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Volume 4, Number 2 (February 1980)

The Solar Ocean Energy Liaison

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Solar OCEAN ENERGY Liaison

INCORPORATING
The OTEC Liaison

VOLUME 4 NUMBER 2
February 1980

THE 1981 US FEDERAL BUDGET: HOW DID DOE FARE? SOLAR/RENEWABLE ENERGY? OCEAN SYSTEMS?

THE 1981 US FEDERAL BUDGET

This article is intended to provide the reader with a balanced overview on current federal funding (see inset on "Changeable Funding Levels" in this issue) and how the OTEC program will be affected.

Also, various funding levels will be examined from several viewpoints to allow the reader to see them in varying perspectives. Inevitably, some will conclude that OTEC/Ocean Energy is making excellent progress, while others will be convinced that OTEC is being held back... depending on how one interprets present circumstances.

[Behind all this, of course, is the relentless debate over what proportion of the funding of energy-resource development should be borne by the Federal Government and what proportion should be borne by private industry. Strong arguments persist on both sides, but neither will be examined herein.]

Overall R&D Funding

Stressing a need to cut mounting budget deficits, President Carter sent to Congress in late January plans for a Fiscal Year 1981 budget that show a paring of the fat in nearly all areas except spending on defense and federally-funded research. In research, the big winner remains the Department of Defense (DOD), with 45% of its budget—roughly \$17 billion—devoted to R&D. This is a 20.2% increase over the present year.

The only other major increase is for the National Science Foundation, which will receive a 17.7% increase, though its budget will reach only \$1 billion.

In marked contrast to the DOD, the Department of Energy (DOE) shows only a modest increase of 4.7% to \$8.1 billion. This is especially ironic, since one of the major objectives of maintaining military defensive superiority is the protection of US energy resources to reduce dependence on Middle Eastern oil. As pointed out by Congressman Melvin Evans of the Virgin Islands in the Studts hearings, energy expenditures toward non-dependence on foreign oil are, realistically, defense expenditures.

The DOE Budget

While the new DOE budget increase is comparatively small, it masks some major changes. The biggest drop shows up in the nuclear-fission program—from \$1.2 billion in FY 1980 to \$925 million in FY 1981. Although research on light-water reactors would double in the 1981 budget to \$50 million (consistent with President Carter's vow to increase safety-related programs in the wake of Three Mile Island), a major drop in the liquid-metal fast-breeder program—largely owing to the cutback on the Clinch River Breeder Reactor from \$614 million last year—accounts for most of the change.

Two additional areas showing substantial increases are magnetic fusion and fossil energy, with 13.5% and 30% increases respectively. For the first time, DOE's coal work—research, development, and commercialization—will exceed \$1 billion. Especially notable are two "solvent-refined coal" plants slated for a 115% increase. Fusion watchers will find interesting Carter's proposed slowdown in the inertial-confinement program (which includes laser fusion experiments). While magnetic-confinement-fusion funding increases, it does not come close to keeping pace with inflation.

The DOE Solar Budget: Up 13% To 20%

At first glance, the FY 1980 funding for Solar and Other Renewables shows an increase of 13%—from \$771 million to

\$868 million, also struggling with inflation. However viewed another way, the funding of solar applications would increase 20%. Augmented by \$355 million in tax credits and \$436 million worth of programs outside DOE, the overall solar commitment by the Federal Government would run \$1.5 billion.

These tax credits are dealt with in a separate story in this issue.

A Potpourri of Commentary on Solar Funding

In testimony before the Congressional Subcommittee on Energy Development and Application, lobbyists for the Solar Lobby maintained that the minimum DOE solar program for Fiscal Year 1981 should be about \$850 million to adequately reflect President Carter's national commitment to provide 20% of our energy needs in the year 2000 with renewable resources.

Thomas E. Stelson, who was sworn in on January 7th, 1980 as DOE's Assistant Secretary for Conservation and Solar Energy, stated in a recent interview: "The national goal of 20% solar energy in 20 years is an achievable target, but clearly there are some technologies that have complexities which require sophisticated research and have a longer-range program-development schedule. I think that in 10 years from now, solar energy probably will be the dominant energy discipline, where the most innovative, exciting, and productive energy research takes place. I think we're in the early stage of an important

(continued on Page 2)

Agency	RESEARCH & DEVELOPMENT			BASIC RESEARCH		
	1980 Est.	1981 Est.	Percent change 1980-81	1980 Est.	1981 Est.	Percent change 1980-81
Total	\$31,956	\$36,136	+13.1	\$4,531	\$5,074	+12.0
DOD	13,781	16,565	+20.2	431	523	+21.4
NASA	5,114	5,617	+ 9.8	538	581	+ 8.1
DOE	4,919	5,106	+ 3.8	523	593	+13.4
HHS	3,784	4,011	+ 6.0	3,332	3,544	+ 6.3
NSF	897	1,056	+17.7	814	952	+16.9
USDA	743	786	+ 5.8	289	324	+12.1
EPA	415	445	+ 7.3	14	19	+35.7
INTERIOR	419	415	- 1.0	76	78	+ 2.6
ALL OTHERS	1,884	2,135	+13.3	118	164	+38.9

Data provided by OSTP and OMB

OVERALL FY 1981 RESEARCH BUDGET BY AGENCY
(DOE's combined total of R&D and basic research funds is increased by 4.7%)

Solar OCEAN ENERGY Liaison

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The OTEC Liaison

AN INTERNATIONAL NEWSLETTER
ENGAGED AS LIAISON FOR ALL
FORMS OF SOLAR ENERGY FROM
THE SEA, INCLUDING:
OTEC
(OCEAN THERMAL
ENERGY CONVERSION)
WAVE - TIDAL - CURRENT
OFFSHORE WIND - BIOMASS
SALINITY GRADIENTS

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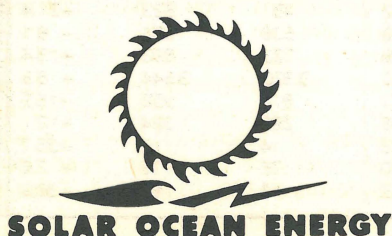
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DEPARTMENT OF ENERGY FY 1981 BUDGET

Budget Authority
(In Millions)

	FY 1980	FY 1981
ENERGY:		
Energy Conservation	\$ 815	\$ 1,067
Research, Development & Applications	3,730	4,092
Regulation & Information	379	355
Direct Energy Production	488	408
Subtotal	\$ 5,412	\$ 5,922
Strategic Petroleum Reserve	0	2,404
Energy Security Reserve	2,208	0
*ENERGY TOTAL	\$ 7,620	\$ 8,326
GENERAL SCIENCE	472	523
DEFENSE ACTIVITIES	3,008	3,443
DEPARTMENTAL ADMINISTRATION	275	362
LEGISLATIVE PROPOSAL—SPENT FUEL	300	0
TOTAL DOE	\$11,675¹	\$12,654

¹ 1980 column includes enacted appropriations and proposed supplementals of \$517 million.

* THE ENERGY TOTAL

is further broken down in a separate table in this issue.

1981 US FEDERAL BUDGET

(continued from Page 1)

evolution or transition, and I hope to get that transition started and better organized."

Asked to comment on questions challenging the adequacy of the 1981 solar budget to reach the 20-year goal, Stelson responded as follows:

"I think it's a little unfair to take a goal that's to be achieved 20 years from now—one that will require individual, local-community, state, regional-planning-council, and Federal Government action—and look at one single year and say that we don't have enough in the Federal Budget to achieve a goal that's 20 years away. I think we're going to see more money in the future because of the importance of this energy source, and I have no doubt that we're going to achieve the goal. The critics of the budget are avid supporters of solar energy, and will always want more money in solar energy. We've got to realize there are fiscal restraints. The Federal Government can spend only so much money, but I think they're going to be pleased to find that we're going to achieve that goal before the year 2000.

"A big part of the energy problem is one of education. Energy has been so cheap and so plentiful over the years that there is a high level of energy ignorance in the population. Nobody paid any attention to it—not to the cost, not to the efficiency of utilizing it, not to the resources from which it's derived. Education is a long-term process; it takes several years to develop new attitudes and to change ingrained habits."

Opposing Views on Solar's Future

NATIONAL ACADEMY OF SCIENCES:

A four-year, \$4 million study sponsored by the National Academy of Sciences recently concluded that the nation's energy pros-

pects for the next 30 years are rooted in conserving energy and relying on coal and nuclear electrical generation.

"Because of their higher economic cost," the report concluded, "solar technologies other than hydroelectric power will probably not contribute much more than 5% to the energy supply in this century unless there is a massive government intervention to penalize the use of non-renewable fuels and subsidize the use of renewable energy resources.

This intervention on behalf of solar runs the risk of locking the nation into obsolete and expensive technologies with high materials and resource requirements, whereas greater reliance on 'natural' market penetration would be less costly and more efficient over the long term."

Solar Lobby co-ordinator Richard Munson commented that, since the 783-page report was requested by DOE, some officials there may use it to keep solar spending in the laboratory. As with some other federally-funded reports, the material on which it was based was almost two years old.

HARVARD BUSINESS SCHOOL: In *Energy Future: Report of the Energy Project at the Harvard Business School*, edited by Robert Stobaugh and Daniel Yergin and published by Random House, a sharply contrasting view of the future of solar energy is presented. The following quotations and the related table in this issue are reprinted with permission of the publisher.

"We believe that given reasonable incentives, solar could provide between a fifth and a quarter of the nation's energy requirements by the turn of the century. Without these incentives, it could end up amounting to little more than that mosquito bite."

[Editor's note: The authors are referring to a remark by the editor of *World Oil*,

(continued on Page 3)

who said that solar energy over the next quarter-century will have the impact of "a mosquito bite on an elephant's fanny".]

"New technology is not required to realize solar's potential, for the kind of relatively low-level technology needed for a 20% contribution is already here, or very close to being here. What does stand in the way is a series of economic and institutional barriers which must be overcome in the early 1980s if solar energy, like conservation, is to have a fair chance in the marketplace against conventional sources. . . . It is not unrealistic to envision a Solar America, a society that relies not on exhaustible hydrocarbons, but on renewable sources of energy."

A table illustrating current and projected funding for solar research, development, and demonstration from the Harvard study is reprinted in this issue.

ADDITIONAL COMMENTARY: A report titled *Facing the Future: Mastering the Probable and Managing the Unpredictable* was completed in late 1979 under the auspices of the organization for Economic Co-operation and Development (OECD) in Paris. Among its conclusions, it finds that nuclear energy, made safe, will be a key element in shifting world energy use away from oil, and that coal and solar energy will also become increasingly important. *"In the long term,"* the report maintains, *"world production of energy will not be limited in any way by the volume of resources."*

The OECD report says the transition—not only a changeover from oil to nuclear and solar energy, but also a shift in attitude toward the environment and jobs—will require a political resolve not yet evident in many Western countries.

Finally, Dr. Frank Press, President Carter's science advisor, said in a 1979 lecture at Harvard University: *"Solar energy is the main hope for the next century. Solar energy is plentiful and renewable, and certainly we will develop the technologies to learn how to use it."*

Further, Press said: *"There are problems with fossil fuels, synthetic fuels, and nuclear energy, but we need these technol-*

CHANGEABLE FUNDING LEVELS

The various funding levels outlined in this article are subject to changes due to a variety of reasons.

The Carter Administration, for political and other motivations, will undoubtedly try to initiate belt-tightening efforts which may or may not be accepted by Congress. At the same time, an assortment of bills that will affect energy programs are wending their way through Congress. A recent tally indicated over a thousand. Some are major, such as the Windfall Profits Tax, the Energy Mobilization Board, and the Solar Energy Development Bank. Others will affect OTEC more directly, such as the Matsunaga, Studds, and Fuqua bills, plus complementary bills to be introduced this spring.

Thus the funding levels described herein are tentative. Both general energy legislation and specific OTEC legislation move slowly. Almost daily, there are steps forward as well as backward. OE will report major movements, but only when they are likely to stay in place, rather than the continuing incremental stages.

A complete review of OTEC-specific legislation will be published in our next issue.

ogies to get through the transition period until we can use the renewable resource of solar energy."

The American Public Wants Solar Energy—NOW!

Repeated Louis Harris polls (see the December 1978 issue of *Ocean Energy*) demonstrate that 94% of the American public wants an aggressive solar-energy program.

And, a late 1979 poll commissioned by NBC News and the Associated Press indicated that Americans would be willing to pay from \$8 billion to \$17 billion more per year for solar energy than they are paying now. This level of spending would enable the United States to receive more

than 33% of its total energy from solar sources by the year 2000.

For some unknown reason, President Carter's political advisors have not capitalized on this strong desire of the American public. Representative Richard L. Ottinger of New York, Chairman of the Subcommittee on Energy Development and Applications of the House Committee on Science and Technology, recently criticized the Carter Administration's Fiscal 1981 budget as presenting the American people with a "credibility gap".

In describing the solar-energy budget proposal, Chairman Ottinger noted that while President Carter established a "challenge goal" of 20% of the nation's energy to be derived from renewable resources by the year 2000, *"it would appear that the challenge is lip-service only; money hasn't matched the rhetoric, and at the proposed level of support the 20% goal is a sham and an illusion."*

The Ocean Systems/OTEC Budget

Despite steady technological progress in OTEC, as unanimously demonstrated by the reports of the working committees at last June's annual meeting, avid enthusiasm expressed by industry—including numerous cost-sharing proposals, the success of Mini-OTEC, and increasing international activity, Ocean Systems was allotted a reduction in funding from \$46 million to \$39 million in DOE's FY 1981 budget.

The reasoning behind this—not to mention the lack of logic—remains unclear.

However, regardless of the Carter Administration's, OMB's, and DOE's apparently deliberate slowing down of OTEC progress, Congressional activity is making excellent progress toward not only offsetting the reduction, but accelerating the program.

\$6 MILLION IN LIMBO

A \$6 million supplemental funding allotment for Fiscal Year 1980 is all but dead. However the House Science Subcommittee on Energy Development and Applications is expected to approve the added money for Fiscal Year 1981.

The additional money is geared to partially cover cost overruns on OTEC-1, the second deployment of Mini-OTEC, heat-exchanger development, and the second OTEC-1 deployment.

Legislation to accelerate OTEC development, in the form of Bill S. 1830, introduced by Senator Spark Matsunaga of Hawaii, unanimously cleared the Senate on January 25th and came before a highly-receptive House Merchant Marine Committee. A companion House bill, H.R. 6154, was introduced by Representative Gerry E. Studds of Massachusetts, Chairman of the House Merchant Marine and Fisheries Subcommittee on Oceanography.

Additional bills, as many as four, that
(continued on Page 4)

ENERGY TECHNOLOGY BUDGET AUTHORITY

(in millions)

	FY 80	FY 81	% Change
Fossil Energy	\$ 897	\$1,165	+ 30
*Solar and Other Renewables	771	868	+ 13
Energy Systems & Storage	104	112	+ 8
Magnetic Fusion	356	404	+ 13
Nuclear Fission	1,186	925	- 22
Environment	235	261	+ 11
Supporting Research	252	297	+ 18
General Purpose Facilities	-	60	
Overall Reduction	(71)	--	
	<hr/>	<hr/>	
	\$3,730	\$4,092	+ 10

* SOLAR AND OTHER RENEWABLES

are further broken down in a separate table in this issue.

THE DEPARTMENT OF ENERGY'S PROPOSED BUDGET

(in millions of dollars)

	1980	1981	Change (%)
TOTAL ENERGY BUDGET	7620	8326	+ 9
FOSSIL FUELS			
Coal	779.1	1046.9	+ 36
Petroleum	61.4	63.8	+ 4
Gas	35.6	30.8	+ 13
Research	876.1	1141.5	+ 30
SOLAR and RENEWABLE ENERGY			
Solar Applications	136.8	176.3	+29
Solar Technology (Total)	447.3	465.9	+ 4
Biomass	56.0	63.0	+ 13
Photo-Voltaic	147.0	140.0	- 5
Wind Energy	63.4	80.0	+ 26
Ocean Energy	46.0	39.0	- 7
Public Information	-0-	1.4	n.a.
Geothermal	139.7	186.7	+ 34
Hydrothermal	9.9	10.0	+ 1
Hydropower	27.7	19.0	- 31
NUCLEAR			
Reactor Systems	65.9	54.9	- 17
Commercial Nuclear Waste	220.1	298.9	+ 36
Spent Nuclear Fuel	18.5	20.5	+ 11
Advanced Nuclear Systems	39.6	44.0	+ 11
Breeder Reactors	761.8	384.0	- 50
Light Water Reactors	1105.9	802.3	- 27
Fusion	355.6	403.6	+ 13
Uranium Enrichment	370.9	210.2	- 29
CONSERVATION (total)	814.6	1067.3	+ 31
Residential	106.1	97.6	- 8
Industrial	60.3	58.9	- 2
Transportation	117.5	113.0	- 3
Public Information	7.0	50.0	+ 614
Planning Assistance	50.0	150.0	+ 200
STRATEGIC PETROLEUM RESERVE	0.2	2404.0	+ 12019
ELECTRIC ENERGY SYSTEMS	103.8	111.7	+ 8
ENVIRONMENTAL RESEARCH (DOE)	235.4	261.1	+ 11
ENERGY RESEARCH	723.7	820.3	+ 13
ENERGY INFORMATION	108.4	116.2	+ 7
ATOMIC WEAPONS (DOE)	3007.8	3443.2	+ 14
DEPT. OF ENERGY ADMINISTRATION	274.8	361.7	+ 32
NUCLEAR REGULATORY COMMISSION	417.3	468.5	+ 12

SBM INCREASES OTEC ACTIVITY

Single Buoy Moorings Incorporated (SBM), whose head office is in Switzerland, advised OE recently that they intend to become more involved in OTEC technology—initially in mooring systems, but ultimately in complete systems.

SBM, whose engineering office is in Monaco, is one of the world's major firms involved in analysis, design, fabrication, and installation of offshore mooring systems as well as floating production and storage systems.

NEW PUBLICATION AVAILABLE

The inaugural issue of the *Tropical Ocean-Atmosphere Newsletter*, dated January 1980, has been received by OE. It is published quarterly with the support of NOAA's Equatorial Pacific Ocean Climate Studies Program, and apparently distributed free. Readers may wish to contact Dr. David Halpern, NOAA Pacific Marine Environmental Laboratories, 3711 15th Avenue NE, Seattle, Washington 98105, to be placed on the mailing list.

1981 US FEDERAL BUDGET

(continued from Page 3)

will accelerate the OTEC program are also in the Congressional hopper. All are receiving great enthusiasm in both the Senate and the House, and are expected to pass by mid-1980.

A thorough review of all Congressional activity that will affect OTEC will appear in our next issue.

To conclude on a positive note, we are happy to point out that federal funding of \$39 million annually has made OTEC the largest civilian R&D project in the United States.

Moreover, OTEC has been included in solar tax credits, dealt with in a separate article in this issue.

OTEC TAX CREDITS

A report by Michael Yokell of the Solar Energy Research Institute (SERI) entitled "The Role of Government in the Development of Solar Energy" supports the proposition that subsidizing solar energy is the proper business of government. For example, the extensive use of solar energy would reduce indirect costs the public experiences from other forms of energy, including the health costs of pollution. According to Yokell, about \$1.5 billion annually in health-related social benefits would be derived from a 10% shift in energy demands from fossil fuels to solar energy. "For the present," he concludes, "the most significant federal policy would be the provision of subsidies to compensate for the current underpricing of conventional sources of energy."

As pointed out in the accompanying article on the FY 1981 DOE solar-energy budget, Senate and House conferees have agreed to \$355 million in tax credits for solar energy, to be funded primarily by the \$227 billion windfall-profits tax bill.

OTEC equipment will receive a non-refundable energy credit of 15% through 1985. This is expected to total about \$311 million, saving at least 35 million barrels of oil. These estimates make no provision, however, for the expected acceleration of the OTEC program by means of various bills before Congress. They are based on the go-slow approach currently planned by the Department of Energy.

MOST OF YOU ARE IN HIGH DEMAND THESE DAYS!

Since many of our readers have engineering and scientific backgrounds, you will be happy to know—if you don't already—that engineers and scientists were in high demand at the end of 1979.

Deutsch, Shea, and Evans Incorporated, a New York employment consultant, says its recruitment index, based on the volume of recruitment advertising for such personnel, is now at its highest level since 1966.

ACTUAL AND PROJECTED FUNDING LEVELS FOR SOLAR RESEARCH,
DEVELOPMENT, AND DEMONSTRATION ^a

FISCAL YEARS 1975-1983 ^c

(in millions)

	1975	1976	1977	1978	1979	1980	1981	1982	1983
Thermal Applications									
Heating and Cooling of Buildings	18	27	93	104	129	98	91	36	28
Agricultural and Industrial Process Heating	—	—	8	10	11	23	19	16	16
Fuels from Plants	5	5	10	20	52	79	68	72	75
Solar Electric									
Solar Thermal	10	15	51	60	70	80	159	237	205
Photovoltaics	8	15	59	57	91	125	151	100	100
Wind Energy	7	12	21	33	51	76	90	90	90
Ocean Thermal	3	4	14	35	52	110	35	68	68
TOTAL ^b	49	78	258	319	455	590	613	618	582

^a Estimated by solar program officials

^b Totals may not add, due to rounding

^c Years 1975 to 1978 actual, 1979 to 1983 projected

Sources: Data compiled from *Government R&D Report*, vol. III, no. 5, September 15, 1977, p. 3; U.S. General Accounting Office, "Federal and State Solar Energy R&D Development and Demonstration Activities," RED-75-376, June 10, 1975; "The Magnitude of the Federal Solar Energy Program and the Effects of Different Levels of Funding," Report of the U.S. Comptroller General, February 2, 1978.

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US GOVERNMENT PROCUREMENT INVITATIONS AND CONTRACT AWARDS

Listed below are contract awards and procurement invitations related to OTEC in particular and ocean resources in general culled from the *Commerce Business Daily*. This is not to be construed, however, as a complete list.

Dec 21: Prepare Analyses and Forecasts in Energy-Related Areas So As to Promote an Accurate Understanding of the Nation's Energy Situation: This is the principal function of the Office of Applied Analysis within the Energy Information Administration. To carry out these responsibilities, the Office undertakes to contract certain activities such as model development and documentation, analysis assistance, and special studies for which the Office has been funded but not staffed. The Office of applied Analysis funds its contracting activity through competitive procurements to the maximum extent possible. In keeping with this goal, descriptions of proposed contracts are offered upon request to advise the contracting community of our intent and to communicate our procurement plans to the broadest possible audience: past and present contractors and other potentially interested firms and individuals. The prepared contract descriptions represent the original FY 1980 procurement plan for applied analysis. Limited resources may not allow funding of all proposed contracts, and some may be replaced altogether by higher-priority initiatives or

delayed until FY 1981. It should be noted that this announcement does not solicit proposals either now or after a contractor receives the descriptions of proposed contracts, nor is there any intention to circumvent the competitive procurement process. This announcement is a statement of intent to widely distribute descriptions of proposed contracts. You are invited to telephone Rita Thomas at (202) 633-8517 by January 15th, 1980 if you want a copy of the list of descriptions of proposed contracts. Department of Energy, Office of Procurement Operations, Washington DC 20585.

Dec 26: Nuclear Waste: "What To Do With It": Negotiations are now being conducted with the National Academy of Science for Solicitation DE-AC-01-80-ET-44112. Department of Energy, Office of Procurement Operations, Washington DC 20585.

Dec 28: Objective Analysis Studies for Ocean Forecasting: Negotiations are to be conducted with Science Applications Incorporated, 8400 Westpark Drive, McLean, Virginia 22101.

● **Jan 28: Ocean Thermal Energy Conversion:** The University of California's Lawrence Berkeley Laboratory will issue RFP 4504210 for the preparation of a comprehensive environmental assessment of potential environmental effects of deployment and operation of OTEC 10/40 MWe commercial offshore power plants. The research program will include (1) contractor becoming familiar with OTEC systems and

all phases of planning operations; (2) evaluation of the characteristics and conditions of the tropical ocean generic to the location of OTEC 10/40 pilot plants; (3) evaluation of potential environmental, health, and safety effects; (4) identification of data requirements, availability, priorities for collection to support essential environmental and system performance effects analysis; (5) recommendation and evaluation as to whether potential environmental effects require or warrant further investigation based on previous environmental assessments and the OTEC programmatic assessment. Proposals will be considered provided that they are postmarked not later than March 10th, 1980. Qualification statements from organizations interested in receiving the RFP are requested to be received within 15 calendar days from the date of this notice. Statements should describe related organizational and personnel experience and capabilities and be limited to ten single-spaced typewritten pages. Shorter, more concise statements are preferred. Resumes of key personnel may be attached. Brochures are not acceptable. Organizations should have demonstrated experience in this field. LBL will determine the applicability of qualified firms from the statements received. Qualification statements should be sent to the University of California Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, California 94720, Attn: H. A. Todd, Building 930, Room 385.

Jan 28: Investigation of Perturbations of Ocean Fronts: Negotiations are being

conducted with the Research and Data Systems of Lanham, Maryland, for RFP 5-95926/257.

Jan 30: Renewable Energy Technologist (Overseas-Africa): The Agency for International Development (AID) is a US Government agency engaged in assisting less economically developed countries in Africa. Currently it has an assignment for a qualified technologist and advisor at the University of Rwanda in Central Africa. Duties: Will be involved in developing and testing renewable energy devices utilizing solar energy and mini-hydropower. Will be concerned with designing activities involving improved charcoal production techniques, the use of peat as a fuel, and adaptation of efficient wood-burning stoves. Must work with an interdisciplinary team since economic and social analysis of renewable energy devices will be carried on simultaneously by the Renewable Energy Center at the University. Will help train university students and village-level technicians. Duration: Contract will be for 18 to 24 months. Salary: \$25,000 to \$30,000 per annum depending on experience and

qualifications, plus generous fringe benefits. Qualifications: The following are essential: MS in Engineering or Physics. At least two years' experience with renewable energy technologies. Fluency in both English and French. Previous professional experience in Africa is highly desirable but not essential. Send resume to Robert H. Wartholowitz (ET) Recruitment Staff, Office of Personnel Management, Agency for International Development, Washington DC 20523.

● **Jan 31: Ocean Thermal Energy Conversion RFP:** RFP 4505010 for physical, chemical, and biological oceanographic measurements off Puerto Rico as a part of their continuing Ocean Thermal Energy Conversion (OTEC) Program. The research program will include: (1) Four quarterly occupations of the benchmark off Puerto Rico. Proposers are required to provide the necessary supplies, personnel, equipment, and vessel(s) and crew(s) for these occupations. (2) Specific sampling and measurements as well as various navigational, meteorological, and weather-reporting data. (3) Analysis of the samples in accordance

with specific LBL-prescribed methods. (4) Reports. Proposals will be considered provided that they are postmarked not later than March 15th, 1980. Statements should describe related organizational and personnel experience and capabilities, as well as a demonstrated capability of work in the ocean, and should be limited to 10 single-spaced typewritten pages. Shorter, concise statements are preferred. Resumes of key personnel may be attached. Brochures are not acceptable. LBL will determine the applicability of qualified firms from the statements received. University of California, Lawrence Berkeley Laboratory, 1 Cyclotron Road, Berkeley, California 94720, Attention H. A. Todd, Building 930, Room 385.

Jan 31: Develop a Three-Inch Pancake Cell Design for the Lithium-Thionyl Chloride Battery: DAAK20-80-Q-0529. The proposed award will be made to P. R. Mallory and Company Incorporated, Tarrytown, New York, by modification to existing contract. US Army Communications and Electronics Material Readiness Command, Fort Monmouth, New Jersey 07703.