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Statement of Honorable Frank Zarb
Administrator
Federal Energy Administration

Before the

Subcommittee on Energy Research, Development and Demonstration

of the

Committee on Science and Technology
U.S. House of Representatives

May 14, 1975

Introduction

Mr. Chairman and distinguished members of the subcommittee, I am pleased to appear before you today to discuss the President's energy program and the role of solar heating and cooling in that program. Specifically, I will address the need for a comprehensive approach to the National Plan for Solar Heating and Cooling, including the requirement for far-reaching goals and objectives and for implementation phases covering accelerated utilization and widespread commercial application.

Let me first summarize the solar-related aspects of my discussio today:

1. Solar Heating and Cooling can and should make a significant contribution to our total energy production by 1985--going well beyond the goals of the demonstration program.

2. Without an aggressive Federal program to commercialize solar energy technologies, the significant fossil fuel savings projected will not be realized.

3. FEA's role in solar energy is to facilitate the accelerated utilization and widespread commercialization of proven solar energy technologies and to provide a policy overview that integrates solar energy with the Nation's overall energy resource development and energy conservation strategies.

4. The Interim Report for Solar Heating and Cooling is a major step towards a comprehensive national plan, but it was directed primarily toward research, development and demonstration (R,D&D).

5. A truly national plan should include comprehensive treatment of elements beyond R,D&D, including specific goals and implementation plans for accelerated utilization and widespread commercialization along with a delineation of the respective agency responsibilities.

6. The term "Demonstration" should be clarified with respect to the maximum number of units which constitute a demonstration.

7. Adequately definitive performance criteria are needed as soon as possible to allow certification of solar water heaters for public use.

8. We should begin now a Government Buildings Project that requires all designs of Federal buildings to include an assessment of the feasibility of using solar heating and cooling. The assessments should be made on a life-cycle cost basis. Where appropriate, substantial numbers of solar heating and cooling systems should be purchased and installed on new and existing Government buildings.

I would like to place our particular discussion today in the broader context of our National energy situation and the need for early and decisive action.

The President's Energy Program

I'm sure that we all agree that the present energy situation requires broad, decisive and prompt government action to prevent continued erosion of our economic vitality and national security. The challenge we jointly face is to implement promptly a coordinated national energy policy which restores our energy independence.

In considering various alternative proposals now before the Congress, we should keep in mind some very important principles. The first relates to the necessity for immediate action. Between now and the end of 1977, the President has indicated that we need to conserve approximately two million barrels of oil a day by that time. That was not an arbitrarily selected number. It was chosen because if we do nothing, we will be expanding our vulnerability by importing about two million barrels a day more by 1977 -- and a greater percentage of these imports will be coming from the Mideast. Therefore, the basic question before us is this: Do we allow our vulnerability to increase in the next few years, or do we take actions now to stop the tide of increasing imports?

Over the longer term -- that is by 1985 -- the President's objective is to become completely invulnerable to foreign economic threats. We all agree that we must not allow this Nation to remain in a position where it cannot protect its own national interests. Our objective is to reduce our petroleum imports to 3 to 5 million barrels a day in the next 10 years. While this may not seem much less than the current level of imports, it would be down substantially from the 12-13 million which we would have to import if we do not act. Should those imports be curtailed, the Strategic Reserve Program and the imposition of various stundby conservation and allocation measures which we are requesting in Title XIII of the Administration's Bill would deal with the loss of imports.

Another principle relates to fairness and equity. Any program which will reduce our dependence on foreign oil will also entail some sacrifices. There is no easy way to do what we have to do. If we ask the American people to make such sacrifices, we should be sure that our program will not unfairly discriminate against them by where they live, by their place in society, or by how they live. Thus, we should allow Americans to choose how they wish to conserve oil, whether it be by driving less, lowering the thermostat in winter, using less air-conditioning in summer, turning off lights, or so forth.

If we are going to have a fair and equitable program--and one which will be workable over the long term--we must use the free market mechanism which will allow each individual citizen and business to make his choice of where and how to save energy. The President's program of raising the value of all types of petroleum products will result in a new energy ethic, which is essential if we are to limit our consumption in the years ahead. If we are to change our conception of energy use, we will not do it by allocation and rationing measures as some propose. To the extent these measures work, they only have a transient effect. And such programs would result in a large bureaucracy to make decisions which the free market makes every day. No matter how fair and "efficient" any allocation or rationing system is, it must make many such decisions and will do so to the detriment of some parts of the economy, as well as directly affecting how each and everyone of us lives.

In addition to allocation and rationing, an additional method of reducing consumption often mentioned is the adoption of a quota system. Somehow, the notion has crept into the

public debate that price increases can be avoided with a quota. That simply is not so. A quota that restricts imports will reduce the quantity of oil available. When the supply of an item is reduced, the price rises. Thus, if an average rise of $4 in the cost of a barrel of oil (as the President suggests) would result in a demand reduction of one million barrels of oil per day, the reverse would also be true. Reducing supply one million barrels of oil per day would result in an average increase per barrel of $4. The main difficulty with the quota approach is that we don't know for sure just how much prices will rise.

One final point warrants renewed attention--the deregulation of new natural gas. A substantial part of the short-term savings envisaged by the President's program (two million barrels of oil per day by the end of 1977) is attainable through new natural gas deregulation and the natural gas excise tax, which is equivalent to the proposed $2 per barrel excise tax and import fee. We estimate that continued regulation will result in a decrease of production of 38 percent between now and 1985. Deregulation would result in a 10% production increase (22.4 to 24.6 TCF). If we do nothing, the result will be unemployment due to curtailments.

Mr. Chairman, unless we move promptly toward achievement of the major goals of the President's energy program, the effects of a future embargo will far outweigh the important contribution we can expect from alternate energy sources, including solar.

Impact of Solar Energy

According to our projections in the Project Independence Blueprint (PIB), Solar Energy Task Force Report, accelerated use of solar energy could allow a substantial savings in the Nation's demand for fossil fuels by 1985. The "Accelerated Case" envisioned an impact of up to 1.5 million barrels of oil per day equivalency by 1985, primarily through use of solar heating and cooling, wind energy conversion and bioconversion. Solar heating and cooling alone could provide the potential for saving up to one million barrels per day by that time. Growth of the industry is expected to be particularly rapid during the period 1980-1985. However, this can be achieved only through policy actions and an accelerated program going way beyond the demonstrations now envisioned.

FEA Role in Solar Energy

The Federal Energy Administration's role in solar energy is twofold. First, we are concerned with the direction and scope of the Nation's solar-related endeavors as part of our national energy strategy. We are intimately involved in energy policy decisions, and are prepared to offer a broad-base analysis of solar proposals as part of an overall energy

development/conservation program. Second, we are developing, implementing and coordinating programs and policies to facilitate the widespread commercial application and accelerated utilization of proven solar energy technologies. It should be emphasized strongly that the solar energy implementation and commercialization effort is concurrent and not sequential to FEA's research, development, and demonstration (R,D&D) program. This is a key point. Concurrent action is necessary because, in some instances, market development requires a longer lead time than does the R,D&D effort. FEA's implementation and commercialization program is predicated on two major assumptions:

- o A reasonably successful R,D&D program;
- o A realization that without an aggressive Federal program to commercialize solar energy technologies, the significant fossil fuel savings projected as a result of solar energy in the Project Independence Blueprint Report will not be realized.

Now, turning to specific program areas, FEA is involved in activities such as:

- o Identifying and, where appropriate, working for the removal of economic, institutional, and legal barriers to the widespread commercial application of solar energy technologies. We will be careful to avoid duplication of similar endeavors by HUD and other agencies.

- Stimulating market demand;
- Developing solar energy industry capability, and
- Performing trade-off studies to assure that solar energy development programs are properly interwoven with other energy development endeavors and with energy conservation programs. Solar heating and cooling, for example, will be an economically rational choice only:
  - When installed in properly insulated homes, or
  - when the higher first costs of collectors have been reduced substantially through mass production and marketing, or
  - When the prices of alternate energy sources, including oil, natural gas, and electricity have been allowed to rise to free market levels.

I want to emphasize that we are working cooperatively with other Federal agencies in each of these areas.

Interim Report Directed Towards R,D&D

We have reviewed the Interim Report and view it as a major step towards a comprehensive national plan for solar heating and cooling. One of the most important aspects of the Inter-Agency Task Force effort was the cooperation from all the various agencies that participated. However, the work of the Task Force was limited by the fact that the Interim Report was

primarily R,D&D oriented as it was in response to P.L. 93-409 and P.L. 93-473.

We recognize that R,D&D is of utmost importance for any technology program, but the national plan will remain critically incomplete until attainable goals for accelerated utilization and widespread commercialization have been formulated and implementation plans developed. In fact, R,D&D on solar water heaters and solar space heating has been in progress throughout this country and in several foreign countries for many years. Solar heated homes have been built and more are now being built throughout the Nation. Solar water heaters are in use in Japan, Israel, Australia, and other countries. More than 25,000 solar water heaters were in use in the Southeastern states, particularly Florida, prior to the introduction of cheap natural gas. Also, research and development on solar cooling has been conducted, and the demonstration phase is now in the final planning stage.

Because of its emphasis on R,D&D, the Interim Report's energy savings objectives for solar heating and cooling--10,000 barrels of oil per day equivalency by 1980 and 100,000 barrels per day by 1985--are too modest and pessimistic for an implementation plan extending beyond the demonstration program. These objectives even fall below the Business-as-Usual projections of the Project Independence Blueprint - Solar Energy Task Force Report. Also, these objectives are one-tenth of ERDA's energy savings projection, stated on February 20, 1975, of "approximately one million barrels of oil per day by 1985" for "commercialization of solar heating and cooling."

As stated in Appendix II of the Interim Report, "A substantially larger impact than provided for by this scenario would be a desirable national goal," and "to achieve an order of magnitude greater implementation of solar heating and cooling technology in this time period will require additional policy measures. ..." We in FEA believe strongly that substantially expanded implementation must be made an integral part of the overall goal of a comprehensive national solar plan.

We are concerned that the Comprehensive Program Definition, due June 30, 1975, as called for in the Act, is limited by the same R,D&D perspective which constrained the Interim Report. It is important that we move now beyond R,D&D planning and implementation for solar heating and cooling. It is time to emphasize the necessary next phases -- Accelerated utilization and Widespread Commercial Application.

Areas Beyond R,D&D Implementation

Chapter IX of the Interim Report covers implementation responsibilities of the Federal agencies for five (5) basic elements of the Plan -- Research, Development, Demonstration on Residential Buildings, Demonstration on Commercial Buildings, and Collection and Dissemination of Information.

A truly comprehensive national plan should include four additional elements:

- o Accelerated Utilization and Commercialization
- o Energy Policy and Program Analysis, Definition and Development
- o International Activities
- o Regulation

A preliminary outline of the project areas within these elements is included as an Appendix to this statement. We believe that it is essential that they be developed in detail in the national

plan along with a delineation of the associated management responsibilities.

Need for Definition of Demonstration

It is important that all of us work toward a clear definition of the limits of a "demonstration" program. We believe a major purpose of the demonstration program is to achieve "leverage" in stimulating both user demand and a producer infrastructure. The payoff is the additional number of units produced and installed. But when are the numbers of demonstration installations so large that they are no longer instrumented or closely monitored as part of a Government program? For example, in discussions regarding the Demonstration Act, I understand that the number of units mentioned ranged up to 4,000. The Interim Report states several options for the present Demonstration Program up to 2,000 residential and 400 commercial units.

In addition, the Interim Report mentions that "a separate demonstration of hot water heaters ... at the 10,000 unit level would cost approximately $5 million and will be considered for incorporation in the plan to be submitted in June 1975." This is an average of only $500 per solar

water heater installation, and many such systems will be purchased and installed by the general public outside the purview of Government demonstration. We must question then whether such a project should be placed within the confines of demonstration, or whether it should be considered as the next step in the transition toward accelerated use and commercialization.

What if the numbers of units reach 20,000 or even 40,000? At what point do we say that we have made the transition beyond demonstration and into the next phase? In our view, we should establish as an upper limit for the demonstration program a number no greater than necessary to provide statistical confidence across the various climatic regions of the Nation.

Need for "Adequately Definitive Performance Criteria"

There are a number of private homes now being constructed or on the drawing boards with solar systems--without Government assistance. What the Government must do to meet the public's increasing demand for quality solar systems is to accelerate the preparation of appropriate certification criteria.

The Interim Performance Criteria were published in January, 1975, as called for under the Demonstration Act. However, these

Interim Criteria, which are appropriate initially for demonstration projects, are by definition not sufficient to adequately certify solar systems for the commercial market. Also, a three (3) to five (5) year delay until the preparation of Definitive Performance Criteria, as called for under the Act, will undoubtedly and unnecessary hamper the public's move toward buying solar systems.

We must begin now to prepare adequately definitive performance criteria for certification of, at a minimum, domestic solar water heaters. These must assuredly can be prepared within one (1) year in light of the long history of R,D&D in solar water heater technology and the expressed willingness of industry to accelerate the preparation of such criteria. The standardized guidelines created for certification would strongly encourage the development of an industry capability.

Establishing a viable solar water heater industry would be a major step in the development of the overall solar heating and cooling industry. First, the production of significant collector square footage will start the manufacturing industry down the evolutionary engineering development process toward lower cost collectors. Second, the building industry (and related regulatory and financing institutions) will become familiar with the installation of collectors. Third

the consumer will become familiar with solar energy as a household energy resource.

We recognize a potential threat to the longer range objective of achieving a very substantial penetration of the solar heating and cooling systems market. Our objective could be jeopardized if poor quality, aesthetically unpleasing solar water heaters receive early, widespread exposure to the consumer. Based on discussions with industry, significant attempts to penetrate the solar domestic water heater market are beginning, and will increase in the near future. To emphasize the need for criteria and standards for commercial use, certain companies could be ready to produce and market between 5,000 - 10,000 solar collectors per month. Should some of these systems "turn-off" the buying public (through distasteful appearance, inadequate performance, poor reliability, poor durability, etc.), the energy savings projected for solar heating and cooling in the Project Independence Blueprint may not be realized. (A similar situation occurred during the early 50's with heat pumps). This risk is an argument for the prompt creation of certification criteria.

A present example of the need for adequately defining performance criteria is H.R. 5005, Section 142, Residential Solar Energy Equipment, which proposes user tax credits for purchase and installation of solar systems. It is n

my purpose for this testimony to judge the value of such user incentives. The tax credits under H.R. 5005 would be permitted for those systems that meet the Definitive Performance Criteria prescribed by HUD under the Demonstration Act. This in effect would severely minimize or even eliminate user tax credits for three (3) to five (5) years. In any event, it is clear to us that adequately definitive performance criteria can and should be developed at least for water heaters within a year as a priority objective.

Solar Energy - Government Building Market

I would like to expand on one method whereby we might accelerate the use of solar heating and cooling systems. The Federal Government itself can provide an early market and thereby make a direct and significant contribution toward developing a solar heating and cooling industry capability. Currently, the Government owns 400,000 buildings containing 2.4 billion square feet of floor space. In addition, the United States Postal Service has 36,000 buildings. As a result, the Government market (new and existing buildings) alone is large enough to provide substantial stimulation to the industry. The combined market potential of the Government buildings project and an accelerated private sector solar water heater market could be large enough to bring industry to a take-off point. The GSA owns 80% of these Government buildings.

As a result of our participation as a member of the Interagency Task Force, the concept of a Solar Energy Government Buildings Project was adopted as a Primary Objective of the Interim Report. Although P.L. 93-409 covers DOE involvement in demonstrations, the Government Buildings Project would go significantly beyond the currently planned demonstration program.

We believe that the Government Building Project should be implemented aggressively and are working with other agencies toward this objective. We envisage that the Project will:

1. Require that all designs for federal buildings initiated from this point on, include an assessment of:

   - the feasibility of using solar heating and cooling at this time, and
   - the feasibility of including provisions within the design to enable relatively easy retrofit to solar heating and cooling equipment at some future time.

Such assessments would cost less than 0.1 of the cost of construction.

2. Require that estimates of costs of efforts to reduce the demand for energy within buildings, including use of such energy conversion products as solar heating and cooling systems,

be done on a life-cycle (total cost) cost basis. Life-cycle costs should be adjusted to reflect the total costs and benefits to the Nation (energy-related and non-energy related values) of using solar heating and cooling systems versus those for using conventional heating and cooling systems. Appropriate changes in law to allow life-cycle costing in Federal buildings may be required.

3. Provide for substantial Government acquisitions of solar heating and cooling systems (including domestic hot water heaters) by:

- Requiring purchase of solar systems found competitive with conventional systems (calculated on a life-cycle basis comparing the total value of the systems);
- Requiring, in addition to the purchase of competitive systems, that a certain quantity of economically non-competitive solar heating and cooling systems be purchased by the Government to contribute to development of the industry capability. This quantity exceeds that required to demonstrate commercial feasibility as envisioned in the Solar Heating and Cooling Demonstration Act of 1974, P.L. 93-409. The volume and schedule of purchases which are necessary will be determined and reviewed for implementation.

If this project were initiated now, at least 10,000 barrels of oil per day could be saved in Government buildings by 1990.

The significance of this effort, however, is primarily in the stimulative effect the program will have on the solar manufacturing industry.

Finally, let me acknowledge that the involvement of many different Federal agencies is an essential aspect of the Federal solar program. These agencies must be involved if we are to have a coherent and successful program. We are working well together, and our respective capabilities and insights all are important. We in FEA want to see this continue, and we are looking forward to working with these agencies and with the Congress in promoting the increased use of solar energy.

Thank you.

Appendix

ADDITIONAL ELEMENTS NEEDED IN A NATIONAL PLAN
FOR SOLAR HEATING AND COOLING

Plan Element/Project Area

C. ACCELERATED UTILIZATION & COMMERCIALIZATION

A. Market Development & Aggregation

1. Stimulate Market Demand

a. User Incentives

(1) Tax Incentives

(2) Home Loan Mortgage Incentives

b. Public Education

(1) Consumer Protection/Interests

(2) Conserving Fossil Fuels

B. Industry Capability Development

1. Standards and Criteria

2. Early Markets

a. Government Buildings

b. Non Government Institutional Buildings

c. Accelerated Private Sector Domestic Solar Water Heater Market

3. Producer Incentives

a. Tax Incentives

b. Loans; Loan Guarantees

4. Demonstrations - Commercial and Residential

C. Removing Constraints: Economic, Institutional, Environmental and Legal

C ENERGY POLICY & PROGRAM ANALYSIS, DEFINITION, AND DEVELOPMENT:

A. Solar Energy, R,D&D

1. Relationship to Overall Energy R,D&D
2. Resource Development Constraint -- Pace of Solar Energy R,D&D

B. Solar Energy Accelerated Use and Commercialization

C. Overall Energy Development/Conservation Policies As They Relate to Solar Energy Policy

C INTERNATIONAL ACTIVITIES

A. R,D&D Related Activities
B. Energy Policy Related Activities
C. Multilateral Energy Agency Support

C REGULATION

A. Utility Related Regulations

1. Electric Utilities
2. Gas Utilities
3. Other (combined, etc.)

B. Energy Conservation Standards for new Buildings

C. Building Codes/Zoning

D. Truth in Energy Labeling

E. Environmental Alternatives

F. Regulations for the Demonstration Act (Sec. 18, P.L. 93-409)

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