

Solar Priorities

When this editorial appears, Governor Ronald Reagan will be our 40th president. The change of administration in Washington is an opportune moment to re-examine our national goals for solar energy and the priorities for its development. During his campaign, President Reagan spoke of the future promise of solar energy:

"We need to . . . provide a national energy policy geared to protect and increase American energy security. Four principal goals of this policy should be to:

- 1 Increase domestic production of oil and gas to the greatest degree possible.
- 2 Promote energy conservation.
- 3 Prepare against possible oil cut off.
- 4 Encourage the wide spread development of other energy sources."

Increasing domestic production of oil and gas is a short term necessity, but will not provide a long term solution. Conservation is important to reduce the demand for energy, but it will not increase the supply. Coal and nuclear power can provide large amounts of our future energy needs, if a breeder is developed. But the former may be limited if the CO₂ increase in the atmosphere should create a serious environmental danger while the latter has still unresolved problems in the long term disposal of nuclear waste and could also encounter political problems if a serious accident should occur. It is therefore imperative that the various forms of solar energy be developed. President Reagan has also said that

"We should adopt an energy vision for the future by providing adequate research support for such potentially abundant fuel sources as solar . . .".

The new administration is thus clearly committed to the development of all indigenous resources, including solar, but it is not clear whether or not it will continue to support the current structure of the solar program within the Department of Energy or, for that matter, continue DOE. However, irrespective of the form of support it plans for solar energy, it is hoped that the scope will be increased and the mode of operation improved.

Basic research does not often lead to patentable results and usually does not pay off in the near term. For that reason, governmental resources must be provided to support the solar scientific enterprise, while activities that have a near term payoff are best carried on in the private sector which is more aware of commercial opportunities. At this point in time most solar energy technologies require federal governmental support to accelerate their development because the risk and cost of deployment is still too high for the private sector. With a large segment of the public expecting solar energy to be deployed soon on a large scale, there is a pressure for deployment, rather than careful R & D efforts. But premature efforts to deploy a solar technology before it is ready can do more harm than good.

Strengthening and modernizing new energy technologies are a national imperative and an important task of the new

administration will be to delineate the role that the federal government will play in supporting solar R & D. The public has given strong support to solar energy, but this support has been based on an unrealistic level of expectation which as yet cannot be fulfilled. The solar technical community must therefore strive to maintain the public support it now enjoys, but at the same time redirect expectations to a level and a time frame that solar technologies can attain. "Switch to Solar" may be a good slogan for a bumper sticker, but it is of little help in deciding how to do it.

In the solar energy field close cooperation between the government and industry is required to meet the competition of other countries. For example, in Japan, a country which imports all of its oil and where a single orange costs a dollar and a half, a complete solar domestic hot water system suitable for "do it yourself" installation was advertised in October of 1980 for 168,000 yen, which is about 800 dollars. A complete system manufactured in the U.S. currently costs more than twice as much. If this country is to capture the lead in solar technology, it must not only produce products of high quality, but also of competitive price. If we fail this challenge, this country may soon find itself in a dilemma in the solar energy field similar to that in the automotive field.

It is hoped that the new Administration will make a serious effort to ensure continuity in the organization of the Department of Energy, if it is to continue, or in any other organization which may take its place. Noam Lior, chairperson of the Engineering Division of the American Section of the International Society has pointed out that among the problems of DOE are "the lack of continuity in demonstration, development and research projects, where many of them are abandoned after completion of a typically short term contract, without follow-up or even minimal maintenance, thus not only preventing the attainment of expanded (or long term performance) results, but also literally littering the country with counterproductive solar debris; the pursuit of commercialization not balanced by long term research and development; the destabilizing mobility of administrators and program managers; and the unclear division of responsibilities among DOE Washington, SERI, the regional centers, government labs, NASA and a host of management consulting companies".

An appropriate step for the new Administration would be to re-examine the current national goal of providing 20 percent of our total national energy needs from solar by the year 2000. The solar industry needs to know if the new Administration supports this goal. If the current goal is not considered to be realistic, it should be adjusted, up or down, and a budget should be allocated for research and development of solar technologies that is appropriate to the goal which has been set. Moreover, to achieve such an ambitious long-range goal it is not sufficient to give general statements on how one hopes to attain it, but it is necessary to work out a detailed program plan on how to get there. From the point of view of many solar experts, there is also a need to set shorter

term goals that can be attained with present technology and to strike a balance between short and long term goals in the overall strategy. President Reagan has stated that

“The Federal Government can play an important role in spurring the growth of alternate energy sources by providing necessary limited funds for research and development”.

Recognizing that federal R & D support is limited, emphasis must be placed on eliminating waste. Basic and applied research programs require long-range planning to achieve success. Preparing a budget every year wastes valuable time of research personnel. Therefore, it is important to provide a mechanism for multiyear budgeting to avoid wasting research time and money by starting programs which must be discontinued before tangible results are obtained because of budget cuts, reallocation of priorities, or the need to cover overruns in demonstration projects. Continuity is critical to good research.

The last mentioned problem could be avoided and research efficiency increased if the budget for demonstration projects were separated from the budget for research. In a period of inflation, there are usually overruns in the cost estimates of large projects such as the Barstow Central Receiver or OTEC 1; if in a given budget 80 percent is earmarked for demonstration and 20 percent for R & D, an overrun of only 10 percent in the demonstration area can cause a reduction of 40 percent in the R & D programs and seriously disrupt progress.

With a limited budget for research, the selection of appropriate topics takes on increasing importance. This suggests directing emphasis to problems that are common to more than a single technology, such as improvement in reflective surfaces and development of light weight and less expensive material and structures, suitable for photovoltaic and thermal conversion systems. Also, expenditures for large demonstration projects will have to be carefully compared with funding more basic research and special care will have to be taken to avoid undertaking expensive demonstration projects that cannot be readily commercialized. We cannot provide support to every possible solar technology and the selection of which one to support should not be made without also

considering its potential for mass production at a competitive price.

Solar technology can help in reducing our trade imbalance. The United Nations will hold this year a major conference on renewable energy resources in Nairobi, Kenya. This conference offers the new Administration an opportunity to present a coherent set of goals and priorities for its international solar program. The amount of investment necessary to develop solar leadership in developing countries is relatively small and a clear commitment to policies that promote early and extensive use of solar energy on a world wide scale offers the U.S. an opportunity to develop export markets for building, installing, and maintaining solar power systems in developing countries that are unable to meet their energy needs from traditional sources such as oil.

The *Sunset Review* of the Department of Energy, mandated at the time the Department was established, will take place in January of 1982. This will be an opportunity to determine how effective DOE has been in developing programs and policies to deal with the energy crisis. It would not be too soon to begin selecting experts for this review to give Congress fair and unbiased, but technically competent, opinions representing a variety of interests, before making a judgment on the performance of the Department of Energy. This is an important task in which the solar community in general, and a professional society such as ASME in particular, could be of assistance to the new Administration.

The energy crisis will be one of the challenges President Reagan faces and those of us who believe that solar energy can become a significant energy source in America will support President Reagan's view that

“ . . . abundant technologies, such as solar power, offer a bright promise for the future that could eventually eliminate the energy crisis as we know it because their primary sources of fuel . . . exist everywhere. Solar power offers us the prospect of significant decentralized energy sources throughout America.”

**Frank Kreith
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