor of the perceived high risks which often accompany large-scale or new technologies.

Portions of the Energy Policy and Conservation Act of 1975 are directed toward the same sectors addressed by S. 2932. Part D of title III of that act established a system of efficiency goals for major industrial energy users which, in combination with continuing programs at the FEA and the Department of Commerce, should do much to focus the attention of industry on the adoption of energy

efficient equipment and processes. We believe that this program will give us a greater insight into the problems confronted by industrial energy users in their efforts to conserve.

The State energy conservation program also established by title III of the Energy Policy and Conservation Act establishes State-run programs for the promotion of energy conservation. It authorizes \$50 million of Federal funding for each of 3 years for administrative support for such State activities. We believe it is most important that the States themselves are directly involved in formulating energy conservation measures. The programs and ideas that flow out of the State energy conservation program will be important in better defining the incentives that may be effective in achieving energy savings.

The point I wish to impress upon you is that the administration proposals currently before Congress and the conservation provisions of the recently enacted EPCA legislation represent a substantial energy conservation program which should be allowed to achieve results.

I believe I have made it clear that the administration supports the concept of Federal efforts to encourage the rapid adoption of effective energy conservation measures. We are concerned, however, that another Federal financial assistance program, as proposed in S. 2932, may be premature.

We have only initiated major information programs within the past year. We have only 2 months ago received the Congressional mandate for appliance efficiency, for industrial conservation reports, and for support of State energy conservation programs. Any major new initiative ought to be preceded by sound analysis of consumer and industrial behavior, which could give us some indication of the effectiveness of measures to promote energy conservation. We look forward to working together with you in this area.

Senator HOLLINGS. Wait a minute. Let's get right to that. Now, here we go—you started in your statement talking about last summer, and then you commented about the Natural Gas Act and the other act that was passed, and you say we have lost an entire winter, yet you say the energy conservation programs in S. 2932 are premature.

Aren't the people restless with this Washington study? What could you really find out in a further study when the Governors and the Representatives say 70 percent of the homes constructed prior to 1939 were without insulation and that their fuel oil has gone from 19 cents to 45 cents a gallon? We don't need another study. We need to act.

The candidates up in New Hampshire saying not just the unemployed but the employed give them concern. We think S. 2932 creates employment. We think it definitely saves energy. We think it definitely pays back within a period of 3 to 6 years and yet you give a self-serving declaration. You say that any major new initiative ought to be preceded by a sound analysis of consumer and industrial behavior.

We could study that for the rest of time. Premature—what is wrong with the financial standards program here for the established home? We have got the weatherization. We have got the building codes for the new construction. What about the small industry out there. We had very interesting testimony from Mr. Nader but they had

the expertise on the campus, Ohio State. They could get the leadership together. But the average little businessman is spending all his extra time filling out Federal forms now and he doesn't have the know-how and the information.

So, hopefully we are trying to get the States to take that leadership support either with loan guarantees or an interest subsidy so that with that information they can move forward. Why is it premature when you say that we have wasted an entire winter? Now we have come in here with a viable program. We are way behind all the industrialized countries in the world on conservation.

Mr. HILL. I think I can answer that in several ways.

I think it is premature in the sense that we have not come close to maximizing the information flow. There is interest here in providing \$10 billion in loans and loan guarantees for people to take energy conservation actions but we have consistently had our very small appropriations for consumer and business and industrial information programs reduced by the Congress every time we have come forward.

I don't think we have yet given the full funding and the full requirements to the information programs to see the full impact that information will have when it is well designed and well structured in terms of inducing people to adopt energy conservation methods that are clearly in their best economic interest.

Second, I don't think we have analyzed sufficiently well all of the implementation requirements of a bill such as this where historically we have had institutions such as cap agencies or others, HUD agencies applying for Federal applications for loans. We haven't had that much experience with hundreds or thousands of homeowners doing that. The only place we have really had that was in the tax area and we thought that was part of the logic of our tax system.

Senator HOLLINGS. Doesn't your energy independence authority adopt in principle the loan guarantee approach?

Mr. HILL. It certainly does, but—

Senator HOLLINGS. Now, once we have got that who is going to administer it? Why not allow the States to operate these things? You know in the grant approach, the President, has taken cognizance of this and I think you ought to get involved in it. He is saying he hasn't been able to do it at the Washington level.

Why not capture all that initiative and leadership and participation at the State level? Why not allow the States to do it? The President is willing to try it in his grant approach.

Mr. HILL. I would agree that the States ought to have a program in energy conservation. I think many of your statements also tend to imply that the States have done nothing in this area and I think that is a wrong assessment to make in that many States have moved quite aggressively in State conservation. I think there are questions that need better answers before we start putting out \$10 billion in loans, guarantees, and subsidies. The State of Michigan began, for example, through the State Public Utility Commission and the utilities have augmented a loan program for homeowners to install energy efficiency devices in their homes. At low interest rates and it is in their electric bills amortized over a long period of time, extremely small monthly payments.

This program has had very little success in the number of people who are actually operating for this kind of program. Why is that the case? We don't understand yet what it is that is necessary to induce millions of people who are small energy consuming units to take energy conservation steps. And I think it is that kind of analysis that needs to be done.

It was clear in the standards area that you obviously had major disconnections in the market where the signals of higher prices did not flow all the way through to the ultimate user.

So, you clearly need to move in with the standards approach with considerable analysis to back that up. We have not seen that kind of analysis yet regarding whether or not \$10 billion in loan guarantees and subsidies will actually induce people to take energy conservation steps. We have not seen the analysis yet to show that \$10 billion did not go into just retiring existing obsolete equipment which is turning over anyway, a subtle question as to whether the Government ought to basically fund replacement equipment that is in the process of being replaced already as opposed to going into retrofit.

Those kinds of issues in our mind need additional analysis and consideration.

Senator HOLLINGS. Well, I don't mean to hurt your feelings, but that sounds like the State Department.

We are looking for leadership. Now, we are doing just what you say is necessary for this committee.

Yesterday we tried to determine why some of these programs haven't gotten widespread acceptance. We heard from a little oil company that bought the ads and did a lot of conserving, but the program was a loser to him, but he hadn't given up on it and to read his exact answer as to why his program was a flop as he described it, he says:

The answer is clearly the leadership of our government to provide the failure of our government to provide the slightest bit of leadership.

The Administration has directed 98 percent of their efforts and taxpayers' dollars to promoting increased supply while contributing nothing but hot air and gimmickry to the demand side of the equation.

That was the testimony and we have got other witnesses coming. And that is the criticism from me and you.

Why can't you come along now? I am amazed to see that word "premature" in your statement. You say: "This measure has been waiting under consideration since last June. We have lost an entire winter. I am moving down the road with you," and then all of a sudden you go in five different directions and say it is premature.

That is not national leadership from John Hill, the Deputy Administrator of the FEA.

Mr. HILL. I think if you would have sat through many of the sessions regarding lack of action on the energy conservation proposals we have had up here, I think you would be in somewhat of agreement that we have not had a concerted sense of leadership on conservation.

We have just been unable to move most of the conservation bills that have been before this Congress. But I think it would be dangerous to assume that because we have not proposed a program of \$10 billion that we have not been trying to provide leadership in this area. I don't think—

Senator HOLLINGS. The administration, the President, said \$100 billion.

Mr. HILL. That is not correct. They already provide loans and loan guarantees.

Senator HOLLINGS. What percent?

Mr. HILL. It doesn't have a specified percent in the act. Any major new conservation technology that could not get private financing but which would make a significant contribution would be eligible for a loan or a loan guarantee from the EIA. It is restricted by the criteria in being able to make a significant contribution and being in a situation of not being able to achieve financing from private sources because it is high risk or of a new nature.

Senator HOLLINGS. How could a homeowner benefit from that program?

Mr. HILL. Well, the homeowner himself would not make a direct application to the EIA.

Senator HOLLINGS. So he couldn't even participate?

Mr. HILL. He could clearly participate in the program through, say, a utility that went into a new technology to conserve energy throughout its entire system.

He would be the beneficiary of the lower rates of electricity that would stem from the technology provided by the utility.

Senator HOLLINGS. You're really putting him into the hands of the Philistines. You're going to ruin President Ford down there in Florida before the other fellows try. You're saying that the homeowner has to wait on the utility to conserve. That can't be your statement. You can't be serious.

Mr. HILL. These are regulated industries. If there are savings, those savings are passed on to consumers and that's clearly the case. But again the homeowner not under EIA but would still get the tax credit which is a direct subsidy to invest in the energy conservation technologies.

Now, I have a hard time believing that the Congress has been unwilling to date to even grant the homeowner up to \$500. But now it seems to be interested in a \$10 billion program.

Our assessment shows that the \$500 tax credit will induce substantial amounts of conservation.

Senator HOLLINGS. Well, get the bill in perspective and I am sure you will realize we are not going to spend \$10 billion tomorrow. It will be a range from \$160 to \$360 million at any one time in the loan program. But let me ask you because I want to be sure. Somebody told me that OMB made you put "premature" in there. Did OMB make you put premature in that statement?

Mr. HILL. I don't think so. When I was reviewing the first draft of the testimony I think it was Monday of this week that was—in looking at the speculation on the legislation, it was my own judgment that it was premature. OMB may have concurred in that. I don't know. I did not discuss this testimony with OMB.

Senator HOLLINGS. It was checked through by FEA, wasn't it?

Mr. HILL. That's correct. And I am sure they concurred in the use of the adjective.

Senator HOLLINGS. Thank you, sir. Go right ahead.

Mr. HILL. All right.

I would now like to raise some specific concerns that we have with the provisions of S. 2932. We have looked at both the tax credit approach and the loan guarantee or loan subsidy approach in detail and feel that both could help the homeowner overcome the capital costs associated with many conservation actions. Both would be most effective among middle and upper income homeowners rather than low income persons, and would thus complement our weatherization proposal. But we chose the tax credit approach for homeowners as the one which would offer the greatest market appeal with the least administrative burden. The tax credit is potentially the same as a price discount, even though the credit is received later, at tax time.

We are concerned by the seemingly cumbersome bureaucracy which might be established to carry out a loan program of the breadth required by S. 2932. This concern affects our reaction, not only to the residential sector, but also the commercial and industrial loan program authorized by S. 2932.

Though cooperation of the banking community in the implementation of this type of program might facilitate its administration, we would still have doubts about its effectiveness. Nevertheless, we will be listening with interest to the position of the bank and savings and loan representatives which are testifying here.

Finally, we feel, based on our studies, that a workable definition of an "energy conservation measure" is difficult to establish, particularly in industrial and commercial applications. In proposals put forth by the administration, we have consistently used definitions which included only insulating materials which improve the thermal properties of buildings, rather than including heating or processing equipment. We are concerned that a definition which includes such equipment will open up our proposals to abuse; outmoded and inefficient equipment which would have been replaced through a normal process of modernization would be subsidized—an unmerited windfall paid for by the Treasury. Such loopholes should never be allowed.

Senator HOLLINGS. We agree with you on that. That's a valid statement. What we are trying to do is put the money at the front end. The front-end money approach, when a consumer sees his neighbors insulating their homes and achieving a cut in the electric and gas bill—he will follow along.

And there are plenty of people in homes, those on social security and such but who are still struggling at 70 years of age who want one thing, to hold onto their home.

This is a result of talking to the homeowners, talking to the heating and oil companies, who are enthusiastic about conservation rather than confused, rather than waiting around to study it. Maybe we ought to have a reception for you with that group so you can meet them. Have you met many conservation people in your role?

Mr. HILL. I have met quite a few of them. I would say I have probably met just about every interest group in the energy sector several times a week.

Senator HOLLINGS. Don't you find them enthusiastic?

Mr. HILL. Extremely enthusiastic.

Senator HOLLINGS. That thing is perishable. I think we ought to legislate it and run with it.

Mr. HILL. I guess there are still some basic questions in our mind regarding whether or not the application of this level of funding will actually achieve results. We have seen no real evidence, for example, that homeowners, that there is a considerable number of homeowners who have difficulty or who are unable to borrow \$1,000 for an energy conservation device, particularly when homeowners are in the market, are borrowing money for other activities, new cars, television sets, and so forth.

Really, there has been very little analysis of the fact that these homeowners as a general rule cannot borrow \$1,000 or \$1,500 for an energy conservation device when they can certainly borrow it for many other activities that they participate in.

You clearly have a group of homeowners who cannot afford it and these are the low-income people in the Nation and we have preferred not to run a loan guarantee program for them because it's unlikely they will be able to repay the loan anyway.

It is the case that their costs or their monthly payments would go up and they would probably like to avoid that, that it's better to handle them through grant programs of insulating their homes at no cost to themselves.

Senator HOLLINGS. You wouldn't recommend a grant program?

Mr. HILL. We have recommended a program to directly purchase energy efficiency materials for the homes for low-income people, yes.

Senator HOLLINGS. So if we changed this from an interest subsidy into an outright grant, you could support it?

Mr. HILL. If you were to do that, I think I would be consistent with the Weatherization Act. For low-income people we would support it, yes. I would not support at this time a grant program for non-low income persons.

Again, I think the evidence is such that they have considerable borrowing capacities as a rule.

Senator HOLLINGS. Wait a minute. Just a minute ago you said that they didn't have all that borrowing capacity.

I'm trying to run you into a corner to get some positive approach to this program.

Mr. HILL. What I was saying, Mr. Chairman, was that the large number of homeowners in the Nation do have the capital capacities to install energy conservation devices.

At least there is a prima facie case that they do, given the borrowing capacity they exhibit regarding other things that they desire. There clearly is a segment of our population, a low-income segment which I personally think is much better to deal with them through direct grants, giving them a loan even if it's low interest.

They still have to repay the loan and many persons' capacity today that is virtually zero.

Once you move beyond the low income, again it's our view that it has not been proven that they do not have the ability to do the front-end financing. They clearly have it on many other devices.

Senator HOLLINGS. That is the very trouble with Washington today with borrowing capacity.

Now, one can easily see the need for loan guarantees for the low-income fellow in Washington. Or if you are rich enough, it's easy to borrow the capital. Gulf and Exxon have that borrowing capacity and they can definitely borrow money.

So we have a subsidy program for that crowd, \$100 billion. We can subsidize the wealthy and we can take care of the low income. But with middle America all we do is just study. And here, in S. 2932, the Government doesn't lose the money. These loans are paid back in generous conservation faster than they will be able to discover more energy offshore.

Conservation can supply as much energy as building another Alaska pipeline. We can go off and run with this and you say it's premature, and you aren't interested in loaning the middle American money to conserve, when he can repay the bill.

The \$200 billion is going to be spent on conservation. Are you telling me that money is going to do to the higher income groups and nothing for the small businessmen and the homeowner?

Mr. HILL. That EIA program is not designed to finance companies but is designed to finance technologies. I think it's a fairly simple proposition. There are a series of technologies that are extremely high risk, both technically and commercially today. The question is simply: Do we want to develop those technologies at full commercial scale or do we not? If we don't want those resources then you just don't put the money in.

If you want to see those technologies in the eighties and nineties make a contribution, then I think you do have to put those Federal funds into the program.

But I don't think it's in any way—it should not be looked at as enriching a particular company. Do we want those technologies or not?

If we don't want them fine, just don't put the money into them. It's a fairly simple proposition, I think.

Senator HOLLINGS. I'm not trying to enrich the homeowner or the company. But I am trying to find out who is going to get the loan assistance. It seems we have nothing for middle Americans.

Mr. HILL. We have got it for technologies, Federal assistance which we will provide financial assistance for a full range of technologies in the Government. We think it's important to provide some of those Federal assistance programs for industrial technologies, not just technologies for agriculture or to put somebody on the moon.

We have also proposed to provide financial assistance to the middle-income earner as a tax credit. Again, we think that program is aimed at the middle class. That is your concern and that is a legitimate concern in this country, to give that group of people who pay most of the tabs for everything else, a benefit, a considerable benefit in trying to cope with higher energy prices.

But I think it's likely that the \$500 that they would achieve under the tax credit bill that is before the Senate is probably as large if not larger a subsidy than they would get under this loan program.

Senator HOLLINGS. Mr. Sant, do you want to add something?

Mr. SANT. I was just suggesting the tax credit is a \$150 tax credit. I think it's clear that the \$400 or \$500 million that we have estimated per year that would be spent on that tax credit would be substantially in excess of anything you're proposing in this bill and, therefore, I think it's a much more liberal proposal than a loan guarantee.

All we're looking at is whether or not there should be some duplication of that in the residential sector.

Senator HOLLINGS. All right. You started that.

Mr. HILL. We have outlined our objections of S. 2932. I would now like to reemphasize that though we feel S. 2932 is premature at this time, we recognize that several significant barriers exist to investments in energy conservation. One of these barriers is lack of detailed information on the opportunities for energy conservation.

Many of us have testified to the importance of the Government's role in distributing information to energy consumers of all types. Contrary to popular conceptions and even to our own initial expectations, commercial and industrial users are frequently as ignorant of their savings opportunities as are homeowners. Though we expected business people to be more sensitive to rising energy costs and thus more likely to seek out conservation information, they often seem to be more comfortable with traditional practices and attitudes about energy as are other consumers. It is with this in mind that we have undertaken various programs to put reliable and helpful information in the hands of building and industrial owners who can make investment decisions. We are convinced that the logical first step is to allow time for the benefits of energy conservation investments to be better understood.

Before I came up here, I might add, I was making some final decisions on a conservation program for small businesses focusing on 20 small business sectors and will be moving ahead with this in the next week or so.

But a lack of information is not the only barrier to increase energy conservation. Energy prices controlled at artificially low levels create a disincentive for making energy conservation investments as does uncertainty about the future of energy prices. With the gradual decontrol of domestic crude oil prices agreed to last December, and the enactment of legislation to deregulate new natural gas, these barriers may finally be removed.

I spent several hours last week with Anthony Wedgewood, then the energy administrator of Great Britain, and he was discussing their experience there with higher prices and the fact that they have had to increase prices to their consumers and Mr. Ben was quite adamant on the fact that prices have to be supportive of conservation and if they are not it has been their experience in England that you just make the conservation headway that you need to make.

Another barrier, however, is the undue emphasis frequently placed on the initial costs of a particular investment, instead of on a complete analysis of both capital and operating costs of investment alternatives. Furthermore, because of ingrained perceptions of the desirability of energy supply as opposed to conservation, commercial and industrial energy users are sometimes unwilling to make conservation investments that would ultimately be beneficial. Hopefully, by increasing the awareness of businesses and financial institutions of the economic basis for such investments, we will be able to overcome these barriers.

In summary, we can all agree on the urgency for energy conservation, yet differ on the best methods to achieve it. We have put forward a number of proposals which have yet to be enacted by the Congress. The many programs mandated by the Energy Policy and Conservation Act of 1975 have yet to be given a chance to work. We do not yet know which incentives are needed or are likely to be the most effective in achieving our common goals. We urge

you to delay action on this bill to permit further analysis of the many concerns which we have highlighted today.

I will be glad to answer any questions you may have.

Senator HOLLINGS. Well, I hope you don't mean when you use that expression "premature", that we ought to hold it up entirely this year. In other words, if we can work out something in the next 3 or 4 months, you might be able to go along with us?

Mr. HILL. I think, Mr. Chairman, that we would be glad to go along with something on this if we work with the staff and see what we think can be achieved in this area. We would be more than happy to join with you to push a program.

Senator HOLLINGS. Well, I hope so because we don't want to follow what they have got going in Britain.

I'm worried that we might go the way of Britain. Why don't we study Sweden and West Germany on conservation? That's what we need. We sure don't want to go the way of Britain.

Mr. HILL. I think Germany may be one of the best case studies in our minds for a lot of the kinds of proposals we have been trying to achieve this year.

Mr. SANT. I would like to provide for the record our study of West Germany, Mr. Chairman.

[The following information was subsequently received for the record:]

COMPARISON OF ENERGY CONSUMPTION BETWEEN WEST GERMANY AND THE UNITED STATES

ABSTRACT

The objective of this study is to examine and explain the differences in per capita energy consumption between the United States and West Germany, and to quantify the factors involved. West Germany uses only half as much energy per capita as the United States. Energy use per capita for transportation is only one-fourth of that of the United States, for residential space heating (climate corrected) only one-half, for other residential uses only one-fourth, and for industrial uses 58 percent. The United States uses at least 40 percent more energy for industry in relation to output as West Germany. The total energy use in the United States in relation to national income is about 50 percent greater than in West Germany. This large disparity in energy use between the two countries suggests that continued economic growth and improvement in the standard of living in the United States should be possible without a proportionate increase in energy consumption.

PREFACE

This study was conducted in the Operations Evaluation Department, Robert M. Rodden, Director, of SRI's Engineering Systems Division. The project supervisor was Edward M. Dickson, and the project leader was Ronald K. White. The principal effort in the study, the comparison of energy consumption in the United States and West Germany by end use category, was performed by Richard L. Goen.

The survey of foreign practices in the consumption of energy was conducted by Lawrence L. Cobb, and was based on questionnaire responses from several SRI staff members with foreign living experiences. The per capita income comparison was made by Ernest C. Harvey and Richard J. Hammond of the Economic Policy Department. The collection of energy consumption data in West Germany was performed by Stuart W. Webster from the London office of the SRI Long Range Planning Service.

The FEA project officer for the study was Dr. Jeffrey S. Milstein.

I SUMMARY

Introduction

Initially this study was to have been a survey of foreign energy consumption practices to identify and evaluate energy conservation practices in other countries for their applicability and potential energy savings for the United States. However, based on

the early results of the survey, the FEA requested a redirection of the study. The revised objective was to examine and explain the differences in per capita energy consumption between the United States and West Germany, and to quantify the factors involved.

The rationale for the revised study objective is related to the observation from FEA studies that several European countries have per capita incomes (PCI) comparable to the United States, while their per capita energy consumption (PCEC) is only half that of the United States. This observation suggests that it may be possible to achieve a substantial reduction in the rate of growth of energy consumption in the United States without reducing the standard of living and economic growth. Substantiation of the observation would thus provide justification for energy conservation policies in the United States. Furthermore, comparisons of the energy consumption in the United States in the various end-use categories with the corresponding figures for the European countries might suggest possibilities for energy conservation or provide substantiation for estimates of conservation potential.

The study was limited to a comparison with West Germany to permit analysis in greater detail than would have been possible with coverage of additional countries. Much of the data on energy consumption in West Germany was obtained by a London-based SRI staff member on a trip to that country.

The sectors covered in the examination of per capita energy consumption were (1) transportation, (2) industry, (3) utilities, (4) residential, (5) commercial, (6) exports and imports, and (7) total of all sectors. Most of the comparisons are for 1972, which was the latest year for which sufficient data were generally available.

To provide timely information for FEA's use, the results of the study were submitted in a series of working papers as segments of the work were completed.

Summary

Section II gives an overview comparison of the electrical and total energy use by the household and commercial, industrial, and transportation sectors of the United States and West Germany. Sections III through VI give information on end uses of energy within the sectors. Section VII derives the energy content of net imports and exports. Appendix A describes the methodology and data sources for Sections II through VII. Appendix B compares the per capita incomes in the two countries. Appendix C presents the results of the survey of foreign energy consumption practices conducted before the redirection of the study.

Energy Consumption by Sectors.—As indicated in the following tabulation, the per capita energy consumption in West Germany is substantially lower in each of the sectors than that in the United States.

PER CAPITA ENERGY CONSUMPTION IN WEST GERMANY AS PERCENT OF THAT IN
THE UNITED STATES—1972

Sector	Percent
Households and commercial	52.1
Industry	60.8
Transportation	25.7
All sectors	48.8

The per capita energy consumption for transportation is markedly lower in West Germany. Excluding the industry sector, the per capita energy consumption in the remaining sectors for West Germany is 41 percent of that for the United States.

Transportation.—Table 1 gives the per capita amounts of travel, freight movement, and energy consumption, by travel mode, for West Germany as a percent of that for the United States. The per capita energy consumption is much lower in West Germany for all modes except passenger rail travel. Road transport is the principal energy user in both countries, accounting for 74 percent of the energy use for transportation in the United States, and 79 percent in West Germany. The two principal factors accounting for the much lower per capita use of energy for transportation in West Germany are (1) lower amounts of both passenger travel and freight transport, and (2) lower fuel consumption rates per vehicle-mile for passenger cars. However, the transport modes other than road transport are more energy-intensive than in the United States.

TABLE 1.—COMPARISON OF TRANSPORTATION ENERGY CONSUMPTION BY MODE—1972

	West Germany per capita as percent of United States		
	Passenger miles	Freight Ton miles	Energy consumption
Road transport	¹ 46	² 24	29
Railroads	998	25	75
Air transport	13	5	20
Inland and coastal shipping		17	33
Military			13
All transportation	47	² 20	27

¹ Cars, motorcycles, buses, and transit.² Intercity only.

TABLE 2.—COMPARISON OF RESIDENTIAL ENERGY USE PER CAPITA IN THE UNITED STATES AND WEST GERMANY—1972

Item	Percent
Space heating	67
Hot water	37
Cooking	60
Air-conditioning	1
Clothes drying	1
Other	18
All uses, excluding space heating	26
All uses	48

Residential.—Table 2 gives the per capita residential energy consumption by end use for West Germany as a percent of that for the United States. When corrected for the colder weather, the per capita energy use for space heating in West Germany is only about one-half that in the United States. Factors contributing to the larger space-heating energy use in the United States include the larger size of dwellings, a greater percentage of dwelling space heated, a smaller percentage of dwelling units in apartments, and less use of insulated windows. The average floor space of dwellings in the United States is 57 percent greater than in West Germany. Only 45 percent of the dwelling space in West Germany is heated, and bedrooms are often left unheated even when heating is available. Temperature settings in West Germany are comparable to those in the United States.

Excluding space heating, the residential energy use for other purposes in West Germany is only one-fourth of that for the United States. The percentages of households with the various electrical appliances are not substantially different, except for air conditioning and clothes dryers, which are negligible in West Germany, and dishwashers, which are present in a much smaller percentage of household in that country. The refrigerator sizes are much smaller in West Germany. Hot water systems in West Germany are commonly small point-of-use systems, with water heated only when needed.

Commercial.—The per capita energy consumption in the commercial sector (defined as the remaining economic activities apart from the residential, industrial, and transportation sectors) in West Germany for 1972 is 56 percent of that for the United States.

Electrical Generation.—Consumption of electrical energy per capita in West Germany is about 50 percent of that of the United States. Thus, the proportion of electrical energy to total energy in the two countries is similar, although West Germany consumes a significantly greater proportion of electricity in industry and transportation and less in households, as indicated in the following tabulation.

PERCENT OF ELECTRICITY CONSUMED

Sector	United States	West Germany
Households	32.0	22.1
Commercial	22.8	20.3
Industry	44.9	54.3
Transportation	.3	3.4

In West Germany, a much larger proportion of the electric energy is generated by self-producers (principally industrial establishments), rather than utilities, as indicated in the following tabulation.

PERCENT OF ELECTRICITY GENERATED

	United States	West Germany
Utilities	94.3	71.5
Self-producers	5.7	28.5

Of the West German industrial (excluding railroads) net production, 59 percent goes for their own use. The generation (and sale) of this much surplus electricity suggests a wider practice of the energy-conserving techniques of combining the generation of electricity and process heat in West German industry.

Table 3 gives the ratios of net electric generation to net generating capacity for each major source for the two countries. The utilization of capital resources is significantly more effective in West Germany. The hydroelectric capacity factor appears lower in West Germany because of the use of pumped storage.

TABLE 3.—CAPACITY FACTORS FOR ELECTRIC GENERATION—1972

Source	Ratio of net generation to net capacity	
	United States	West Germany
Conventional thermal	0.50	0.57
Hydroelectric	.55	.33
Nuclear	.40	.47
All sources	.51	.54

The heat rate for power generation is similar in the two countries, but distribution losses are proportionally 50 percent greater in the United States. The larger losses may be attributable to the longer transmission distances in the United States and to the greater use of dc transmission in West Germany.

Industrial.—Table 4 compares the energy consumption in relation to value of shipments for the two countries in 1972, for six energy-intensive industries, other manufacturing industries, and industry total. The United States uses 40 percent more energy in relation to industrial output than West Germany.

TABLE 4.—COMPARISON OF INDUSTRIAL ENERGY CONSUMPTION IN RELATION TO VALUE OF SHIPMENTS—1972

Industrial sector	10 ³ Btu/\$ of shipments		West Germany as percent of United States
	United States	West Germany	
Food	11.9	8.3	70
Paper	104.0	38.6	37
Chemicals	71.8	40.8	57
Petroleum and coal products	112.0	56.0	50
Stone, clay, glass, and concrete products	75.3	54.8	73
Primary metals	97.0	77.6	80
Total for 6 energy-intensive industries	61.2	42.4	69
Other manufacturing	9.4	7.1	76
Industry total	34.8	25.1	72

The energy use in relation to output is also higher for the United States when output is measured in physical rather than monetary terms. Table 5 compares energy use per ton of petroleum products, steel, and paper for the two countries.

The lower per capita industrial energy consumption in West Germany is due in part to the lower per capita industrial output, through in larger part to the lower energy used in relation to output, as indicated in the following tabulation:

	West Germany as percent of United States
Per capita industrial value of shipments	80
Energy use per dollar of shipments	72
Per capita industrial energy consumption	58 ¹

¹ This number differs slightly from the comparable figure given earlier since the former was calculated from a partitioning of total national energy consumption among the three sectors, while the present figure was calculated from details of energy use by industries.

One of the factors contributing to the lower energy use by industry in West Germany may be the large amount of electricity (28 percent) generated by self-producers, principally industrial establishments, which permits the greater thermal efficiency obtainable from the combined production of electricity and process heat.

TABLE 5.—ENERGY USE PER TON OF PETROLEUM PRODUCTS, STEEL, AND PAPER—1972

	10 ⁶ Btu/ton		West Germany as percent of United States
	United States	West Germany	
Petroleum products	4.9	3.3	67
Steel	27.3	18.6	68
Paper	46.6	26.6	57

Exports and Imports.—The energy consumption within a country does not indicate the actual energy use of the inhabitants. The energy required for the production of exports does not represent energy consumption by the inhabitants, while the energy content of the imports (excluding fuel) should represent a part of internal energy consumption.

For the United States the energy content of net exports and imports is negligible—a net export of energy of less than 1 percent of the total energy consumption. For West Germany, however, the large net export of energy through energy-intensive goods is about 4 to 9 percent of total national energy use. Thus, the apparent per capital

energy consumption for West Germany should be reduced by that amount to reflect actual energy consumption by the inhabitants.

Per Capita Income.—SRI's review of FEA comparisons made in 1974 of per capita income (PCI) between the United States and West Germany uncovered a number of discrepancies. Correction of these discrepancies results in a relative PCI for West Germany that is much lower than the FEA figure. The corrected figures for 1973 show the PCI for West Germany to be 89 percent of that for the United States, based on the 1973 currency exchange rates.

However, use of exchange rates cannot be expected to provide a valid comparison of national income. Other indicators suggest that the private consumption level in West Germany is substantially less than 89 percent of the level in the United States; perhaps more like 70 percent. The apparent narrowing of the gap between the PCIs of the two countries in recent years is attributable principally to the change in the currency exchange rates.

Energy Consumption in Relation to National Income.—As noted earlier, the per capita energy consumption (PCEC) of West Germany is 48.8 percent of that for the United States. Subtracting 5 percent from the PCEC of West Germany to account for the energy content of net exports reduces the PCEC for West Germany to 46.4 percent of that for the United States. Assuming the per capita income of West Germany to be 70 percent of that for the United States, the energy use per unit of national income for West Germany is $46.4/0.7 = 66$ percent of that for the United States. Expressed another way, the United States uses 50 percent more energy in relation to national income.

Conclusions and Recommendations

Implications of Differences in Energy Consumption.—The large disparity in energy use between these two economically similar countries suggests that it should be possible for the United States to substantially reduce the ratio of energy use to national income. Or expressed another way, continued economic growth and improvement in the standard of living should be possible without a proportionate increase in energy consumption.

Energy Conservation Measures.—For many of the types of energy conservation measures suggested by the differences in energy use patterns between the two countries, such as smaller cars, and transportation modal shifts, there are already awareness and efforts at implementing these in the United States. Other types of energy conservation measures, for which there is less awareness in this country, are suggested by the study:

Industrial Generation of Electricity and Process Heat.—In West Germany, 29 percent of the electricity is generated by self-producers, principally industrial establishments. The practice permits the greater thermal efficiency obtainable from the combined production of electricity and process heat. Where process heat (steam) is required, the extra fuel required to generate electricity is only about 37 percent of that required for the production of electricity by a utility. The West German example suggests that a large increase in the industrial generation of electricity, combined with the production of process heat, should be possible in the United States.

Improved Utilization of Electric Generating Capacity.—Practices in West Germany that contribute to higher utilization of electric generating capacity include greater use of pumped storage for meeting peak loads, and special off-peak rates for electricity used for storing heat at night for space heating.

Residential Heating Systems.—In West Germany, only 45 percent of the residential floor space is heated. Although adoption of that practice in the United States would be difficult to implement, a step in that direction might be possible through changes in residential heating systems to provide greater control of temperatures in different parts of the house.

Hot Water Systems.—The per capita use of energy for hot water in West Germany is only about one-third of that in the United States. The prominence of this energy use in households, second only to space heating, is widely appreciated in the United States, but the comparison with West Germany suggests that potential energy savings may be far larger than previously considered. Small point-of-use and heat-on-demand water heating systems are commonly used in West Germany. With these systems, the user is more closely involved with the activation and operation of the system. The adoption of such systems in the United States might effect a change in hot water consumption practices.

Energy Conservation Potential for Industry.—Energy consumption in the six energy-intensive industries in West Germany in relation to value of product range from 20 to 63 percent less than in the same industries in the United States. Energy use per ton of petroleum products, steel, and paper is 33, 32, and 43 percent, respectively, less than in the United States. While energy conservation in the most energy-intensive

industries is receiving much attention and discussion in the United States, the extent to which industrial energy use could be reduced has been controversial. The example of West Germany verifies the large potential for energy conservation in industry, and establishes realistic energy conservation goals for the energy-intensive industries.

Recommendations for Further Study

Additional analysis of the reasons for the lower energy consumption in West Germany and extension of the study to other industrialized countries should be conducted to (1) further substantiate that substantial energy conservation should be possible without reducing economic growth, (2) identify additional potential energy conservation practices and (3) establish realistic energy conservation goals for important components of the economy.

Senator HOLLINGS. We would be glad to accept that. Why has the budget gone down from \$48 million in 1976 to a projected \$11 million in 1977?

Why are you putting up less money for conservation?

Mr. HILL. The budget that you see before the Congress today, Mr. Chairman, is not a terribly realistic budget in that it was done in the context—

Senator HOLLINGS. You can stop right there and we can recess. I am on the Appropriations and Budget Committee and that's just our feeling, and now we have gotten you to say it.

Mr. HILL. That budget basically is based on a veto of the act that was signed in December. We are now working with OMB and we hope to have up to your committee a supplemental for 1976 and 1977 for the entire agency.

Senator HOLLINGS. How much of an increase do you expect for conservation? Cutting it back up to the same level?

Mr. HILL. It will be at least at the same level if not higher than prior years.

Senator HOLLINGS. Because usually Mr. Zarb talks all over the land in terms of \$200 billion to be invested in conservation.

I think, yes, certain things could be a little premature.

Certainly we've got a lot of kinks to work out. We can't put this bill through in an afternoon.

If we can get it through this year we will be very successful. But I think it would be terrible to delay it any longer than that.

Mr. Sant?

Mr. SANT. We sometimes like to blame each other for whatever happens. I think I will only add to that, that in fiscal 1976 we proposed a budget of \$88 million, that was cleared through the Appropriations Committee of only \$43.7 million. So the problem has been throughout. It's not just OMB or it's not just the Congress, everybody needs to increase their perceptions as to how much we could stimulate conservation and we appreciate your support in that regard.

Senator HOLLINGS. Thank you very much, Mr. Hill, you and Mr. Sant both. We appreciate your appearance here this morning.

Mr. HILL. Thank you, Mr. Chairman.

Senator HOLLINGS. Our next witness is Mr. Fred Dubin, president of Dubin-Bloome Associates, New York.

Go right ahead, Mr. Dubin.

**STATEMENT OF FRED DUBIN, PRESIDENT, DUBIN-BLOOME
ASSOCIATES, NEW YORK, N.Y.**

Mr. DUBIN. Thank you, Mr. Chairman.

I am sorry I didn't have time to prepare 75 copies of my statement, and I hope you will bear with me a bit; there may be some typographical errors and a number of omissions, but it would take a book as large as the Ford Energy Policy to state the case. I won't quote directly—I won't follow this script line for line.

Senator HOLLINGS. Who paid for this study, "Energy Use on Long Island, 1975-95"?

Mr. DUBIN. Suffolk County Department of Environmental Control, Long Island. A similar study is now being financed by The Public Advocate in the State of New Jersey, in the gas and electric territory in New Jersey of the Public Electric and Gas Co.

Senator HOLLINGS. Very good, sir. Go right ahead.

Mr. DUBIN. Thank you, Mr. Chairman.

I am a member of the Solar Heating and Cooling Committee of BRAB and Chairman of the American Consulting Engineers Council National Committee on Energy. However, I am presenting my views as an individual and these are not necessarily the views of either organization. I haven't cleared them with either of these organizations, although many of the things I will state have been wholeheartedly supported by both organizations.

I appreciate the opportunity very much to testify here because I really believe that this piece of legislation is the most important energy legislation yet to be introduced in the Congress, or proposed by the administration; and I am quite familiar with, if not word for word, the context of almost all the energy bills, if that is possible. I heartily support this bill in concept, and I think, with some reservations, additions, and modifications which I will allude to later, I think it would be an extremely valuable bill.

Senator HOLLINGS. Now, if you would rather go ahead, I don't want to interrupt you, but talking about the concept that the public doesn't have enough information about conservation opportunities available to them, you felt the businessman would react normally to instituting conservation procedures when the Government sends him a big package of booklets he will have to burn those to keep warm.

Our concept is that if consumers don't have the right information and they don't have the front-end capital to do it, then they need to get that subsidy to put the show on the road. Now, criticize that or tell us where we are wrong or tell us how we can improve on it.

Mr. DUBIN. There are a number of factors which mitigate against implementing a major energy conservation program. I have listed some in my prepared testimony and also in the exhibits which I have taken the liberty of including. They are bulky, but the exhibits describe many measures and proposed policies that I would like to be able to say here, but time won't permit.

There is a lack of information available as to what the net effect would be of particular energy conservation measures; what they would produce in the way of savings in raw source energy, which I will call fossil fuels and uranium. There is a lack of information, even among professionals, as to the procedures to be made in analyzing any particular project to see what the cost/benefits may be. I am emphasizing the benefits in reduction of the use of natural resources, because this is really what conservation is all about.

We don't want to conserve energy. We need to provide medical facilities, jobs, housing, in a continuing society. There is not the question of reducing the amount of energy used. Let's put this in perspective. We must reduce the amount of fast-depleting fossil fuels; and that is why solar energy is, in effect, a conservation measure because it conserves natural resources—using solar energy in place of burning fossil fuels.

And so, with that I would like to continue. There is a great misconception of what energy conservation really is. It is not unmitigated reduction in the use of energy; rather it is using a different energy source, and it is using our resources more efficiently.

If I may continue; this may answer some of your questions.

Senator HOLLINGS. Very good.

Mr. DUBIN. I feel that conservation is absolutely the most effective in first cost, and in time to implement, of any segment of a national energy policy.

I want to emphasize that much of what we are doing is out of context, because we don't have end goals in sight; we don't have a national energy and resources policy, it is absolutely essential that we have one, I think this bill will help establish the principles of a national policy. I don't mean a handed-down document that is the policy, but rather a set of procedures, actions that will grow from specific measures.

This bill, which addresses energy conservation, is addressing the most important part of the "supply-demand" formula, because conservation—limiting the consumption of nonrenewable resources—can be done immediately and cost effectively. And it must be cost effective. This bill, S. 2932, is based on effectiveness. One makes an investment. One saves energy, thereby reducing operating costs and amortizing that investment. But one must have the capital to invest, the knowledge of the cost/benefits, and incentive to make the investment. This bill will further all of those objectives.

I have been a consulting engineer for a long time, over 30 years. Energy conservation, or making better use of resources, is basic engineering principle. You seek to accomplish the most with the least effort, and with the least expenditure of energy. This is consistent with sound engineering practice.

However, there must be a client. We can't practice engineering or energy conservation without a client. This bill will create clients. Let me establish priorities; No. 1, we do have a major crisis approaching. I don't think we have a crisis yet. We aren't short of supplies. We have higher costs for energy than we have had in the past, and they have come so fast and abruptly as to be disrupting. Still energy is not as high a cost level as many other commodities. But we are approaching a crisis and we must act now to soften or divert it. Real shortages of domestic fuels will materialize.

So, No. 2, we must conserve natural resources.

No. 3, we must do it in a cost effective manner. This is reality. These are the facts of life. Conservation won't happen unless we provide incentives. If we don't we'll suffer severe dislocations in our society.

We have knowledge now, escalated in the last 3 years, of the potential to conserve energy. Previously we did not have a clear

idea of what insulation, and storm windows, and better operating practices, and eliminating gas pilots, and more efficient lighting systems, and improvements in domestic hot water systems, in relationship to each other could accomplish. And none of these factors stand alone.

We knew that we could save energy, certainly by any number of these individual measures, but we were not aware of the tremendous potential to conserve energy by approaching each measure together as a systems approach. Roger Sant or Mr. Hill alluded to that. Not only do you consider insulation alone, but if you do insulate your house, you now have an opportunity to conserve energy for heating, not by only reducing the amount of oil or gas that must be consumed to satisfy reduced heat losses, but insulating the house, or implementing other measures which reduce heat loss or heat gain in the summer now permit you to make certain modifications to your air distribution system. You can save energy in subsystems as well if you follow a logical sequence and modify those systems by reducing fan or pump power because they are dependent upon the building load. A lower building load permits a reduction in fluid flow and a savings in power. There is a cause and effect. A series of measures carried out as total system modifications produce far greater results than simply improving any one element, however effective it may be, out of context and independent of the others.

So this approach is necessary and based on work we have done to date, the GSA demonstration building in New Hampshire, we studied more than 500 ways to heat, cool and power that building, and the kinds of building materials and construction, and we found that we would be able to save more than 60 percent of the energy of that standard office building.

Senator HOLLINGS. That study entails the entire reconstruction or just the insulation?

Mr. DUBIN. It included many areas in context with each other. Insulation and solar heat gains. Modifying hot water temperatures.

These measures must be qualified, quantified and the information disseminated. This bill S. 2932 will provide the means for disseminating information to the public through design professionals, universities, governmental agencies and others. The grant program will permit the States to develop data on potential savings through energy conservation, and the methods to be employed to do so.

I might differ very widely with my friends from FEA. I have worked with them, advised them, and discussed energy conservation strategies with them. But we are very, very late in establishing an energy policy and providing the incentives to enhance such a policy. This bill is far from being premature. Three years ago I tried to introduce, to every Federal agency in this country that had anything to do with energy, a program which would have cost modestly \$20 million, that would have established the energy-building system relationships in all parts of this country. First a computerized program with the output stored in a memory bank that any homeowner, or building owner, or design professional could go to this data bank and find out if he were to install double windows on the north wall facing windows in his building how much he would save in energy and operating costs. Does he save the same if he put them on the south wall? No he doesn't.

These things are little known. But I could get no support for the program. This was a fantastic amount the agencies claimed. I figured we waste that much every morning in this country—you know, the investments seemed to be quite modest to save \$20 million each morning but so far the funds have not been furnished to do the work.

The programs we have been involved in—and this crosses all classifications of buildings include one project for the design of an energy conserving house for the U.S. Home Corp., which didn't look too far different from the neighboring house, so that it wouldn't be thought that one must have a "freaky-looking" house to conserve energy. We found that we could save more than 40 percent of the energy and 40 percent of the water which would normally be used. Water is becoming a problem too, and can't be separated from the energy problem. The investment to save this amount of energy and water would cost less than 10 percent more for the house.

And the builder, at that time, was willing to invest 10 percent more, because he felt he had a more saleable project.

There are many other projects in the country that also have demonstrated that we can save about 15 to 20 percent with better operating and maintenance practices alone. Beyond that, further savings takes an investment. We have found, in our practice, that this added investment has been a serious constraint to implement energy conservation further.

The major constraints that we have found which have mitigated against implementing energy conservation programs are lack of available capital, high interest rates which have made the investment unattractive to the user, lack of technical information for the consumer to provide him with the engineering and economic feasibility of alternative systems—there are alternative measures which must be analyzed.

For instance, one might consider that if he has leaky windows he could add weatherstripping. But he might be doing the wrong thing, because if he had a bit more knowledge, he might consider adding a storm window instead. It would cost somewhat more, but on the other hand, it would eliminate the need to weatherstrip the window because the new window can serve as the weatherstrip also, and the energy savings would be much greater.

So, without knowing the relationships and the full range of possibilities, and analyzing all of them, the wrong decisions will invariably be made.

There is competition for funds between conservation measures on the one hand and alternative investments on the other. And in order to make the investment for conservation, I believe that special incentives are required. We hear objections that we can't afford to do this, and we must resist subsidizing an industry, because this is a handout. However if we can give Egypt a \$100 million loan for 4 years at 2 percent interest, presumably to enhance investment in American industry, and I believe we are doing so, I believe the S. 2932 program will accomplish more. In the final analysis it will really cost nothing, because it will create more jobs, it will create additional industrial activity, there will be additional taxes paid back into the State Treasury. This is an assistance program, and it is a mover. But, it is an investment and not an expenditure.

The FEA commissioned us 2½ years ago to study energy conservation in existing buildings and prepare two manuals; one for the use of the owner/operator and the small businessman. It didn't require really any degree of technical knowledge to use it. It demonstrated how to save energy without making any investment, and without the necessity of making a technical analysis of the problem. We called it Energy Conservation Manual I—ECM-1.

The second manual, ECM-2, is directed more toward architects, engineers, and major building operators. It does not provide a laundry list of energy conservation ideas, but rather these manuals quantify the savings that are possible. There are charts and nomographs for any area in the country. One can create his own geographical and climatic zone and find out exactly what he would get back in energy and dollar savings from insulation, replacing the heating systems, and dozens of other measures.

Finally, these manuals were printed by the Government Printing Office. They are available, but they have not been widely distributed.

One analysis which we made of the existing 3M facilities in St. Paul, and new facilities to be built by 3M, indicates that the new facilities, designed for energy conservation will use only 40 percent as much energy as the existing buildings. When we did ECM-1 and 2, which were addressed to existing buildings, we found that 90 percent of all the measures that were applicable for new buildings were also applicable to existing buildings.

The work that has been done to date has been useful in establishing the magnitude of energy savings that are possible and cost effective.

Now, the exact amount of savings is dependent upon climate, building conditions, operating methods, system type, cost of money and other factors. I think this program, S. 2932, would start getting the program for conservation underway. Each State would formulate a policy, which would disclose the kinds of measures that can be done in that State and would disclose the economic and engineering feasibility analyses required to do it. A memory bank of conservation data would be built up and we would eventually have a data bank countrywide, the kind I have envisioned. Anybody who wanted to undertake an energy conservation program could quickly assess his proposed program.

Professional skills are required to develop and implement a nationwide energy conservation program. S. 2932 will be valuable in helping the States develop these skills.

The Connecticut General Life Insurance Company were fortunate to be able to make an investment in energy conservation. We did a study for their home offices and developed an energy conservation program which they have now undertaken. They are now saving 29 percent of the energy they used originally, with an investment of something like \$24,000. The annual savings are in the hundreds of thousands of dollars.

In addition, we made a further study for a computerized control system for that installation. For an investment of \$325,000 they will realize savings of \$135,000 per year—a pay back of 2½ years. They are fortunate. They can make this investment and to hire professionals to analyze it for them. But there are millions of people that cannot do this and don't know what to do to save energy.

Solar energy is also an energy conserving measure. It has to fall in line behind energy conservation modifications for buildings and systems, because solar energy will require a greater investment today, than an investment in conservation measures for the same fuel savings. But it's (solar energy) becoming more cost-effective, and in New York City and Westchester County, where the electric rates are so high solar energy is cost-effective today as compared to electric heating, domestic hot water heating, and can show a 15-year payback—hence qualifying under bill S. 2932. We have areas in the country in New England and the colder climates where solar energy systems for heating are more cost-effective than in warmer and summer climates.

For instance, a solar heating system in Florida would be a bad investment, because there is no heating load. In the colder climates where there is a heating load, the investment in solar collectors can be amortized through the savings in operating costs.

Solar heating is cost-effective in many areas of the country today, but not everywhere. It doesn't mean we can indiscriminately recommend solar energy systems for everyone who indicates an interest in it, because there are many, many more people that want it today, than understand it and know what the paybacks will be.

We need some solar demonstrations in New York City to address some of the problems of urban installation. A client wanted to install a solar water heating system for 100 cooperative apartments. We estimated that it would have cost \$200,000 to install the system in this existing building. The payback period would have been between 10 and 15 years at today's electricity costs.

Here was a cost-effective program, but there was nobody that would make the loan to finance the installation.

They have held the project in abeyance. We have five other prospective residential clients who would like to "go" solar. We have gone through the preliminary engineering and cost analyses. But their bankers will not give them a full mortgage for the solar systems.

They, the financial houses, aren't sure of the economics. The payback periods are uncertain. It takes the money to make the economic analyses. S. 2392 would provide the means to finance such efforts.

Senator HOLLINGS. Your testimony is quite educational. I don't want to shorten it in any fashion. But I can see by these lists here that we have some other witnesses, and I particularly wanted to get that Long Island study in the record.

Mr. DUBIN. We were asked to analyze energy usage in Long Island between 1975 and 1995 to see whether the projections that were forecast by the Long Island Lighting Co. were valid, were accurate enough to warrant building two new nuclear plants a few years down the lines. And a second task was to find what would happen if an intensive energy conservation were implemented in Long Island, if solar energy were to take off and be installed in Long Island in those buildings that were suitable for it, if wind energy could be used and if on-site power generation could be used.

And what would happen to the supply-demand curve then? We disagreed with the lighting company's forecast after an extensive forecast of our own and suggested—if you will look at exhibit H

on page 11, the series of curves; the top curve shows the existing electrical generating capacity and projected capacity by years and curve B, just under it, shows the company's peak demand projections. Curve C was the forecast under normal conditions that we made.

You can see that our forecast predicts less energy will be required than what Long Island Lighting Co., projected.

The Public Service Commission of New York State, one of the most advanced commissions, has a research department. They are very much interested in forecasts and they made their own projections. Their curve fitted right into our curve C. They were a little lower for a couple of years than we were.

Our normal projections were reasonable. We then assumed an intensive energy conservation scenario, selecting all new buildings and a certain percentage of existing housing and non-residential buildings for retrofit for energy conservation and solar heating systems. The two proposed nuclear plants will require an investment of \$2 billion.

We said "Let's take the same \$2 billion and put it into energy conservation and alternative energy sources in accordance with the scenarios." For \$2 billion, we found that the conservation measures would save between two and three Btu's of energy as compared to one that would be produced by the same investment in new supplies.

So, from an investment standpoint, if one is to invest \$2 billion, one gets more for his money. This can be repeated countrywide.

New nuclear plants would create 16,000 new jobs. We calculated, as best we could, how many jobs would be created by an energy conservation program in Long Island and determined that about 64,000 jobs would be created, and these jobs would be created mainly in the Long Island community and not remotely where major equipment would be constructed for the central electrical generating plant.

Senator HOLLINGS. That's 16,000 and 64,000, that's over a 20-year period? Well, what was the period for the construction of \$2 billion—

Mr. DUBIN. Let's say over the 10-year period.

Now, there is a lot more work to be done on jobs and economics. Hopefully this program S. 2932 would start the States in examining these kinds of measures, which must be quantified.

Now, let me address the bill specifically, since I know time is short.

Going back into my testimony I support all the provisions of the bill and suggest the following for your consideration: The section 101 on page 2, I would add that "the incentives for both tenants and landlords to make such investments do not exist now, particularly for tenants." In an earlier version of the bill, I saw tenants addressed here, I had three versions of the bill and I must say I didn't do the same amount of homework on all three.

Refer to section 101, page 4, section A, I think we should add here, "to supplant existing legislation which provides for tax credits for industrial investment."

There is an investment credit and I think that's a good program. The energy conservation investment should be in addition to that.

The interest rates which were selected as 5 percent and 2 percent for 20 percent of the loan respectively. Perhaps the rates should be keyed more closely to the prime rate which exists at the time of financing.

Now, if the prime rate goes down, I think the rates ought to be 50 percent of the prime rate or the 5 and 20 percent respectively whichever is lower.

So, if the prime rate floats and goes down to 6 percent, a 5-percent rate does not provide the added incentive.

Section 108, I would suggest that where a State does not take the initiative to begin a program, there ought to be a provision for individuals in that State to participate in the program. I know this is very difficult, but there could be a wide segment of the population, which is disfranchised, if their State doesn't elect to go along with the program and to meet the guidelines that are promulgated.

In order to do that, direct citizen participation, there must be a widespread dissemination of information about the program and about measures, so that the public will know that these measures are available.

One problem is that the public does not know that these opportunities to save energy exist and it's very difficult for them to read the bills and read the kind of promulgating legislation and bulletins that are issued.

They can't really understand them and they can't be faulted for that. They are complicated.

It may be difficult to determine in advance the energy consumers who demonstrate the greatest energy conserving potential as called for in the bill.

It gives them priority. In other words, the homeowner on 8th and Main Street doesn't really know which measures exist, and their cost and savings, and he is not going to hire a professional to say "come in here and see what I can do for conservation, I'll make a study, submit it to the State and if it's good, it will be funded."

I think that the program will stall unless there is a grant program and standards set up to provide the technical assistance to the consumer at the early stage, to determine for him what could be done with his property.

With proper professionals, there will not be wasted money and analyses on systems that aren't feasible.

This is a problem and it's an important one, because I don't think the bill would work without providing this kind of assistance.

In section 109, I suggest that small businesses be included in the cooperative program.

I think the program is innovative and it has worked in other areas of our economy. The small businessman, the small storeowner is in the same boat as the homeowner.

Referring to section 110, where it says: "provisions for Federal agencies to cooperate with and participate in." This is like too much of our language today vague and evasive. It should be made more definitive and mandatory, and it should clearly state which agencies are in a position to participate in this program.

Now, in conclusion, I would urge that the committee vigorously pursue this bill. It does not replace other measures that were suggested earlier. Energy conservation and an energy policy is a multi-faceted effort.

It's not too early, and there is now a tendency on the part of both Government and the public to relax their efforts.

We have seen quite a bit of backsliding and without continuous prodding and incentives. We won't meet our goals without them.

Senator HOLLINGS. You said you want us to pursue it vigorously. What about the FEA?

Mr. DUBIN. I have a couple of ideas. I am not sure the FEA is the proper agency to promulgate the guidelines and standards based on their belief that there is a need to test all the measures, behavioral patterns, et cetera first. ECM-1 and 2 were completed 2 years ago. After a year of completion.

The Government Printing Office is now printing the manuals. We've lost 2 years. I would like to see a direct congressional appropriation for an institute of energy conservation.

I would like to see an authority set up like the TVA Authority or other authorities, made up of partly Government people, partly from the private section knowledgeable people in economics, governments, engineering, manufacturing, and banking to develop guidelines and administer the program.

Now, I know we have consolidated a number of agencies under ERDA. You can, on the record, look at how much conservation gets in relation to new supplies. I just think that there has to be a completely new approach, I don't think you can allocate an appropriation to an agency and depend upon them to properly allocate the funds, if their whole hearts and interest are outweighed by a 10 to 1 ratio with other interest. OMB should not be permitted to set energy policy by limiting funds for specific measures.

I think this is a Congressional responsibility.

Senator HOLLINGS. I agree with you. I am trying to get this through. All your suggestions are superb. I agree with all of them. And we are going to keep this record open, so we can submit some questions to you.

With respect to these utilities, when utility charges often go up when you conserve. What has been your experience as a consultant in that particular field?

Mr. DUBIN. This is a difficult problem for the consumer and for the utility. They have gone up, because if conservation reduces consumption, but the investment is still there, the utility company, to maintain an even keel, has to increase their costs per kilowatt. This is very discouraging to the user.

I believe that this bill would permit the States to start to provide suggestions and hard data to utility companies to improve their load factors and load management and not have to raise prices as consumption is reduced.

I have been to 11 countries on behalf of the State Department in Europe and the Middle East. I find that in many countries their load factor is improved with energy storage systems, particularly with electric heat. That reduces the need for new plants and new capital expenditures for the utility plants, and that in turn reduces the cost to the consumer for power.

The utility companies also require a considerable amount of education. They have not encouraged heat pumps and that is partly due to their lack of real energy knowledge of what the heat pumps can do in different situations. Heat pumps can reduce consumption and peak demand.

The program S. 2932 will disclose the benefit of particular measures, whether it be heat pumps or others, and we will begin now to have a body of knowledge and which can influence the thinking of the utility companies and get their support for energy conservation measures which they hitherto resisted.

So the educational aspect of this bill can't be neglected.

Senator HOLLINGS. Well, we can't thank you enough.

I wish we didn't have this constraint of time.

We thank you very, very much, and we will be keeping in touch with you.

Mr. DUBIN. Thank you.

Senator HOLLINGS. Our next witness is the president of the American Institute of Architects, Mr. Louis de Moll.

Let's wait on the 5-minute bell.

Could we take your statement and include it in the record and let you emphasize the main points?

STATEMENT OF LOUIS DE MOLL, FAIA, PRESIDENT, THE AMERICAN INSTITUTE OF ARCHITECTS; ACCOMPANIED BY JOSEPH A. DEMKIN

Mr. DE MOLL. I think I can probably summarize it.

Senator HOLLINGS. We are going to have to break in the middle of your testimony. But you can start right in if you don't mind.

Mr. DE MOLL. Mr. Chairman, I am Louis de Moll, FAIA, President of the American Institute of Architects. Accompanying me is Joseph A. Demkin, AIA, our director of energy programs. I am here today to speak on behalf of the AIA, the national society for the architectural profession, and to express our views on S. 2932, the Energy Conservation Act of 1976.

The American Institute of Architects endorses and supports the approach to energy conservation in buildings contained in S. 2932. We commend the sponsors of this legislation for their recognition of the critical importance which energy conservation has in our national policies. It is our belief that long-term, comprehensive energy conservation policies must be adopted in all sectors of industry, construction, and transportation.

As the second largest energy-consuming sector, buildings offer a significant opportunity to save energy. For the past several years, the AIA has studied the relationships between energy and the built environment. Our findings and recommendations are included in three documents which we have submitted for the record.

These reports outline the dramatic potential of a high priority national program to achieve energy efficient buildings. Our estimates show that such a program could save an average of nearly 1 million barrels of petroleum equivalent a day each year between now and 1990. By 1990 a savings of the equivalent of more than 12 million barrels of oil per day could be reached. This energy savings by building for efficiency is approximately equal to the future capacity of any one of the United States' prime energy systems.

I might note here that I think Senator Kennedy's remarks about the savings of 2 to 7 million barrels a day were quite conservative because our studies have come up with as much as 12 million.

Of course we realize that additional time is needed to develop and test the innovations necessary to implement our long-range strategy which involves the "integrated utility" concept outlined in the 1990 report. We recommend that complementary initiatives, such as those contained in S. 2932, be taken in the short term.

There are major benefits to be derived from a program of energy conservation in the built environment. In the interest of time, I will not list them. I believe the previous witnesses have covered them in their statements.

While there is much to be gained from energy conservation, it must be understood that there are many existing constraints, both institutional and attitudinal, which must be overcome.

During the era of seemingly inexhaustible energy, our society evolved attitudes, policies, tax laws, and institutional practices which engendered a powerful demand for buildings of low first cost.

New buildings and major improvements to existing buildings, including energy efficient measures, are financed to a large extent on borrowed funds. The traditional approach to reduce the risk associated with this type of debt has been to minimize initial construction costs as much as possible. This aspect, together with certain tax considerations, such as those for commercial buildings which favor the economics of higher operating costs over higher capital expenditures, make the "first cost" problem a formidable barrier to the construction of energy efficient buildings.

I might add that the AIA has been refining an original tax incentive proposal for the design of new buildings and the retrofitting of existing buildings to be energy efficient. This is part of our short-range strategy. We have debated the advantages and disadvantages of many different approaches to energy conservation in buildings.

We are pleased to be able to share the fruits of our labors with this committee. We find the funding mechanisms authorized in S. 2932 to be complementary to the tax incentives we have been advocating.

Turning now specifically to provisions of S. 2932, there are two areas of concern which we feel need attention in order to insure that the legislation's objectives are effectively met. These concerns are insuring [1] that maximum energy savings are achieved, and [2] that a system for quality control is provided.

With respect to achieving maximum energy savings, we suggest that eligibility for financial assistance should be tied more formally and precisely to quantified amounts of energy saved, rather than only to the rate of return on investment. This could be accomplished by establishing a minimum level of energy savings [in terms of percentage of reduction in consumption] as a threshold qualification. This approach avoids several potential problems.

First, it insures that the financial assistance goes to the most productive projects which will reduce energy consumption significantly, as well as insuring a cost effective program.

Second, the rate of return on investment is affected by a great many variables which do not directly relate to energy conservation, such as increases in fuel costs, the leniency or stringency of lending terms, and the financial position of the borrower.

Making return on investment the only quantifiable qualification for assistance may leave the program open to lending institutions favoring more solvent clients, thus defeating one of the stated purposes of the bill.

Third, the rate of return on investment necessarily calls for a prediction as to future costs of energy. The bill would require that each State make its own prediction. This is an extremely difficult proposition. The result could be a wide diversity in how States compute eligibility for projects and a corresponding complexity and inequity in the program.

Another point with respect to energy savings involves the length of the payback period as it relates to the useful life of the energy conservation measure. While 15 years is ample for most add-on equipment and hardware [for example, solar collectors and heat pumps], it might not necessarily be true for measures which incorporate energy saving techniques directly into the building structure. Like the building itself, these measures often could have a useful life of 30 or more years.

While S. 2932 limits only financial assistance to this 15-year period, owners and lenders will naturally tend to match the life of energy conservation measures to the term of the loan guarantees or interest subsidies. This will probably skew the program toward higher technology equipment and hardware solutions.

As designers, we believe that a more integrated approach to energy conservation may bear more fruit and we suggest that a bias against comprehensive approaches not be built into the program.

We would also like to suggest that the cost of maintenance and servicing for energy systems be factored into the computations which establish the rate of return on investment. This would help stimulate an awareness of the importance of effective operational procedures to insure that equipment can achieve its full potential.

This brings us to the second major area of concern—quality control.

Section 108[1] of the bill calls for "encouragement of energy audits" and "certification by qualified persons." We believe that audits and evaluations of energy conservation measures are so important that more than encouragement is needed. Unless the energy saving is qualified beforehand, the likelihood of not achieving the greatest conservation for the investor's dollar is greatly increased.

Senator HOLLINGS. That is my last chance to get to that roll call.

The committee will be recessed for a minute. I will be right back.

[Recess.]

Senator HOLLINGS. All right, Mr. de Moll, you may continue.

Mr. DE MOLL. I was in the process of talking about our reservations, supporting comments made earlier by Mr. Dubin.

We suggest that the financial assistance programs in the bill be specifically extended to include the costs of audit and evaluation. As a necessary part of this, the definition of who is qualified to certify these audits should be made clear. We would hate to see a program as important as this one be given a black eye by the materialization of a corps of instant energy experts preying on the consumer. We suggest that a qualified person be defined as a professional in the construction field who is licensed by the State.

Senator HOLLINGS. And he would handle the audit? In other words, how would you handle the audits?

Mr. DE MOLL. We believe the audits should be done by licensed professionals, who would need probably some training or additional education to be able to conduct these kinds of audits.

We foresee that direct involvement by licensed professionals in audits and individual energy conservation measures might be limited, in terms of economics, to commercial and larger residential consumers. The certification called for in the bill should be required for this class of consumers. These certifications would then be submitted as part of the application for financial assistance.

For the homeowner, direct professional involvement and individual audits to assure quality control may not be economically feasible.

Senator HOLLINGS. If someone was just going to air condition their home, would you insist upon the heat pump approach or not?

Mr. DE MOLL. No. Just good efficient equipment.

Senator HOLLINGS. But the actual savings for heat would then exist?

Mr. DE MOLL. Right.

Senator HOLLINGS. You may continue.

Mr. DE MOLL. All right.

We suggest that the State plans could provide for certification of conservation packages, after professional evaluation at the State level. These packages could then be marketed to individual homeowners and small consumers and would be eligible for financial assistance if they were appropriately applied to a building within the terms of the certification.

We have a number of technical suggestions regarding the actual language of the bill. For example, section 106[a], page 9 at line 24, where the language "A subsidy shall be provided . . ." appears to create an entitlement in what is clearly intended to be a discretionary grant or contract program. We would be happy to submit, at a later date, our comments on the precise wording of the bill.

Before closing, we would like to mention two general considerations which could inhibit the effectiveness of this legislation. First, we foresee a problem when the statewide plans become fully effective. If regional energy consumption is substantially reduced, the savings realized could be wiped out by rate increases granted to utilities by State utility commissions to compensate for shrinking markets.

Senator HOLLINGS. That could be a very valid defeating factor and we need a policy so that cannot occur.

Mr. DE MOLL. That is right. And the thing we have been advocating is the adoption of a true national policy with all these things tied together.

I think the other—

Senator HOLLINGS. But before you pass this, maybe we ought to reform the utilities billing systems, so that the less you use the cheaper your bill will be. If we fit that in place for the program, then the consumer will be becoming eligible all the time for that lower rate. It is a matter of putting the horse before the cart.

Mr. DE MOLL. Yes, which comes first, the chicken or the egg. But I think, as Mr. Dubin was saying, once any legislation like this, any new direction, begins to be implemented, all kinds of things come out of the woodwork that perhaps we hadn't thought of before. We think this utility rate structure could be a problem. I am not sure it could be solved in this particular legislation but it certainly needs to be considered.

Second, the consumer who applies an energy conservation measure to his home or business will be making a capital improvement. This normally would give rise to an increase in property tax assessment. The consumer may find that the resultant increase in taxes greatly reduces the savings he acquires from lowered energy consumption.

Both these potentially crippling problems should be addressed in the State plans, if the programs in this bill are to be successful.

I thank the committee for the opportunity to comment on this greatly needed legislation and I would be glad to answer any questions you may have.

Senator HOLLINGS. Work on that qualification language for us if you don't mind.

Mr. DE MOLL. All right.

Senator HOLLINGS. That is going to be a problem. And I think we are going to have to toy with that a little.

Mr. DE MOLL. I might just add that we are conducting some educational programs for the profession, to our members, on energy conscious design. And I think these kinds of courses will help in that whole qualification process.

We are just launching this program at this point.

Senator HOLLINGS. Does that include the thoughts that you expressed right at the end of your statement, that the bill is going to go up or that the property taxes will go up when you insulate?

In your educational program does the architect down in the boon-docks say, "That guy in Washington is just trying to look pretty?" Does he feel that if he does it the bill will go up? Does he throw the brochure in the corner, or are you getting a response?

Mr. DE MOLL. I think we have gotten a real good response from the profession. This whole question of energy conservation is a major issue with the AIA and the architects. I think our only problem is to sufficiently educate architects so they understand the principles and can do evaluation studies of buildings.

Senator HOLLINGS. Well, the bill has had all kinds of expertise.

We appreciate it very much. Thank you.

Mr. DE MOLL. Thank you.

[The statement follows:]

STATEMENT OF LOUIS DE MOLL, FAIA, PRESIDENT, THE AMERICAN INSTITUTE OF ARCHITECTS

Mr. Chairman and Members of the Committee. I am Louis de Moll, FAIA, President of the American Institute of Architects. I am here today to speak on behalf of the AIA, the national society for the architectural profession, and to express our views on S. 2932, the Energy Conservation Act of 1976.

The American Institute of Architects endorses and supports the approach to energy conservation in buildings contained in S. 2932. We commend the sponsors of this legislation for their recognition of the critical importance which energy conservation has in our national policies. It is our belief that long-term, comprehensive energy conservation policies must be adopted in all sectors of industry, construction, and transportation.

As the second largest energy-consuming sector, buildings offer a significant opportunity to save energy. For the past several years, the AIA has studied the relationships between energy and the built environment. Our findings and recommendations are included in three documents which we would like to submit for the record [Energy and the Built Environment: A Gap in Current Strategies, A Nation of Energy Efficient Buildings by 1990, and Saving Energy in the Built Environment: The AIA Policy].

These reports outline the dramatic potential of a high priority national program to achieve energy efficient buildings. Our estimates show that such a program could

save an average of nearly one million barrels of petroleum equivalent a day each year between now and 1990. By 1990 a savings of the equivalent of more than 12 million barrels of oil per day could be reached. This energy savings by building for efficiency is approximately equal to the future capacity of any one of the United States' prime energy systems.

Of course we realize that additional time is needed to develop and test the innovations necessary to implement our long-range strategy which involves the "integrated utility" concept outlined in the 1990 report. We recommend that complementary initiatives, such as those contained in S. 2932, be taken in the short term.

There are major benefits to be derived from a program of energy conservation in the built environment.

The elimination of the need to import millions of barrels of oil a day into the United States would avoid the staggering burden that otherwise would be placed on the U.S. international balance of payments. At current price levels, the cost of these imports could reach approximately \$50 billion a year. Moreover, decreased reliance on foreign oil sources would have a positive impact on our nation's foreign policy.

Energy conservation would also mean wiser use of land, building materials, and fossil fuels.

A decrease in fossil fuel consumption would help alleviate the pollution hazards associated with the conversion of those fuels into energy.

There are more than 70 million existing residential buildings in this country, and millions of existing commercial structures. These buildings will constitute the majority of structures for many years to come. Energy conservation measures using current technology could be applied to this vast inventory of buildings as soon as this measure is enacted.

Many job opportunities in construction and related industries would be created, thus stimulating economic recovery.

There is much to be gained from energy conservation, but it must be understood that there are many existing constraints, both institutional and attitudinal, which must be overcome.

During the era of seemingly inexhaustible energy, our society evolved attitudes, policies, tax laws, and institutional practices which engendered a powerful demand for buildings of low first cost.

New buildings and major improvements to existing buildings, including energy efficient measures, are financed to a large extent on borrowed funds. The traditional approach to reduce the risk associated with this type of debt has been to minimize initial construction costs as much as possible. This aspect, together with certain tax considerations, such as those for commercial buildings which favor the economics of higher operating costs over higher capital expenditures, make the "first cost" problem a formidable barrier to the construction of energy efficient buildings.

Many building owners and operators are aware of the potential for saving energy. They need and want to reduce their energy costs. But they are simply unable, in the current market, to acquire the capital to make the necessary modifications. We are pleased that it is precisely this problem that is addressed by S. 2932. The program of loan guarantees and interest subsidies contained in the bill is an important first step.

At this point I might add that the AIA has been refining an original tax incentive proposal for the design of new buildings and the retrofitting of existing buildings. This is part of our short-range strategy. We have debated the advantages and disadvantages of many different approaches to energy conservation in buildings. Our two prime criteria have always been the achievement of optimum energy savings (which is accompanied by quality control) and the reduction of barriers to available capital. We are pleased to be able to share the fruits of our labors with this Committee. We find the funding mechanisms authorized in S. 2932 to be complementary to the tax incentives we have been advocating.

Turning now specifically to provisions of S. 2932, there are two areas of concern which we feel need attention in order to ensure that the legislation's objectives are effectively met. These concerns are ensuring (1) that maximum energy savings are achieved, and (2) that a system for quality control is provided.

With respect to achieving maximum energy savings, we suggest that eligibility for financial assistance should be tied more formally and precisely to quantified amounts of energy saved, rather than only to the rate of return on investment. This could be accomplished by establishing a minimum level of energy savings (in terms of percentage of reduction in consumption) as a threshold qualification. This approach avoids several potential problems.

First, it ensures that the financial assistance goes to the most productive projects which will reduce energy consumption significantly, as well as ensuring a cost effective program. Second, the rate of return on investment is affected by a great many variables which do not directly relate to energy conservation, such as increases in fuel costs, the leniency or stringency of lending terms, and the financial position of the borrower. Making return on investment the only quantifiable qualification for assistance may leave the program open to lending institutions favoring more solvent clients, thus defeating one of the stated purposes of the bill. Third, the rate of return on investment necessarily calls for a prediction as to future costs of energy. The bill would require that each state make its own prediction. This is an extremely difficult proposition. The result could be a wide diversity in how states compute eligibility for projects and a corresponding complexity and inequity in the program.

Another point with respect to energy savings involves the length of the payback period as it relates to the useful life of the energy conservation measure. While 15 years is ample for most add-on equipment and hardware (for example, solar collectors and heat pumps), it might not necessarily be true for measures which incorporate energy saving techniques directly into the building structure. Like the building itself, these measures often could have a useful life of 30 or more years.

Let me illustrate this point. A particular building, let us say a detached residence, might be modified to take advantage of natural energies by changing window orientation, adding built-in shading devices, increasing heat retention in the exterior wall system, and installing natural ventilation systems. The useful life of such features would be well beyond 15 years.

Therefore, we urge that consideration be given to applying measures that are literally incorporated into the building and optimize energy utilization throughout the life of the building.

While S. 2932 limits only financial assistance to this 15' year period, owners and lenders will naturally tend to match the life of energy conservation measures to the term of the loan guarantees or interest subsidies. This will probably skew the program toward higher technology equipment and hardware solutions. As designers, we believe that a more integrated approach to energy conservation may bear more fruit and we suggest that a bias against comprehensive approaches not be built into the program.

We would also like to suggest that the cost of maintenance and servicing for energy systems be factored into the computations which establish the rate of return on investment. This would help stimulate an awareness of the importance of effective operational procedures to ensure that equipment can achieve its full potential.

This brings us to the second major area of concern—quality control. Section 108 (1) of the bill calls for "encouragement of energy audits" and "certification by qualified persons." We believe that audits and evaluations of energy conservation measures are so important that more than encouragement is needed. Unless the energy saving is quantified beforehand, the likelihood of not achieving the greatest conservation for the investor's dollar is greatly increased. We would suggest that the financial assistance programs in the bill be specifically extended to include the costs of audit and evaluation. As a necessary part of this, the definition of who is qualified to certify these audits should be made clear. We would hate to see a program as important as this one be given a black eye by the materialization of a corps of instant energy experts preying on the consumer. We suggest that a qualified person be defined as a professional in the construction field who is licensed by the state.

Of course, direct involvement by licensed professionals in audits and individual energy conservation measures would be limited, in terms of economics, to commercial and larger residential consumers. The certification called for in the bill should be required for this class of consumers. These certifications would then be submitted as part of the application for financial assistance.

For the homeowner, direct professional involvement and individual audits to assure quality control may not be economically feasible. We suggest that the State plans could provide for certification of conservation packages, after professional evaluation at the state level. These packages could then be marketed to individual homeowners and small consumers and would be eligible for financial assistance if they were appropriately applied to a building within the terms of the certification.

We have a number of technical suggestions regarding the actual language of the bill. For example, Section 106(a), page 9 at line 24, where the language "A subsidy shall be provided . . ." appears to create an entitlement in what is clearly intended to be a discretionary grant or contract program. We would be happy to submit, at a later date, our comments on the precise wording of the bill.

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wide plans become fully effective. If regional energy consumption is substantially reduced, the savings realized could be wiped out by rate increases granted to utilities by State utility commissions to compensate for shrinking markets.

Second, the consumer who applies an energy conservation measure to his home or business will be making a capital improvement. This normally would give rise to an increase in property tax assessment. The consumer may find that the resultant increase in taxes greatly reduces the savings he acquires from lowered energy consumption.

Both these potentially crippling problems should be addressed in the State plans, if the programs in this bill are to be successful.

I thank the Committee for the opportunity to comment on this greatly needed legislation and I would be glad to answer any questions you may have.

Senator HOLLINGS. Our next witness is Mr. Thomas J. Owen, president of Perpetual Savings and Loan Association.

Go right ahead.

STATEMENT OF THOMAS J. OWEN, PRESIDENT, PERPETUAL SAVINGS AND LOAN ASSOCIATION, WASHINGTON, D.C., ON BEHALF OF THE U.S. LEAGUE OF SAVINGS ASSOCIATIONS; ACCOMPANIED BY HAROLD B. OLIN, DIRECTOR, ARCHITECTURAL AND CONSTRUCTION RESEARCH DEPARTMENT

Mr. OWEN. With me is Mr. Harold Olin, he is the director of the League's Architectural and Construction Research Department, and he is here to assist in answering any questions of a technical nature which you might pose to him.

Senator HOLLINGS. Very good.

Mr. OWEN. My name is Thomas J. Owen of Washington, D.C. I am president and chief administrative officer of Perpetual Savings and Loan Association. I appear on behalf of the United States League of Savings Associations. Accompanying me today is Harold B. Olin of Chicago, Ill., director of the League's Architectural and Construction Research Department.

Mr. Chairman, the U.S. League appreciates this opportunity to testify on S. 2932, the Energy Conservation Act of 1976. As specialized lending institutions devoted to home finance, our savings and loan association members are acutely aware of rapidly increasing energy costs and their impact on homeowners and home ownership. We are vitally interested in exploring ways to reduce or better utilize energy consumption, and we applaud your initiative, Mr. Chairman, and that of your colleagues Senators Kennedy, Jackson, Magnuson, and Pearson in introducing S. 2932.

Certainly energy prices are contributing to some of our home finance problems today, particularly for income properties, where one recent study shows 28 percent of operating expense now goes to energy costs, up from 18 percent just 2 years ago. In some areas of the country mortgage payments for single-family homes are exceeded by monthly utility bills, and our members report an unusual increase among higher income families—though overall delinquency figures remain a fraction of 1 percent for savings associations.

There are some obvious benefits to our institutions from a national program to promote energy conservation. With energy costs stabilized, our present borrowers will be better able to meet their loan obligations; the value of our security properties will be enhanced; more families will have the potential for attaining home ownership; and our savers will have more disposable income to invest in their savings.

Workman and Mann, Inc., has constructed a model home utilizing a solar and two-way air flow system that has cut utility costs by at least 50 percent.

In another area, Mr. Olin and other staff members have engaged in an intensive study of the appraisal process, and the standardized documents now in use. Of particular interest is the trend in professional appraisal circles for assessing life-cycle costs for multifamily construction. Since many of the new developments in energy conservation involve high initial costs to the builder, the life-cycle costing could make a substantial change in the valuation of multifamily properties and the attitudes of lending institutions in granting credit for their purchase. We are also interested in ascertaining thermal standards for single-family houses; this data is already available from insulation companies. Buyers and sellers can obtain this information, which can then be entered on loan application forms to assist lenders in underwriting judgments. (Current application forms normally ask applicants about utility costs carried under previous living arrangements, but do not specifically consider utility costs for new properties.) Energy-relevant information could also be incorporated in the standard forms developed by the Federal Home Loan Mortgage Corporation and in widespread use throughout the country, and that possibility is under active review. All of these developments are raising lender consciousness about energy conservation—making it easier for buyers to qualify for loans, encouraging more energy-efficient construction, and providing an incentive to builders to utilize new energy-saving techniques.

In our view, one of the major national priorities—particularly with the strain on our energy resources—should be the preservation and improvement of our existing housing stock. Savings and loan associations, to a far greater degree than other types of financial institutions, have a stake in the rehabilitation of our existing housing stock. At year end, 1975, our institutions were providing 88 percent of the residential 1-to-4 family home mortgage credit of all depository institutions. Savings and loan associations loaned about \$55 billion in 1975—which was record for our business. Our research people estimate that these funds financed the purchase of 1 million used, or existing, single family houses, and about one-quarter million apartment units last year. In addition, we financed the purchase of about 230,000 single family new construction homes and 100,000 new apartment units. As you can see from these figures, we are indeed the financial backbones of the home real estate market and, in particular, the existing used, or resale housing market.

Because of our established relationship with owners of used homes, the savings and loan business is an obvious participant in any new program of financial incentives for energy-saving home improvements as envisioned by S. 2932.

Though the invitation to our organization to testify today was no doubt occasioned by our performance as residential finance specialists, I would like to underscore the fact that the Government—as user—represents an ever-growing demand on Nation's energy resources, as well. Energy conservation in public buildings and uses deserves a high priority in your deliberations. I note that the policy declaration section of S. 2932 recites this objective.

Before commenting about a few of the statutory and practical difficulties we perceive, I would like to observe that credit incentives are never particularly effective unless consumers are convinced of real savings for the family budget and the merit of new products. The availability of subsidized and guaranteed loans will not of themselves induce homeowners to retrofit their homes with energy-conserving devices. If a new product has merit in the marketplace in the eyes of the consumer, then the financial community will respond to the public's needs. We are concerned also that any federally sponsored program of loan subsidies and guarantees for retrofitting homes could become the target for disreputable businessmen and shoddy merchandise. In our view, the best protection against fast-buck home improvement firms and inflated costs for insulation and other conservation measures is to encourage the participation of supervised financial institutions—such as insured savings and loan associations—with their established loan underwriting procedures and their frequent Federal and State examinations.

Given these observations, I would hasten to add that we feel the financial community can obtain the resources necessary for a national effort of energy conservation. While it is very difficult to make firm projections, it has been suggested, for instance, that capital demands for solar heating/cooling units could involve an expenditure on the order of \$5 to \$10 billion. While this is a sizable dollar amount, it is not unduly burdensome considering that the annual net increase in mortgage debt is on the order of \$50 to \$60 billion and the increase in installment debt outstanding to the consumer sector is roughly \$30 billion.

There seems to me to be some practical difficulties to financing such energy conservation tools as home insulation, heat pumps, and the like. In the first place, much of the financing we are talking about results in relatively small loans amounts—\$200, \$300, or perhaps \$1,000 for insulation, heat pumps, duct work. Such loans are difficult and expensive for financial institutions to service. Perhaps we should also recognize that the dollar savings to the consumer through the use of subsidized loans, as contemplated by section 106 of S. 2932, is modest when applied to such principal amounts. It is certainly not of the magnitude which would make an energy conservation purchase irresistible.

In the case of savings and loan associations, in particular the federally chartered institutions whose investment powers are controlled by Federal Statute, there are other impediments to such lending activity. (Roughly two-fifths of the Nation's S. & L.'s, with 60 percent of the assets, are federally chartered.) Real estate loans by Federal savings and loan associations must be secured by a first lien—thus preventing second-mortgage financing of major improvements such as solar heating units. A home improvement loan category does exist for Federal associations—but it is restricted in terms of dollar amount, geographical location, and percentage of assets. These rigid limitations make small dollar amount loans for energy conservation materials very difficult for our institutions.

Fortunately, however, some greater flexibility may be on the horizon in title III of S. 1267, the Financial Institutions Act 1975. This legislation, as you know, was passed by the Senate on December 10, and

a comparable bill is developing in the House. S. 1267 removes the first lien impediment and permits increased lending flexibility for Federal savings associations by permitting "loans secured by or made with respect to for the acquisition, development, construction, improvement, repair, equipping or alteration of real property." In the event that these comprehensive financial reform measures stall in coming months, we would recommend that this Congress seriously consider as a separate matter modernization of these traditional areas for Federal savings and loan associations along the lines of S. 1267.

I might also mention in passing that participation by supervised financial institutions in any national program to finance energy conservation devices could be seriously impaired if a proposal such as that now pending before the Federal Trade Commission were adopted. The FTC has proposed a trade regulation rule which would permit unsatisfied purchasers of consumer goods to assert their claims and defenses against not only the seller of the goods but a holder in due course—which would include supervised financial institutions acquiring the loan. At a minimum this proposed rule should be clarified to exempt real estate and home improvement loans made by our supervised institutions; we are not prepared to insure the quality of such goods.

Senator HOLLINGS. You think if we pass this, S. 2932 could dovetail with it?

Mr. OWEN. It certainly could make it a lot easier.

Given the practical and legal impediments that I have just outlined, I would like to make a few broad-brush suggestions that might make a financial incentive program for energy conservation more workable:

1. The first, and one which our organization is actively pursuing already, is to redesign the mortgage instrument itself to open up new financing possibilities for home borrowers. A more flexible mortgage instrument might, for example, permit a homeowner to unlock some of his built-up equity to provide the foundation for a new loan for an energy-saving improvement to his home. This is particularly important in the case of retired persons who have religiously met their mortgage obligations for 20 or 25 years. Because of their fixed and limited incomes, they are unable to unlock the life savings that their home represents because of the strictures of their original mortgage instrument. If they are to afford improvements which will cut their rising utility bills, their options today are to seek a high-rate installment loan, or to attempt to refinance their property; in either event, an expensive proposition. A line-of-credit opportunity in the provisions of the original contract—much like the loan privilege built into life insurance contracts—might help consumers make energy-saving improvements in future years, and at greatly reduced financing costs and improved terms.

2. Another suggestion addresses the problem of size and the difficulty of servicing the small loans for energy-saving devices. The Congress may wish to consider authorization for a secondary market facility to aggregate large numbers of small subsidized or guaranteed loans which are made for retrofitting purposes. One possibility would be to utilize the existing facilities of the Federal Home Loan Mortgage Corporation and the Federal National Mortgage Association. Another would be to create an agency similar to the Student Loan Marketing

Association established under Public Law 89-329. "Sallie Mae," as you know, is a government-sponsored, private, for-profit corporation which "warehouses" guaranteed student loans. Given the proven performance of homeowners in meeting their mortgage payments, and their exhibited creditworthiness, we would anticipate that the small, energy-related loans originated by financial institutions and sold to a secondary market facility would be very attractive assets. These investments would be enhanced even further by the Federal guarantees suggested in S. 2932. At the same time, using a market mechanism such as the participation or guaranteed certificate, these small energy-related loans could be aggregated into larger investment units, which would then, in turn, provide the basis for bond-type securities. Such large denomination securities might prove attractive to pension funds or similar institutional investors—thus, indirectly, tapping additional sources of capital to help meet the residential energy conservation needs of our Nation.

3. The tax system can also be used to stimulate public interest in energy conservation—though I recognize that this may more appropriately be a subject for other committees of the Congress. Tax incentives do have the decided advantage of fast public recognition, with a minimal need for bureaucratic involvement. One such incentive appears in the tax credit permitted individual taxpayers making improvements for insulation as in H.R. 6860.

4. Another approach which I would suggest for your study—though I am not prepared to endorse it—would address the problem of additional construction costs on new buildings when energy savings devices are incorporated into their design. It has been suggested that the Congress could dedicate appropriated, but unused funds under the Brooke/Cranston program to new construction units with certain energy saving devices by raising the current statutory cost ceilings which apply to that program when these improvements are made.

Energy conservation, Mr. Chairman, deserves the attention you are giving it today as one of our top national priorities in 1976. The U.S. league stands ready to assist this committee and the Congress in developing an effective national program for retrofitting our existing housing stock and producing new construction which conserves our energy resources. I appreciate this opportunity to testify, and look forward to your questions.

Senator HOLLINGS. You advocate that the loans for this program be so designed that they can be taken up by others?

Mr. OWEN. Yes; we want to make this whole program more attractive to the financial community if they are not interested in it, we can advertise all we want but if homeowners go to their lenders and it's only a \$200 loan, the senior officers of that bank, savings and loan or credit union are not going to encourage a lot of this borrowing.

Lenders are also very wary of becoming the policemen for this system. We don't have the apparatus to employ it.

There are also those who will take advantage of the consumer.

Senator HOLLINGS. Well, let's work with your association and see if we can make it more presentable and more acceptable.

Mr. OWEN. We would welcome that opportunity.

Senator HOLLINGS. And in the formative changes in the law itself to change that original line-of-credit clause, let's make sure this becomes enacted. We will work from your statement and make sure it all coordinates.

I guess that's the purpose of this hearing, to bring out these problems and reduce them. As you indicated, additional legislation is necessary but it ought to be fashioned so it is not difficult to implement. It ought to be easy.

Mr. OWEN. That's right. I want to thank you for the opportunity of appearing before you. And we stand ready to assist this committee or any other committee of the Congress that thinks our advice and counsel could be of benefit.

Senator HOLLINGS. This bill—I would like to work out this bill, S. 2932. It does need to be worked out so that it incorporates what our colleagues in banking and you in the savings and loan think is necessary.

Mr. OWEN. I am sorry the credit unions, banks, and mortgage bankers are not here. As you know, mortgage bankers are the primary makers of federally insured paper. They could give us a major insight into the paperwork problems we might anticipate and the relative costs of creating this paper.

Senator HOLLINGS. I will have staff get in touch with you and then we will ask them up here to get some credible witnesses to criticize and make suggestions.

Mr. OWEN. The banks and credit unions could tell us something about consumer lending.

They could give us insight, I'm sure.

Senator HOLLINGS. We need to go through and study the various items you have raised here today, which I think are very significant if this is going to fly.

Mr. OWEN. We don't want this program to be like the programs we hear of every night advertised on the radio asking people to come in and take money from the Government.

But we want them to understand why it's to their benefit.

Senator HOLLINGS. Well, Mr. Owen, we really appreciate your appearance here today.

Next we have Mr. Frank Scaduto, the legislative director of the Sheet Metal Workers International Association.

We appreciate your coming down here today to testify.

You may proceed as you wish. Your entire statement will be placed in the record.

STATEMENT OF FRANK SCADUTO, LEGISLATIVE DIRECTOR, SHEET METAL WORKERS' INTERNATIONAL ASSOCIATION; ACCOMPANIED BY STANLEY H. RUTTENBERG, PRESIDENT OF RUTTENBERG, FRIEDMAN, KILGALLON GUTCHES & ASSOCIATES, INC.; AND ROBERT G. MILLS, DIRECTOR OF RESIDENTIAL PROGRAMS, SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

Mr. SCADUTO. Thank you, Mr. Chairman.

I have a statement which I will give.

The energy crisis of recent years, and the spiraling fuel costs which characterize it, have demonstrated the need for energy conservation and solar energy.

The current imbalance between the domestic supply and the demand for fuels and energy is likely to continue unless a Federal effort is made to test, utilize and promote conservation measures and new forms of energy.

Over 25 percent of all the energy used in the United States and Canada is consumed in the industries in which sheet metal workers are employed—heating, ventilating, air-conditioning systems and related systems in space heating.

The modification of these systems can be accomplished at relatively low cost and make a huge dent in the Nation's energy consumption.

The Project Independence Blueprint estimates that the equivalent of almost half a billion barrels of oil per year can be saved by 1985 through an accelerated energy conservation program in residential and commercial buildings.

Among the energy conservation options:

Exchangers to transfer heat from exhaust air, before it goes outside, to incoming fresh air in schools, hospitals, and other buildings where health considerations require a heavy air turnover.

Installation of heat pumps to perform both the heating and cooling functions at a considerable savings of electricity.

Replacement of constant-volume air circulation systems—which vary temperature to provide constant comfort level—with variable volume systems—which hold air temperature constant and vary volume to maintain comfort levels.

The increased usage of solar energy. Solar energy is nonpolluting, inexhaustible and can become inexpensive. However, the full potential of solar energy will not be realized until the cost of solar hardware is reduced through mass manufacturing.

To increase public demand for energy conservation and solar hardware, a program of Federal assistance is necessary. This assistance should include, but not be limited to, tax credits and loans for the purchase and installation of energy conserving and solar equipment, the use of energy conservation and solar hardware in buildings financed with Federal funds, direct subsidies to assist in the purchase of energy conserving and solar equipment, and Federal grants and contracts to the research community and manufacturers for the development of energy conservation and solar technologies. The energy conservation incentives provided in S. 2932 are but a step in the right direction.

The Sheet Metal Workers' International Association has become active in energy conservation and solar energy not only because it makes sense for America's energy needs, but because even figured conservatively, energy-saving modification work could put all unemployed sheet metal workers back to work.

At the present time, one sheet metal worker in five is unemployed. In the Northeast, nearly 40 percent of our membership is jobless. Many more are working less than full time.

Energy conservation and the use of solar energy can have a large impact on unemployment. It has been estimated by the Stanford Research Institute that one-fourth of the dollars invested in solar heating and cooling will go to the labor costs of installation.

In addition, there will be many jobs created fabricating the collectors, storage tanks, ducting and allied equipment necessary for a solar installation.

A Federal program to promote energy conservation and the use of solar energy will not only aid in achieving energy independence, but it will help to put Americans back to work. Dollars now being spent on expensive fossil fuels from abroad would be better spent reducing joblessness by harnessing less expensive, inexhaustive energies at home.

As a result of our interest in energy conservation, our union has taken several steps:

We are educating our membership to the possible impact of energy conservation and solar energy. At an August conference of our union's business agents, we devoted nearly 2 days to energy developments and the part our union can play.

Our national training fund, recognized as one of the best of apprenticeship programs, is now conducting a survey to determine if additional courses are needed for the construction of solar hardware.

We commissioned the Stanford Research Institute and the Mitre Corporation to make studies of the impact on the sheet metal industry of solar development and energy conservation.

Senator HOLLINGS. Let's include copies of both of those by reference.¹

Mr. SCADUTO. All right. We'll do that.

Copies of these reports have been sent to every Member of Congress.

The Sheet Metal Workers' International Association strongly supports a direct low-interest loan program to assist homeowners and builders in purchasing and installing solar equipment.

The passage of S. 2932 will help achieve the goals of fossil fuel conservation, solar energy development and new job opportunities for Americans.

The national training fund was created in 1971. It is a joint labor/management program which generates from its own organized portion of the Sheet Metal and Air Conditioning Industry \$2 million annually.

The \$2 million, in its entirety, goes back into the industry through the development of teaching materials, training of instructors, and research.

The NTF has an annual contract with Ohio State University [one-half million per year] for instructor training.

As a part of this training, NTF has requested that steps be taken to include solar energy—air type—in the instructional material.

The NTF has under contract authors for the writing of comprehensive textbooks for both journeymen and apprentice training. Present contracts exceed \$1 million. Portions of the curriculum will relate to solar energy.

In Detroit, Mich., the joint apprenticeship committee—labor and management—are constructing a new school plant facility. The NTF has given a \$40,000 grant to the project for the installation of instrumentation. The program will include monitoring the results of this solar installation.

The NTF trustees have approved the production of a 16mm film (\$50,000) of the Detroit JAC's new school. The film will concentrate on the installation of all material and/or equipment relative to the solar portion of the new construction.

¹The studies are in the committee files.

This film will be circulated throughout the country for the purpose of exposing to our contractors and workers the importance of this new technology and our industry's responsibility to become prepared to meet the consumer and industrial challenge.

The NTF has recently signed a contract with Syracuse University for \$100,000 for the year 1976. The university will research our entire industry from a technological point of view. They will make projections into the 1980's based on their findings. They are instructed to give major emphasis to solar energy—air heating and cooling.

The NTF recently gave approximately a \$50,000 grant to Colorado State University, Solar Energy Applications Laboratory, for the installation of highly sophisticated monitoring equipment. The research equipment will be placed in a solar air system which was installed in a residential unit on the campus.

It should be noted that SMACNA—which shows the close working relationship between management and labor regarding solar research—also gave a grant of \$11,000 to the same project for the installation of the duct system in this same residence.

I just bring out these points to have it a matter of record that while the sheet metal workers do support this particular bill, the Sheet Metal Workers' International also has invested well over \$3 million through the national training fund and also from our own direct funds.

We are very much involved for the very obvious reason that we need energy conservation in this country and I might say that our membership and our employers and a lot of people that work in related industries certainly need the jobs that a bill of this kind could create.

Thank you very much.

Senator HOLLINGS. Thank you very much.

We see the leadership that your association has given to research and development and equipping the personnel to become conservation-conscious, you and the national training fund. The solar energy potential is very impressive but then the Government comes around and says it's premature.

The private sector is way ahead of Washington on this, way ahead. There is no way for us to be premature on conservation.

Mr. SCADUTO. We're certainly not premature.

Senator HOLLINGS. Let me ask you about the economics, in a bill of this kind. What do you think of electric cooperatives?

Mr. RUTTENBERG. I think one of the suggestions that was made earlier this morning about the rate of interest that would be permitted in the bill in relation to the prime rate was a valid one that ought to be looked at.

Obviously, if the prime rates drop—they were up as we know, to 10.5 or 11 percent last year.

They have dropped down and I think the prime rate now must be somewhere between 6.5 and 7 percent.

When it gets that low, the differential which is guaranteed in terms of the bill, is not very much.

I don't know whether it should be 50 percent of that or some concept in which there is a differential, that would be very helpful.

Senator HOLLINGS. I was interested by that.

Mr. RUTTENBERG. I just wonder whether the provision in the bill which says that 20 percent total loan, whether that ought not be a progressive form in which the lower the income, or the more difficult it is for the group, whether it be the individual homeowner or the small businessman or the commercial establishment, that maybe 20 percent ought to go to 30 or 40 at the lower interest rate, depending upon the financial condition and the needs of the applicant himself.

I just wonder whether that might not be an improvement in terms of handling the problem.

Senator HOLLINGS. Did your association make any estimate whatsoever as to how many jobs could be created by a bill of this kind?

Mr. RUTTENBERG. I really wouldn't want to estimate the number of jobs that would be created and I have not done that specifically in connection with this bill.

But obviously, any bill which is designed at conservation and particularly the great interest of the Sheet Metal Workers' International Association in solar energy has to be looked upon as kind of a twofold approach to the whole problem of conservation, because there you are, as was pointed out earlier, you are using that solar energy of the universe and are conserving at the same time the utilization of natural gas and fossil fuels and while doing that, you are promoting additional employment opportunities to move toward the conservation and the use of solar energy and I think that's a very worthwhile effort and this union and its involvement needs to be commended for taking leadership in this area, which really, leadership is what we need and I think this union and its president have done an excellent job in providing it.

Senator HOLLINGS. There is no question in my mind. We are going to put this in the record and commend the Sheet Metal Workers' for providing this kind of leadership.

Do you think there should be a ceiling on interest rates perhaps?

Mr. RUTTENBERG. A ceiling that would be guaranteed in terms of the bill?

Senator HOLLINGS. Yes, sir.

Mr. RUTTENBERG. Oh, yes. I would certainly say that the 5 percent ought to be the top. And that the relationship to the prime rate ought to be only if it—50 percent or whatever percentage it is that the prime rate drops below 5 percent. I would not run the interest rate above 5, if the prime rate goes to 11.

Senator HOLLINGS. From your experience, should the banks be limited on how much they can charge?

Mr. RUTTENBERG. Well, I am a strong advocate of controls in relationship to what interest rates ought to be.

I think interest rates left in the free open market the way they were in 1974 and 1975 did more toward bringing on the serious levels of the recession and high levels of unemployment than anything else could have possibly done and I think the people that profited during the recession were the banks and one has to just look at their profit and loss statements to see that. And I think it behooves economic policy to give serious consideration to restrictions on the level to which interest rates can go. That applies across the board.

Senator HOLLINGS. Mr. Scaduto, how do we protect the consumer from the unscrupulous contractor? There has been prior testimony

in regard to the fact that there ought to be some kind of protection within the bill.

From your experience, how do you do that?

Mr. SCADUTO. Mr. Chairman, based on our experience, we also encourage consumers to go to the yellow pages when they are looking for a heating and air conditioning contractor.

We feel that's always a good thing.

Over the years, we have had a serious problem with people going from door to door soliciting. A person only has to go to the yellow pages or call someone in the Better Business Bureau or the Chamber of Commerce.

Deal with somebody who is reputable. Do business with someone who is established in your local community. If people would adhere to those simple rules, we don't think there would be any serious problems.

Mr. MILLS. We determined that the consumer was getting a ripoff and so we felt it was incumbent upon our own industry to correct this particular problem and we have in the form of establishing in most of the urban marketing areas in the United States a so-called Better Heating and Cooling Bureau.

This bureau is staffed by a technically competent individual who is given the rights and privileges to advocate the problems of the consumer even though he is financed and supported by our industry, he is given the right to question and resolve the consumer's problems as he feels should be a fair means of solving this.

We now have 12 of these bureaus, in Seattle, Wash., in Caster Valley, Calif., in Los Angeles, in the San Diego region, Denver, Oklahoma City, Kansas City, Highland, Ind., Detroit, Mich., Rochester, N.Y. and we are now chartering 5 more bureaus in the industrial Illinois region. Champaign, and Springfield. It's our hope to create a nationwide network of these bureaus to do just this, to protect the interest of the consumer.

And by doing that, we will be able to create a much more professional image for our business people.

Senator HOLLINGS. In creating those bureaus, my mind moves to the cooperative section of the bill.

Do you think that can work, and should be supported, or—

Mr. MILLS. Absolutely.

I think it has great merit. But unfortunately, I am not prepared to advise you in that regard.

Senator HOLLINGS. Do you have any suggestion as to the administration of such a program?

Mr. MILLS. It should be on the State level, I believe.

Each individual area has its own problems and therefore, I believe it should be done on the State level.

Senator HOLLINGS. Well, thank you very much.

We appreciate your patience in waiting here.

If there are any additional comments you want placed in the record, we'll be glad to include them.

Thank you very much.

Mr. SCADUTO. Thank you.

Senator HOLLINGS. The committee will be in recess.

[Whereupon, at 12:30 p.m., the hearing was adjourned.]