DOCUMENT RESUME

00185 - [A1051825]

[The Federal Wind Energy Program]. B-178205; EMD-77-33. March 29, 1977. 6 pp.

Report to Robert W. Fri, Acting Administrator, Energy Research and Development Administration; by Monte Canfield, Jr., Director, Energy and Minerals Div.

Contact: Energy and Minerals Div.
Budget Function: Natural Resources, Environment, and Energy: Energy (305).
Organization Concerned: Department of Agriculture; National Aeronautics and Space Administration; National Science Foundation.
Congressional Relevance: House Committee on Science and Technology; Senate Committee on Energy and Natural Resources.

Under the direction of the Energy Research and Development Administration (ERDA), the National Aeronautics and Space Administration is responsible for developing, testing, and evaluating large wind energy systems, and the Department of Agriculture is responsible for identifying, developing, and testing applications in rural and remote areas. Of the funds specifically designated for small, medium, and large systems from July 1974 through September 1976, more than 82% had been spent on large systems. ERDA's emphasis on these systems has been based on its belief that: well-defined commercial markets exist for large systems but not for small and medium-sized systems; large systems will provide cheaper power than the small and medium-sized; Federal assistance will be needed by industry to develop and commercialize large systems, but little Federal assistance will be needed to develop and commercialize smaller systems; areas needing improvement are well-defined for large systems, but not for the small and medium-sized; and a Federal program to develop small and medium-sized systems would eliminate private investment. Findings/Conclusions: A GAO survey of the Wind Energy Program showed that: the decision to stress large systems was made without comparative analysis of small and medium-sized systems; and ERDA needs to systematically compare and evaluate the potential and advantages and disadvantages of wind energy systems of all sizes so that program content and priorities are proper and that resources are effectively allocated among the different sized wind energy systems and between the wind program and ERDA's other programs. Recommendations: ERDA should: direct the expeditious completion of market studies in sufficient depth to identify the commercial potential of small, medium, and large wind energy systems; using these market studies in conjunction with the ongoing and completed studies, make a comprehensive formal review of the formal potential and the advantages and disadvantages of wind energy systems of all sizes, and, if warranted, redirect

resources within the Wind Energy Program and between the wind program and non-wind programs. Provided ERDA's comprehensive review shows that small and/or medium-sized systems have the potential for rapid commercial expansion, it should move quickly to develop optimum designs, identify constraints and impediments to commercialization and take actions to overcome them, and, if necessary, develop plans to demonstrate these systems. (Author/QM)

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

ENERGY AND MINERALS
DIVISION

B-178205

MAR 2 9 1977

The Honorable Robert W. Fri
Acting Administrator, Energy Research
and Development Administration

Dear Mr. Fri:

We have surveyed the Wind Energy Program administered by the Energy Research and Development Administration (ERDA) with support from the National Science Foundation, the National Aeronautics and Space Administration, and the Department of Agriculture.

Since its inception in 1973, the program's emphasis has been on developing and commercializing large wind energy systems. Our survey showed that:

--The decision to stress large systems was made without comparative analysis of small and medium-sized systems.

--ERDA needs to systematically compare and evaluate the potential and the advantages and disadvantages of wind energy systems of all sizes so that program content and priorities are proper and that resources are effectively allocated among the different sized wind energy systems and between the wind program and ERDA's other programs.

BACKGROUND

The Federal Wind Energy Program was established to advance the technology, development, and commercialization of wind energy. The program was managed by the National Science Foundation until January 1975 when ERDA was created and given responsibility for program management. The Foundation continued some wind research projects and contracts until July 1975 and can still, under certain circumstances, be responsible for some basic research. Under ERDA's direction, the National Aeronautics and Space Administration is

responsible for developing, testing, and evaluating large wind energy systems, and the Department of Agriculture is responsible for identifying, developing, and testing applications in rural and remote areas. Annual funding for the program increased from $200,000 in fiscal year 1973 to an estimated $24.1 million in fiscal year 1977. The President's current budget request would further increase funding to $25.7 million in fiscal year 1978.

The goal of ERDA's Wind Energy Program is to advance wind technology and accelerate the development and use of reliable and economical wind energy systems--systems that are capable of rapid commercial expansion to produce a significant portion of the Nation's future energy.

PROGRAM STRUCTURE CHOSEN WITHOUT ADEQUATE EVALUATION OF ALTERNATIVES

Of the funds specifically designated for small, medium, and large systems from July 1974 through September 1976, more than 82 percent has been spent on large systems. ERDA's emphasis on these systems has been based on its belief that

- --well-defined commercial markets exist for large systems but not for small and medium-sized systems;
- --large systems will provide cheaper power than small and medium-sized systems;
- --Federal assistance will be needed by industry to develop and commercialize large systems, but little Federal assistance will be needed to develop and commercialize smaller systems;
- --areas needing improvement are well defined for large systems, but not for small and medium-sized systems; and
- --a Federal program to develop small and medium-sized systems would eliminate private investment.

ERDA contractors have completed two studies to determine optimum designs and energy costs for large systems. Work has also been done to identify impediments to large system commercialization. In addition, ERDA has sponsored the design and construction of a large 100 kilowatt wind energy system near Sandusky, Ohio. This system began operation in 1975 and has been used to provide large system cost estimates and

performance data, to test components for large systems, and to identify large system problems. ERDA has also contracted for a June 1978 completion of a 1.5 megawatt, large system prototype costing in excess of $7 million. ERDA plans to construct another 1.5 megawatt ($3.5 million) and two 200 kilowatt systems ($2 million each) by September 1978.

On the other hand, ERDA has done little on small and medium-sized wind energy systems. Small system research and development received almost no support from ERDA until May 1976, when ERDA selected its Rocky Flats Laboratory to manage small system development. Initial work, however, has involved only the testing of existing designs. No agency or laboratory has yet been assigned responsibility for medium-sized systems. Also, no optimum design studies or demonstration efforts have been undertaken or planned for either small or medium-sized conventional systems.

To maximize the effectiveness of important research and development programs, such as the Wind Energy Program, it is essential that ERDA systematically assess the potential and the advantages and disadvantages of various program mixes before allocating resources. The decision to emphasize large wind energy systems was not based on that kind of analysis. Although Wind Energy Program officials still believe this emphasis to be correct, it has not yet been confirmed by factual data or actual studies.

ERDA has contracted for a number of studies that have recently been completed or will be completed this year. These studies will provide much of the information needed to properly compare the advantages and disadvantages of the various system sizes. For example, ongoing studies are addressing such things as cost estimates for small, medium, and large wind systems; wind energy system applications; legal, environmental, and institutional impediments to wind system development in general; and the theoretical impact wind systems could have.

However, ERDA has no market study ongoing or planned to determine the commercial potential for small, medium, or large systems. In commenting on our report, an ERDA official told us that it would be more proper for private companies to perform market surveys. He said that private industry would perform their own market surveys regardless of what ERDA does, and any ERDA market survey would not be useful to private companies.

Without knowing the commercial market potential for small, medium, and large wind energy systems in the various

regions of the country, ERDA cannot be assured that its Wind Energy Program content and priorities are proper and that resources are being effectively allocated among the different sized wind systems and between the wind program and ERDA's other programs.

For example, market studies could find that small and/or medium-sized systems have greater commercial potential than large systems and that wind program resources should be redirected. Similarly, market studies could disclose that small and/or medium-sized wind energy systems have greater potential than nonwind technologies being developed by ERDA and that ERDA should reallocate nonwind program resources to the wind program. Thus, even though ERDA's completion of commercial market surveys may not meet the individual needs of private companies, these surveys are essential for effective resource allocation.

CONCLUSIONS

Although the Wind Energy Program's emphasis on large systems may be proper, it has not been supported by the thorough planning studies which are needed to wisely establish program content and priorities and to allocate resources. Large systems have been emphasized without benefit of comparative analysis of the advantages and disadvantages of small, medium, and large systems.

Although ERDA has completed or has ongoing studies which will provide much of the information required to compare program alternatives, it should also make market studies to determine the commercial potential of the various sized systems in different regions of the country.

Once the market studies are completed, ERDA should make a comprehensive, formal review of the commercial market potential and the advantages and disadvantages of wind energy systems of all sizes, and--if warranted--redirect resources within the Wind Energy Program and between the wind program and nonwind programs. If the comprehensive review shows that small and/or medium-sized systems have the potential for rapid commercial expansion, ERDA should also move quickly to develop optimum designs; identify constraints and impediments to commercialization and take actions to overcome them; and, if necessary, develop plans to demonstrate these systems. Such actions would be necessary to maximize the contribution these systems can make in meeting the Nation's future energy needs.

RECOMMENDATIONS

We recommend that you:

--Direct the expeditious completion of market studies in sufficient depth to identify the commercial potential of small, medium, and large wind energy systems.

--Using these market studies in conjunction with the ongoing and completed studies, make a comprehensive, formal review of the commercial potential and the advantages and disadvantages of wind energy systems of all sizes, and--if warranted--redirect resources within the Wind Energy Program and between the wind program and nonwind programs.

--If ERDA's comprehensive review shows that small and/or medium-sized systems have the potential for rapid commercial expansion, move quickly to develop optimum designs; identify constraints and impediments to commercialization and take actions to overcome them; and, if necessary, develop plans to demonstrate these systems.

A draft of this report was furnished to ERDA officials responsible for the Wind Energy Program. Their comments were considered in finalizing this report and changes were made where appropriate. These officials generally agreed with our conclusions and recommendations.

- - - - -

We are sending copies of this report to the Director, Office of Management and Budget; the Chairman, House Committee on Appropriations; the Chairmen, House Committee on Government Operations and Senate Committee on Governmental Affairs; the Chairmen, House and Senate Subcommittees on Public Works; and the Chairman, House Committee on Science and Technology.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request

for appropriations made more than 60 days after the date of the report.

We appreciate the courtesy and cooperation extended to our staff during the survey.

Sincerely yours,

Monte Canfield, Jr.
Director