

30 Years Under the Sun

*Research
Development
Results*



*History of the
Florida Solar Energy Center®*

30 Years Under the Sun

History of the Florida Solar Energy Center

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Florida Solar Energy Center

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David Block

I undertook writing the history of the Florida Solar Energy Center (FSEC) for a number of reasons. One is that many of the individuals who could document the beginning days are either retired or close to retirement. The people you'll meet in this publication are truly genuine achievers in their respective fields. In addition, the future will bring new leadership with new perspective. If I didn't document and preserve this historical perspective, parts of it could be lost forever. One hopes this documentation of the past may serve as a blueprint and guide to the future.

It has been my pleasure to serve as Center Director for 25 years of its 30-year history. As a witness to most of this history, I assumed the task of principal author. As you will read, the Center went through significant changes over the years, beginning during the 1970's energy crisis and enduring the national security crisis initiated on September 11, 2001.

A handwritten signature in red ink, appearing to read 'David L. Block', written in a cursive style.

March 2005

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Acknowledgments

I want to acknowledge key individuals who assisted me during the three years I have been assembling this story. The first is Dr. C.B. Gambrell, who came to the Center's 25th Anniversary celebration in 2000, encouraged me to write this history and graciously offered his help. C.B. initially assigned me to serve as FSEC's Acting Director for a three or four month period in 1977. It is now 25 years later – I stepped down from the Director's position in 2002.

I would also like to acknowledge my mentor, Dr. Robert Kersten, the former Dean of Engineering at the University of Central Florida. I am sure Bob had much to do with my assignment to FSEC, and I will always treasure his friendship and the confidence he had in me.

Employees and former employees who assisted in drafting this account also deserve acknowledgment. Yayi Rickling, our long-time librarian and the last of the initial employees, supplied all the references. Ingrid Norberg handled the extensive editing, and Ken Sheinkopf helped organize the story. Philip Fairey, our Interim Director, along with Sherri Shields and Shelli Keisling of our graphics department, did extensive work. Shelli is especially noted for her work with the photos, layout and final text. Dianne Wood, Janice Matley and Jessica Wylie handled the typing and assembled

the text, as did Carolyn Burby, my long-time and very capable Administrative Assistant, who never forgets a name.

Finally, I must acknowledge the most important person – the one who left Iowa with me in 1962 and stuck by my side the whole time – my long-time, lovely and accomplished wife, Sharon Block. Without her smile and unwavering support, this story could not have happened.

Photo Note

I reviewed thousands of archived photos while putting together this history. In the process, I tried to put names and a date with each image. I compiled more than 100 photos for Chapter 8 alone, before editing and inserting final selections into the written material. My goal was to find a photo of every FSEC staff member during this time period, and I think I came close to including all. As a reader, look for yourself or your friends.

I expect I have forgotten to mention people who greatly helped the Center in its growth and development, and I wish I could think of all their names now. I apologize if I left out any key people.

FOREWORD



Thank you for documenting the history of the Florida Solar Energy Center. *The History of the Florida Solar Energy Center* will preserve the past and provide a guide for future policies and programs.

I have been involved with the Florida Solar Energy Center for years. Back in 1974 when I represented Brevard County in the Florida House of Representatives, I was involved in getting the first funding for the center. In 1982, as central Florida's Congressman, I pushed for funding for the center's solar cooling program. And in 2000, as Insurance Commissioner, the Governor and I passed a resolution recognizing the center and its employees for 25 years of service.

I congratulate you for putting your history into writing. Best wishes for the future – I hope it is as bright as your past.

Bill Nelson
United States Senate

United States Senator Bill Nelson is recognized as being the key individual in the initial conception of the Florida Solar Energy Center. Senator Nelson was a member of the Florida House of Representatives from Brevard County and was the critical member who had funding of \$1 million placed in the university system budget for the establishment of a solar energy center in Brevard County. In addition, he is recognized for his assistance working with the United States House of Representatives, Science and Technology Committee to establish, in 1982, one of FSEC's initial research programs, the U.S. Department of Energy funded solar cooling program.



Office of the President



August 11, 2004

Dr. David Block
Director Emeritus
Florida Solar Energy Center
1679 Clearlake Road
Cocoa, FL 32922-5703

Dear David:

I look forward to reading your history of the Florida Solar Energy Center and am privileged to provide this letter as an introduction to the first chapter of the history. I have visited the Center many times since assuming the presidency of the University of Central Florida and have always been impressed with the quality of the staff and its research.

As you are aware, the growth of our young university has been spectacular. We opened in 1968 with 1,500 students and today have more than 44,000 students, as well as an exceptional faculty and strong academic, creative, and research programs.

As UCF and the Central Florida region look toward the future, it is imperative that the university research function be an integral part of their development. The history that you have recorded sets a benchmark for our future leaders.

We are indeed proud of the accomplishments of the Florida Solar Energy Center in its first 30 years and look forward to new and more exciting revolutions in energy technologies. The Center's activities have brought national and international recognition to the university, and we applaud you and the others on the staff who have made all this possible.

Cordially yours,

A handwritten signature in black ink, appearing to read "John C. Hitt".

John C. Hitt
President

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SCHOOL OF ENGINEERING
Dean Emeritus

June 21, 2004



Dr. David Block
Director Emeritus
Florida Solar Energy Center
1679 Clearlake Road
Cocoa, FL 32922-5703

Dear David:

I am most pleased to send this letter to you in support of your writing of *The History of the Florida Solar Energy Center*. On a personal note, I take great pride in being the individual who recommended you for the position of FSEC Director back in 1977 and then 25 years later, I was the one who encouraged you to begin writing the Center's history. I did not realize at the time that the task of writing this history could be such a large one, but I am very happy to see the fruits of your labor in this document.

As I reflect on the past, I am delighted to recall that a major part of my initial career included research in solar energy that I conducted while at the University of Florida. Since that time, I have always maintained an interest in the field of solar energy and when UCF had the opportunity to compete for the establishment of the Florida Solar Center, I led the effort that won the initial location of FSEC at UCF's Resident Center in Cape Canaveral and the Center became a part of our university. The facilities at the UCF Cape Canaveral Resident Center were very under-utilized at the time and their use as the Solar Center was a great opportunity for UCF.

Let me emphasize that being an engineer, I have always felt that university research is a critical part of university education. All faculty should conduct research to remain relevant in their fields. Your history presents an excellent roadmap for success in research and I hope the next generation can match in excellence the achievements of the past generation that you document so vividly herein.

Forever your friend,

A handwritten signature in cursive script, reading "C.B. Gambrell".

C.B. Gambrell, Ph.D., PE
Dean of Engineering Emeritus, Mercer University

Dr. C. B. Gambrell was the University of Central Florida's Vice President for Academic Affairs at the time of the inception of FSEC. In 1974, Dr. Gambrell spearheaded the effort that led the University of Central Florida to become the host institution for FSEC. His foresight to recognize the potential of solar energy technology and the potential for a world-class university research center led by UCF provided the basic foundation to build FSEC as we see it today.

Introduction: The Energy Crisis

Chapter 1

I began this chronicle of the Florida Solar Energy Center (FSEC) history in November 2001, following my 25th anniversary as Center Director. More than three years later, it is finally finished.

The story begins with the energy crisis of 1973 and ends with FSEC's 30th anniversary in 2005. The story also covers the tragic events of September 11, 2001, an event that clearly shows energy will play an even greater role in our nation's future.

Reflecting back on the Center's 30-year history begins with a look at the '70s, when it all began. FSEC had its start with the Florida Energy Committee and the Florida Legislature in 1974. It was the first, and remains the premiere, state-supported energy organization. Many have come and gone. FSEC is a tribute to former Florida leaders and their wisdom and support.

The story also begins with a review of federal activities, as they have driven the majority of energy actions in the U.S.

The energy crisis of 1973 began during the presidency of Richard Nixon. Nixon started his program by creating the Federal Energy Agency (FEA) and signing a law on May 7, 1974, that made

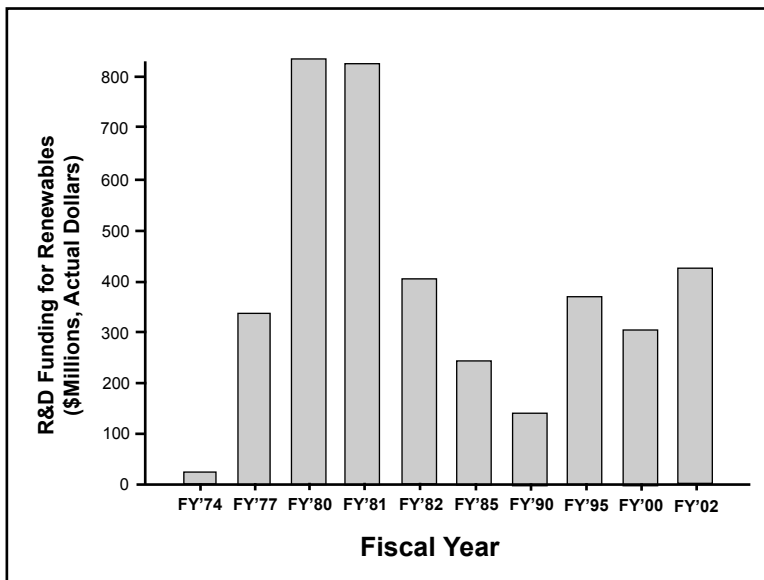
FEA the temporary agency to meet the nation's immediate energy problems. In time, the FEA assumed all energy responsibilities of the federal government.

Following Nixon, President Gerald Ford enacted the Energy Reorganization Act of 1974, which established the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission.

When President Jimmy Carter was elected in 1976, he declared a "War on Energy" and significantly upgraded federal efforts to include increased appropriations from Congress. Carter's energy program combined FEA and ERDA into the U.S. Department of Energy (DOE). DOE was activated on October 1, 1977, as the 12th Cabinet-level agency. James Schlesinger was its first secretary.

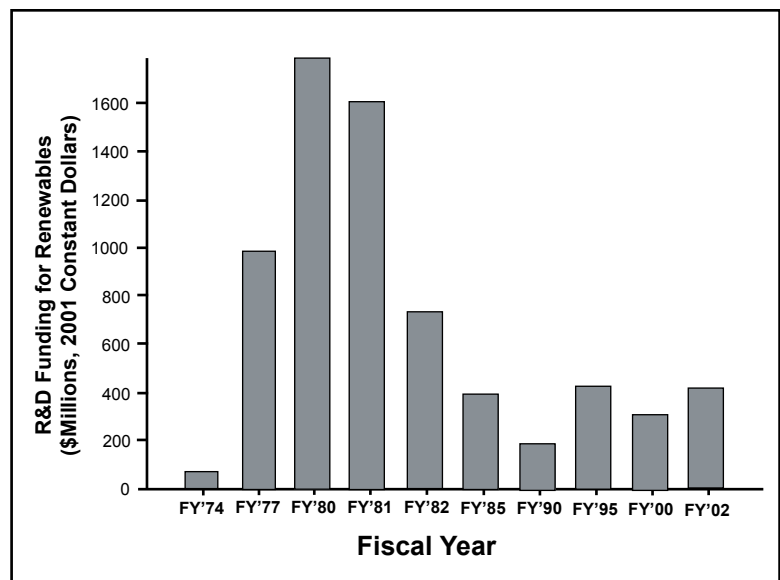
The initial federal solar energy budget in 1974 was set at \$21 million. It jumped to \$373 million in 1977. The largest solar budget was \$833 million in 1980 under President Carter. The solar budget dropped from \$824 million in 1981 to \$401 million in 1982 under President Reagan. DOE's solar budget for 2002 was \$425 million.

These funding levels present a much different picture if dollars are inflated to present-day values. Using 2001 as the base year, the solar budget for 1974 was \$75 million. In 1977, it was \$984 million; 1980, \$1790 million and 1982, \$737 million. The 2002 budget was \$425 million.



Plot of U.S Department of Energy Funding by Fiscal Year

Plot of Inflated dollars for U.S Department of Energy Funding by Fiscal Year (for 2001 constant dollars)



As you can see, the 2002 budget was one-fourth the budget set by President Carter, and our energy problems have not changed. These numbers make me question White House and Congressional priorities.

Levels of federal support for renewable energy resources over the years reflect the interest and commitment of the nation's presidents. The lack of sustained interest and commitment has been a major hindrance to the development and use of solar technologies. Consider where we might be now if Carter's funding levels had been maintained.

Nothing in this world is free – especially not energy. Federal-level policy and funding support has waxed and waned as issues of the day have drawn political attention to and from their sustaining root cause – energy. The energy issue has been a political seesaw battle for far too many years.

Our future always depends on what we do right now. Every aspect of the 1973 energy crisis is still with us today. We still have not tackled the monumental challenge of ever-shrinking fossil fuel resources and the end of the fossil fuel era. Nor have we addressed the issue of currently underdeveloped nations increasing their energy consumption levels to challenge those of industrialized nations. Who will (or should) say “no” to millions of Chinese citizens who want refrigeration to store their food?

Our ever-expanding and sophisticated global communications network will fuel this growth in demand.

Nor have energy-induced environmental problems gone away. Energy production and use still cause more than 50 percent of the environmental problems that threaten the health and sustainability of the planet. We still have nowhere “safe” to store nuclear energy waste. From mercury in the food supply to forests browned by acid rains, burning coal continues to damage our natural resources. While policy-makers wait for an “outcome,” the world of science holds that global warming caused by consuming carbon-based energy is a fact, even if its long-term effects are as yet unknown.

From the bronze age, to the iron age, to the industrial age to the information age, energy was, and still is, the key to the world's future. Economic growth cannot occur or be sustained without adequate energy resources. Renewable energy is the only form of energy that offers the possibility of a permanent solution to current and future energy needs and environmental sustainability. Only renewable resources can offer us the security of not having to rely on oil from politically volatile or environmentally sensitive global regions.

Thus, renewable energy research, development and demonstrations are as important today as they were in 1973, when this story began.

Chapter 2

The Florida Energy Committee: Recommending a Solar Energy Center for Florida

Anyone old enough to remember the 1973 OPEC oil embargo may also recall personal or televised images of cars snaking backward from gas pumps, clustering bumper to bumper across gas-station driveways and spilling in disorganized pools onto thoroughfares. Nationally, President Nixon responded by implementing 55 mph speed limits, permanent daylight savings time and energy price controls.

It was in this national context that forward-thinking Florida leaders, including Governor Reubin Askew, called for a statewide energy conference. Its purpose would be to provide a forum for examining and evaluating the energy issues facing the state.

In response, the Florida Legislature created the Florida Energy Committee. Its charge was to:

- *Study the policies affecting energy conservation and use in Florida;*
- *Study the available sources of energy for use in Florida;*
- *Recommend a comprehensive system of energy policies to meet the needs of Florida; and*
- *Recommend administrative, statutory, or constitutional changes necessary to improve energy policies.*

This committee and legislative leadership were the forces that sparked the concept of a Florida solar energy center.

The 15-member committee was composed of four senators, four representatives, joint legislative alternates and seven members appointed by Governor Askew. It was co-chaired by Florida State Senator George Firestone and State Representative Kenneth H. (Buddy) MacKay, Jr. MacKay later became a member of the U.S. House of Representatives and Florida's Lieutenant Governor for two terms under Lawton Chiles.

The other Legislative members were Senators Jack Gordon, Warren Henderson and Alan Trask, and Representatives A. H. Craig, A. S. Robinson and Guy Spicola. Senate alternates were Lew Brantley and David Lane. House alternates were Gary Cunningham, Pat Thomas, Lorenzo Walker, Walter Young and Vernon Holloway. The Governor's appointees were: Arthur England, attorney; Dr. Erich Farber, University of Florida; Marshall McDonald, President, Florida Power & Light Company; Raymond Mason, Chairman, The Charter Company; Dr. Sybil Mobley, Department of Business and Economics; Nils Schweizer, architect and Hal Scott of the Audubon Society.

Committee functions were carried out by Executive Director Marvin Yarosh and a professional staff of eight, which eventually grew to 11. Yarosh came to Florida from a long and distinguished technical career at Oak Ridge National Laboratory in Tennessee.

The Energy Committee began its formal activities in October 1973. During initial meetings, members heard testimony from a range of experts on energy policy, research needs, available resources and development activities. The committee devoted its attention to understanding the energy problem and its relationship to Florida.

The following statements, taken from the committee's 1974 and 1975 reports [References 1 and 2, respectively], frame perceptions of the energy problem in 1973 and 1974. Consider their continued relevance today.

Few dispute that there is an energy problem, few energy experts disagree that the problem may be one of the most complex, most frustrating, and least tractable problems our nation and the world has ever faced. In its inter-discipline complexity, it overshadows the largely technical achievements of either the Manhattan or the Moon project. Not only technical facets, but also economic, political, sociological, and environmental factors are included within its breadth. In the energy area, we are experiencing, perhaps for the first time, a global impact which reflects the phenomenal increase in man's use of the Earth's resources over the past 100 years

Florida derives about 93 percent of its total energy from petroleum or natural gas and is thus almost totally dependent on these resources. Florida is therefore potentially more sensitive to present or impending shortages of these resources than the nation as a whole where 75 percent of energy resource use is from petroleum or natural gas.

At the time of the oil embargo, the United States was importing approximately 32 percent of its petroleum. It is unlikely that present consumption could ever again be supplied from domestic reserves.

The initiation, for example, of offshore drilling on state or federal owned land, if successful, would require several years for even initial

quantities of petroleum or natural gas to be secured, and these are not assured sources of energy for exclusive use in Florida. New refineries require a minimum of three to five years for construction and since Florida has no refineries at the present time, any petroleum found in Florida offshore waters must be sent elsewhere for processing. The degree of control that Florida might exercise over such resources is uncertain.

Over the past 12 years, annual energy growth rate has been 7.6 percent within the state. Over the 1950 to 1970 period, Florida's population grew at approximately a 4.6 percent rate. Over this period, population increased by a factor of 2.4, while energy use increased five fold. Florida's energy growth rates dramatically exceed those for the United States and the World. At the present growth rate for electrical power (11 percent annually), and correcting for anticipated saturation limits in energy and population, Florida may require 145,000 Megawatts of electrical capacity by the year 2000.

[Author's note: Florida currently has approximately 42,000 Megawatts of electrical capacity, which illustrates the success of our energy efficiency programs and points to a likely error in the original projections.]

The use of non-depletable resources such as solar energy, ocean

temperature differences, and wind resources has been suggested as a viable alternative to our present depletion of fossil reserves. Of these, the application of solar energy appears to be the most immediately attractive for the state of Florida. It seems likely that if an intensive effort to develop this application is made, then within five years significant numbers of installations using solar energy could be in operation in Florida. It should be recognized, however, that it is unlikely that even within 10 years solar energy will handle more than a very few percent of total energy use within the state. This is characteristic, however, of most actions that can be taken.

Decisions are being made now which will influence our energy consumption rates for decades to come. Buildings are under design or construction (the new Capitol, for instance) whose rate of energy consumption will be largely fixed for the building life by designs employed during the "cheap energy era." With the expected escalation of energy costs over the coming years, it is likely that such designs should be significantly altered to reflect the higher operating costs for energy. We are examining the consuming sectors for energy within the state to identify the areas and actions for energy savings. [Reference 1]

The quadrupling of petroleum prices within the past eighteen months, coupled with a downturn in

the economies of many of the industrialized nations, has resulted in a softening of U.S. and world demand for petroleum and the first small reductions in petroleum prices. In the first few months of 1975, world petroleum production capacity has exceeded demand; however, the Organization of Petroleum Exporting Countries (OPEC) cartel



Gasoline price (February 1979)

has demonstrated effectiveness in controlling the production and price of petroleum. Any reductions in world petroleum prices will help reduce the U.S. dollar drain (\$25 billion in 1974) for petroleum but may strain U.S. efforts to reduce its dependence on foreign imports. [Reference 2]

Thirty years ago, the committee's commentary articulated vitally important concerns. The complexity of the energy problem. U.S. importation of oil. Drilling in the Gulf. Florida's population growth. The state's dependence on oil for energy. The lack of energy-efficiency in buildings. These concerns continue to resonate through Florida's energy problems today.

The Energy Committee's warnings about drilling for oil in the Gulf were virtually ignored by state policy makers until President George W. Bush sold leases off Florida's Gulf Coast as part of his 2001 energy policy. Florida Governor Jeb Bush opposed this move. On May 30, 2002, the White House announced it would spend \$235 million to buy back the Florida Gulf mineral rights it had sold to oil companies. At least for the immediate political future, Florida's Gulf Coast is off limits to oil rigs.

The Energy Committee made many excellent recommendations after its first year. The following three pieces of legislation — all recommended by the Energy Committee — were enacted in 1974:

1. *The Board of Regents was to prepare a plan for the establishment of a solar energy center for Florida and to submit the plan to the Legislature by March 1, 1975.*

2. *The initial design of every new state-funded building must consider the energy costs to be incurred over the life of the building.*

3. *An Energy Data Center within Florida's state government would gather information on energy sources and energy use in Florida.*

In 1974, the legislature took another significant energy action. It created a special board to devise and develop a statewide thermal energy building code to take effect no later than January 1, 1977. The code is still in place today; only California's code is comparably extensive.

The Florida Energy Committee in 1974 recommended the state establish a Division of Energy in the Department of Administration. The division was initially part of the Governor's Office. It still exists today as the Florida Energy Office and is now in the Department of Environmental Protection.

While the committee sought additional time to complete its work, the Florida Legislature abolished it in May 1975. The exact reasons for this decision are not known. However, the legislature created the Florida Solar Energy Center that same year; it's likely that FSEC was created to lead the state's energy efforts forward.

A final comment about the Energy Committee: its Executive Director, Marvin Yarosh, took a position with the Solar Center. Yarosh began his work at FSEC on November 24, 1975, and served in an administrative function for the next 17 years before retiring on June 30, 1992. The only other Energy Committee member to take a position at the Solar Center was Keith Beaty, an engineer who worked at FSEC from April 16, 1976, to June 17, 1977.

Marvin Yarosh



Mr. Marvin Yarosh is recognized for his leadership in establishing the first energy programs for Florida. In 1973, Marvin came to Florida from a long and distinguished career at Oak Ridge National Laboratory to lead the Florida Energy Committee established by Governor Rueben Askew and the Florida legislature. This leadership established the Florida Solar Energy Center within the university system and initial Florida laws covering energy. In 1975, Marvin came to FSEC, where he served as Associate Director for the next 15 years before retiring in 1990. Colleagues were saddened by the news of Marvin's death at his home in Cocoa Beach on March 6, 2004.

The University of Central Florida: Taking on Administrative Responsibility

Chapter 3

Testimony to, and reports from, the Energy Committee helped Florida's Legislature recognize the potential of solar energy in Florida's future. In 1974, the Legislature passed Senate Bill 721, which directed the Florida Board of Regents (BOR) to prepare a plan for a center that would work to develop solar energy applications deemed most important for Florida. The Legislature then passed Chapter 74-185 of the Florida Statutes. The act specified the following objectives for the Florida Solar Energy Center:

- *Advancing research and development in solar energy,*
- *Engaging in demonstration projects,*
- *Providing ongoing educational services for persons desiring technical knowledge of solar energy,*
- *Developing and disseminating information,*
- *Maintaining an information system on solar energy products, and*
- *Providing technical assistance to State agencies in the development of solar energy information and standards.*

The BOR tackled the process of establishing the new Solar Energy Center in the summer of 1974. The process asked for competitive proposals from Florida universities to locate and administer the new center. Three universities submitted proposals – the University of Central Florida (UCF, then called Florida Technological University), the University of Florida and the University of Miami. UCF's proposal won the competition.

One attractive element of UCF's submittal was its proposal to place FSEC on its Cape Canaveral site. The 20-acre site included four existing buildings that offered approximately 14,000 square feet of working space. The site, which was virtually empty, could be used immediately for Center operations. In addition, the facilities included an auditorium, laboratories, a basic engineering library, television studios and offices. Moreover, the site offered ample space for outdoor solar test facilities and building expansions.

Another critical factor supporting the Cape location was that the space-race boom had recently gone bust. From its Cape Canaveral launch pads in Brevard County, NASA sent the first man to the moon in 1969 and the last in 1974. The demise of the Apollo program caused severe economic problems in

the area. Brevard County, alone, lost an estimated 40,000 aerospace jobs.

The dire unemployment situation prompted Bill Nelson, a young member of the Florida House of Representatives, to put \$1 million into the State budget for the Solar Center *given that it be located in Brevard County*. Nelson is now one of Florida's U.S. Senators and still a staunch supporter of solar energy research and development.

The Solar Energy Center Technical Advisory Committee, appointed by the BOR, spearheaded the Center's selection and implementation process. The committee was chartered to advise on the Center's organization, functions, location and operations. The BOR's Dr. William Phillips headed the committee, which included representatives of the governor's office, Florida's private and public universities, and the Florida Energy Committee.

The Advisory Committee recommended that, once created, FSEC should function as a component of the State University System (SUS). The BOR accepted this recommendation, along with one that the Center be situated on a 20-acre site at Cape Canaveral.



FSEC Administration Building



FSEC Auditorium

Cape Canaveral facilities of Florida Solar Energy Center (June 1979)

The Advisory Committee further recommended a budget of \$1 million from Florida general revenue funds for the first year (1975-1976) — a recommendation in accord with Representative Nelson's legislative initiative. The committee also recommended that this funding level double after five years.

The committee foresaw that part of the Center's general revenue funds should be used to stimulate solar energy research and development in both public and private universities throughout the state. Thus, it recommended that the Center develop multilateral associations with such educational institutions.

The National Science Foundation (NSF) had originally supported development of the Cape Canaveral site. It assigned the site to the BOR which, in turn, assigned its operation to UCF. The Cape facilities were originally constructed by the University of Florida as a site from which

to provide graduate engineering education to Cape engineers via closed circuit television. The NSF-funded project was called GENESYS (Graduate ENGINEERING Education SYStem).

The GENESYS program comprised five sites dedicated to graduate engineering education. They were located at Cape Canaveral, West Palm Beach, Daytona Beach, South Orlando and the University of Central Florida. The University of Florida decided to drop the GENESYS program because of the downturn in space activities at the Cape following the moon landing in 1969 and the high cost of operating the closed-circuit television system. Dr. C.B. Gambrell, who was the UCF Vice President for Academic Affairs at the time, reports that the GENESYS sites were assigned to UCF after he and BOR Secretary Allan Tucker met with an NSF representative in Washington, DC, in 1970 or 1971. The BOR concurred with

the decision. Allan Tucker passed away a few years ago.

UCF then transferred the West Palm Beach site to Florida Atlantic University (FAU) and used the other three sites as off-campus education centers (called Residence Centers). Within the same time frame, UCF established the Brevard Resident Center on the Brevard Community College campus in Cocoa. As a result, the Cape Canaveral facility — less than five miles away — was underutilized. It operated with a staff of two: secretary Lillie Green and technician Bill Brewster. The Cape site was the golden opportunity for UCF to locate the Florida Solar Energy Center.

The BOR officially established the Florida Solar Energy Center at the Cape Canaveral facilities in its January 1975 meeting. It also placed FSEC under UCF's administration.

In his inaugural address of January 8, 1975, quoted in the *Orlando Sentinel Star*, Florida Governor Reuben Askew said:



*Visit of Congressmen
Don Fuqua and Bill Nelson
with Louis Rotundo, David Block,
Jim Roland and Marvin Yarosh
(April 1981)*

The genius of the Kennedy Space Center that placed men on the moon can be dedicated now to resolution of the serious energy problems that afflict us all. Just as Florida played such a vital role in space research, so too can we play a vital role in the solar research that is necessary if we are to find those new sources of energy.

[Reference 3]

The newspaper also quoted State University System Chancellor Robert B. Mautz:

The Center would provide several hundred jobs within a few months, with first year state funding expected to be \$1 million, increasing to \$3 million the second year. Very large amounts of federal funds will soon become available for energy research, development and demonstration, and the prospects for obtaining such funds for Florida are very good. The UCF site offered greater potential for national recognition in solar energy research and development due to the enormous resources of the Cape area.

Factors that decided the committee on UCF and its Canaveral facility as ideally suited for solar energy research and demonstration included:

- *Its geographic location, near the center of the state and convenient, through McCoy Jetport Orlando, to the whole nation*

- *UCF's existing physical facility for the center*
- *The support in the area*
- *The potential major involvement of the Kennedy Space Center in future energy research and development projects.*

Many space-related industries are located near the site, which borders the space center. Virtually any required technical service is available in the area.

[Reference 3]

In addition, Vice President Gambrell emphasized the case for UCF's engineering program and joint use of facilities between the Cape and UCF. He concluded that they were instrumental in UCF's decision for the Cape's selection as FSEC's location. So, FSEC officially began in January 1975.



FSEC sign on Beeline - H. Harrenstien, Center Director (September 1975)

FSEC Opens Its Doors: The Center Directors

4 Chapter

With the Board of Regents' approval of UCF to host the solar center in 1974, first items of business were to appoint a Center Director and hire staff members. At its beginning, FSEC was to be jointly operated by the BOR and UCF. So, in February 1975, the two entities appointed UCF Dean of Engineering Dr. Robert D. Kersten and BOR Science Advisor Dr. William B. Phillips as Acting Co-directors.

From February to September 1975, Dean Kersten was assigned full time at the Cape Canaveral facilities — hiring the initial staff, starting program activities and upgrading the physical facilities. Future FSEC Director David Block filled in as Acting Dean of Engineering at UCF during that period.

In the meantime, the BOR in Tallahassee began its search for a permanent Center Director. Dr. William Phillips chaired the search committee; names of the other search committee members were not recorded.

During the same time frame, the Florida legislature approved the Center's initial \$1 million budget. It became effective on July 1, 1975.

Dean Kersten provided positive leadership for the Center from its beginning. He hired seven employees on a temporary basis through the federal Comprehensive Employment Training Act (CETA). The CETA program pledged up to \$270,000 in federal "distressed area funds" for these staff positions.

He also obtained the Center's first two external grants. One, for \$15,000, came from the Frank Gannett Newspaper Foundation in April 1975. These grant dollars paid Center operational expenses prior to receipt of the original state funds. The other grant, \$15,000 from ERDA, funded FSEC's initial research work.

Dean Kersten returned to his position as Dean of Engineering at UCF in September 1975, when Dr. Howard Harrenstien was hired as the first permanent Director.



Original Directors, Dr. Harrenstien (L) and Dr. Kersten (C), with Bob Murkshe, Mayor of Cocoa Beach (1975)

Initial Center Directors

Dr. Harrenstien's tenure as Director of the Solar Center could be considered tumultuous. Prior to his appointment, Harrenstien was Dean of Engineering at the University of Miami. He was formally announced as FSEC Director at an Orlando news conference on August 19, 1975, by UCF Vice President for Business Affairs Phil Goree, on behalf of SUS Chancellor E. T. York, Jr. The BOR didn't publicly publish its reasons for Dr. Harrenstien's appointment, but an editorial from the Aug. 21, 1975, *Florida Today* reports the official rationale:

The State Board of Regents' selection of Howard B. Harrenstien to direct the new state Solar Energy Center at Cape Canaveral is an excellent one.

Harrenstien, 44, is dean of the University of Miami, College of Engineering, where he increased federal research grants by about 800 percent during his three-year tenure.

He also is recognized for his leadership in developing the field of alternative energy research, one of the aims of the state solar center. Harrenstien's appointment should provide a boost to Florida's pitch for location of the federal energy research center at Cape Canaveral because he is a member of the governor's task force drawing up the state's proposal.

The new director will start work around Sept. 1, his first job being to design programs under the \$1 million appropriation approved by the legislature for the state center.

Florida officials said they eventually hope for a payoff of up to \$10 in research grants for each dollar of the \$1 million state appropriation.

And with Harrenstien's success obtaining grants for the university, he should have no problem reaching that goal at the solar center. [Reference 4]

By the summer of 1976, the staff had grown to 40, including 18 professionals. But on October 1 of that year, the BOR relieved Harrenstien as Center Director.

While the BOR did not publicize its rationale for this action, an October 13, 1976, article in the *Orlando Sentinel Star* describes the action in the following two paragraphs:

Dr. Howard P. Harrenstien, a leading proponent of the hydrogen age of energy supply, has resigned as director of the Florida Solar Energy Center at Cape Canaveral to resume research work.

Dr. Roy McTarnaghan, vice chancellor for academic programs of the Florida Board of Regents, said from Tallahassee that Harrenstien will remain on the center's staff at least until the end of this year.

The article also said:

Dr. John S. Blakemore, a physicist from Florida Atlantic University at Boca Raton, is the center's acting director, and the regents are advertising in scientific publications for applicants for the director's position. [Reference 5]

A *Florida Today* newspaper article of October 14, 1976, made the following comments:

Dr. Howard P. Harrenstien was asked by a state Board of Regents official to resign as director of the Florida Solar Energy Center because of serious management problems there, Today has learned.

Harrenstien was told in a Sept. 23 letter from Dr. Roy McTarnaghan, Vice Chancellor for Academic Programs, to either return to the University of Miami or step aside as Director and assume a temporary research position at the Port Canaveral facility.

McTarnaghan said Harrenstien's departure had been prompted by management problems at the center, specifically in the areas of budget and personnel.

"The center has had its share of personnel issues this past year in terms of hiring and firing," McTarnaghan said. He said the Regents were upset with Harrenstien's policies.

He also said that the Regents was concerned about the treatment in the last year of full-time employees who had been at the center

before Harrenstien took the helm 13 months ago.

"Some of those individuals have been terminated or were notified of their termination" during Harrenstien's tenure, McTarnaghan said, calling those firings part of "personnel issues that are real and a matter of record."

The vice chancellor also acknowledged that the United Faculty of Florida had filed a grievance with the Regents over the way Harrenstien allegedly treated part-time employees at the center.

McTarnaghan further indicated the Regents was not satisfied with Harrenstien's day-to-day management of the center.

"There's an awful lot of mundane but important bureaucratic attention to detail at the local level which involves personnel and budget and other matters," McTarnaghan said.

Harrenstien had told associates a number of times how frustrated he had become trying to live within the rules and regulations the Regents had put forth.

Harrenstien had also been critical of the Regents for not increasing the center's funding during its second year of operation. [Reference 6]

Harrenstien was subsequently named assistant director of the solar energy section of ERDA in Washington, DC, on December 1, 1976. [Reference 7] He even-

tually returned to the University of Miami.

Joint operation of FSEC by the BOR and UCF caused initial administrative and management problems. Dual signatures were often required, not only for contracts and other budget issues, but even for mundane actions. It was often difficult to determine who should be the ultimate authority for many decisions.

Following Harrenstien's departure, the BOR immediately appointed Dr. John S. Blakemore, physics professor at Florida Atlantic University, as acting FSEC Director in October 1976. It also began another nationwide search for a new permanent Director.

A *Florida Today* article of December 2, 1976, reported the following:

More than 30 persons submitted applications for the directorship of the Florida Solar Energy Center by Wednesday, officially the final day to apply.

Parker (from the BOR) said a nine-man selection committee that he serves on will begin the time-consuming task of studying the applications, checking references and credentials and deciding which applicants should be interviewed.

Seven of the selection committee members are faculty members of Florida universities, he said, and the additional member represents the state's energy administration. [Reference 8]

A *Sentinel Star* article of April 20, 1977, commented on the Center Director search as follows:

A Georgia Institute of Technology research administrator appears to be the front-runner to become the new director of the state-funded Florida Solar Energy Center here, it was learned Tuesday.

Sources said that Dr. Albert Sheppard of Georgia Tech leads a handful of candidates. [Reference 9]

On June 10, 1977, a *Today* article said:

The current acting director of the Florida Solar Energy Center is to vacate that post next week, with no permanent successor in sight, Today learned Thursday.

Acting Director John Blakemore said he will leave the job Wednesday after filling in for nine months, returning to teaching and research duties at Florida Atlantic University in Boca Raton.

A temporary replacement is expected to be named next week. Meanwhile, a member of the committee screening applicants for the director's job said a search that began last year is "back to ground zero."

Dr. Richard Hulet, a member of the committee established by the state university system's Board of Regents, said, "we're terribly disappointed" that nine final candidates culled from hundreds of

applicants have proven unavailable for the post. [Reference 10]

As of June 1977, Dr. John Blakemore had spent nine months as Acting Director, and the Director Search Committee was not even close to a selection. Blakemore informed the BOR that he was "tired of living in a motel" and was going to return to his teaching position at FAU. Blakemore's action prompted the BOR to offer UCF its first opportunity to independently select FSEC's Acting Director.

UCF Vice President for Academic Affairs C.B. Gambrell recognized this opportunity and asked Associate Dean of Engineering Dr. David L. Block if he would temporarily take the position as Acting Center Director. Gambrell also said he intended to appoint a new Director Search Committee that should complete its search in three to four months. Block accepted Gambrell's offer and became FSEC's Acting Director on June 16, 1977.

In accepting the position, Block noted that the line of reporting presented problems. The Center Director reported to BOR Vice Chancellor for Academic Affairs Roy McTarnaghan in Tallahassee. At the same time, UCF provided the Center's administrative support.

Dr. Leslie Ellis chaired UCF's FSEC Director Search Committee. He was the UCF director of sponsored research and dean of graduate studies. Leo Goff, the

Center's business office director, was the other search committee member. Ellis later became UCF's acting president and vice president for academic affairs.

By the end of summer 1977, the Search Committee narrowed its candidates to two - Block and Dr. John Thornton of Brooklyn Polytechnic Institute. A known entity at UCF, Block was interviewed by McTarnaghan and BOR member Betty Anne Staton. UCF offered him the position in September 1977.

UCF President Dr. Charles Millican signed Block's FSEC Director contract on September 23, 1977. The contract noted that "the ongoing operation of the Center will follow under guidelines and principles set forth for Institutes and Centers as approved by the Board of Regents on May 2, 1977." So, UCF assumed full operation of FSEC, and Center activities were officially decentralized from the BOR and the Chancellor's Office in Tallahassee.

The final note on FSEC Directors is that after 25 years, David Block resigned as Director on November 1, 2002. Philip Fairey was named the Interim Director and served in the position until January 1, 2005. On January 1, 2005, Dr. James Fenton began his tenure as FSEC Director.

the solar collector



NEWSLETTER OF THE FLORIDA SOLAR ENERGY CENTER

NUMBER 6

OCTOBER, 1977

FEA-Aided Project On Buyer Protection Undertaken By Center

A nationwide project designed to complement the proposed National Energy Act through identification of measures for education and protection of purchasers of solar energy systems has been launched by FSEC.

Governor Reubin Askew signed in September a cooperative agreement with the Federal Energy Administration (FEA) under which the project, "Development of Solar Energy Consumer Protection Systems," will be conducted. Of the total \$155,620 funding, FEA will contribute \$124,362, the State providing the balance.

President Jimmy Carter's proposed energy plan aims to stimulate the solar energy market in a variety of ways, including tax credits to individuals and businesses investing in solar energy systems.

"If the incentives in the President's plan are to accelerate growth of a viable solar market, it is crucial that measures for education and protection of consumers be established as soon as possible," said Marvin Yarosh of FSEC, the project manager.

Yarosh also pointed out that establishment of many different state and local requirements or the imposition of overly-strict or costly industry constraints would be equally damaging.

Stated for completion by next summer, the FSEC project will:

- Identify types of existing and potential consumer problems associated with early and widespread utilization of solar energy systems for space heating and cooling, domestic water heating, and pool heating.
- Identify existing consumer protection programs and



DR. DAVID L. BLOCK
Takes FSEC Helm

mechanisms which might be used to meet the above problems, and assess their usefulness.

- Develop new programs, where necessary, for addressing the special solar problems that have been identified, and evaluate them.
- Recommend alternative consumer protection measures for adoption at all levels of government and by industry and develop implementation strategies for them.

Already mailed to a number of governmental and private organizations is a request for information activities associated with consumer protection.

While this project is of national scope, FSEC will in addition conduct a poll of Floridians who are using solar energy systems to learn what, if any, major problems they may have experienced. Any such information will be welcomed; it should be addressed to: Marvin Yarosh, Florida Solar Energy Center, 300 State Road 401, Cape Canaveral, Florida 32920.

Dr. David L. Block Appointed Permanent Director of FSEC

Dr. David L. Block, named "Young Engineer of the Year" in 1973 by the Florida Engineering Society, has been appointed director of the Florida Solar Energy Center, a post he assumed in an "acting" capacity last June.

The announcement was made jointly by Dr. Roy McTarnaghan, University System vice chancellor, and Dr. Charles Millican, president of Florida Technological University, which provides administrative support for FSEC.

"Dr. Block has established a record as an outstanding engineer, educator and administrator," McTarnaghan said.

Noting Block's "fine job" as acting director, Millican added that "I know he will continue in the same high level of performance and service to the people of Florida."

Block came to the Center last spring while on leave from FTU, where he was on the faculty since 1968, serving both as assistant and associate dean of the Engineering College. He formerly was staff engineer with Martin Marietta Corporation, Orlando, and in a research position at NASA Langley Research Center, Hampton, Virginia.

The appointment was recommended by an interinstitutional search committee. Under Board of Regents (BOR) policy, the FSEC director operates with recommendations and assistance from an advisory council representing the universities, state agencies and the BOR office. The new director will report to the FTU president for administrative and support services and for annual budget development, with review of operating budget and annual plan of operation by the Council of Presidents prior to consideration by the BOR.

David L. Block appointed Director, "The Solar Collector" (October 1977)

Setting the Agenda and Direction: Early Beginnings

Chapter 5

From 1975 to 1977, the following dominated FSEC's agenda and direction:

- *Actions by the Florida Legislature*
- *Development of the Center's mission*
- *Development of its Cape Canaveral facilities*
- *Organizational efforts*
- *A proposal to host the Solar Energy Research Institute (SERI)*
- *Establishment of the research agenda.*

This chapter examines each of these six areas.

Florida Legislative Actions

As a child of the Florida Legislature, FSEC's early growth was formed by that body's actions. Beginning with the Florida Energy Committee, legislative influence set the Center's initial agenda.

In a show of its strong support during the 1975 session, the Legislature authorized initial FSEC funding of \$1 million beginning on July 1, 1975. It also authorized funding of \$1 million per year for 1976-77. For 1977-78, Senator Clark Maxwell from Brevard County initiated an increase in annual funding from \$1 million to \$1,363,000. In 1979-80, again thanks to Senator Maxwell, the amount was increased to \$1,744,527.

In 1976, the legislature enacted a truly significant piece of legislation – the Solar Energy

Standards Act, Section 377.705 of the Florida Statutes. This law, which went into effect on October 1, 1976, directed FSEC to develop standards for solar energy equipment sold or manufactured in the state; establish criteria for determining the performance of solar energy equipment; and maintain a testing facility for evaluating solar energy equipment performance.

It allowed the Center to charge a fee to cover costs of testing and to accept test results from other testing organizations. It also authorized results of performance tests to be displayed in an approved manner on equipment meeting minimum standards. The law stated that equipment manufacturers could voluntarily participate in the program.

The 1978 Legislature put some teeth into the Solar Energy Standards Act through legislation requiring that, beginning in 1980, all solar equipment manufactured or sold in Florida must display a label showing that the equipment met FSEC standards. This law – still in effect today – has helped to legitimize and foster the State’s solar energy industry, protect consumers and establish FSEC’s preeminence in the field of solar equipment testing and certification.

Other legislation passed during the ‘70s that did not directly affect FSEC, but was important to solar energy development in the state:

- *Solar Easements.* This law provided for the creation and recognition of agreements between two adjoining property owners allowing for the uninterrupted exposure of a solar energy device to the sun. (Section 704.07 F.S.)
- *Solar in State Buildings.* Solar energy systems were to be installed, where feasible, in state buildings, including educational facilities. In addition, no construction or leasing arrangement could be initiated by a state agency without a life-cycle cost analysis. (Sections 235.211, 235.212, 255.254, 255.255 F.S.)

- *Solar Adaptable Plumbing.* All new construction must have plumbing designed to facilitate future installation of solar water heating equipment. (Section 553.87 F.S.)
- *Solar Sales Tax Exemption.* Solar energy systems sold in Florida were exempt from the four percent Florida sales tax. (Sections 212.02, 212.08 F.S.)

Of these laws, the testing and standards statutes and a form of the sales tax exemption are the only ones still valid today.

At the federal level, the National Energy Act passed in late 1978 contained several important provisions designed to encourage use of solar energy:

- *Solar Energy Tax Act.* This was the single most important piece of legislation to energy consumers and the infant solar industry. It allowed for 30 percent of the first \$2,000 and 20 percent of the next \$8,000 invested in a solar system to be deducted from an individual’s federal personal income tax. **The sunset of this act in December 1985 caused a significant problem for the U.S. solar industry.** The industry has worked since then to reinstate the tax deduction. The tax act also gave businesses an investment credit of 10 percent of the total expenditure for

solar systems designed to generate electricity, provide hot water, or heat or cool a building. It also provided for an additional 10 percent credit for systems designed to produce industrial process heat or hot water, or for investment in equipment to use, process or store biomass materials (P.L. 95-618).

- *National Energy Conservation Policy Act.* The Residential Conservation Service program directed regulated utilities to conduct audits and arrange for the installation and financing of suggested energy conservation measures, including solar energy systems. The Schools and Hospitals program under the act could make grants of up to 50 percent (90 percent in hardship cases) of the cost of an energy audit and energy conservation and solar energy measures. It authorized \$100 million for a three-year solar heating and cooling demonstration program in federal buildings, as well as a 10-year conservation plan (including solar) for federal buildings (P.L. 95-619).
- *Public Utility Regulatory Policies Act (PURPA).* This act was probably the most significant energy legislation enacted by Congress. It established a

requirement that utility companies buy back power produced by independent power producers. The buy-back rate was to be at the avoided cost of power generated by the utility. At the time, Congress believed the act would encourage production of electricity through cogeneration, or through solar, wind or other renewable resources. Through the years, all types of independent power producers have used this act, but solar never blossomed from it, as expected. PURPA is still in effect today (P.L. 95-617).

Mission

The following statements from FSEC's first annual report [Reference 11] provide historical insight into FSEC's initial mission concepts:

The mission of FSEC to work towards widespread beneficial use of solar energy in Florida is of great importance regardless of federal decisions concerning energy strategies, solar energy R&D or the location of the federal Solar Energy Research Institute in Colorado. Decisions made by federal agencies will be based on expectations for national needs; yet the fuel consumption and energy utilization patterns for Florida are significantly different from those of the nation as a whole. Thus, the priorities for

Florida in solar energy utilization are not necessarily in the same order as in a national plan.

Among the ways in which Florida energy utilization historically has been different from the national average is its relatively large use of natural gas and imported petroleum fuels for electricity generation, and a higher-than-average use of electricity for residential purposes. Since much of the residential consumption of electricity goes into water heating and space cooling and heating, it is clear that a substitution of solar cooling and heating for electricity generated from fossil fuels could become critically important in the future. The humid climate of Florida makes solar air conditioning a more challenging problem than is the case for dryer climates. The year-round mild climate has encouraged widespread construction of private swimming pools - many heated during the winter months - an application that could be served by solar energy with relative ease.

There is particular relevance to Florida's location and climate in some other longer-range possible applications of solar energy for which federally supported R&D funds are essential. One of these is ocean thermal energy conversion (OTEC). Where sites contemplated for OTEC stations are far from land, the energy produced might be transported in secondary form, such as liquid hydrogen. However,

the proximity of warm tropical waters to much of the Florida peninsula could allow stations near enough to shore to permit direct transmission of electricity to land via submerged cable. In view of this advantage, OTEC research is expected to be a target for FSEC during the coming decade, with federal dollars aggressively sought.

These comments set the stage for FSEC's initial program activities.

Establishment of the Center's Technical Advisory Committee also influenced development of FSEC's initial mission and research direction. Members of the committee were appointed by the FSEC Director, with the purpose of making recommendations concerning Center operations and plans. It included representation from public and private universities, energy utility companies, professional associations of architects and engineers, the solar industry, and others involved in the state's energy future. In the late '70s, the committee was renamed the Policy Advisory Board (PAB). It is still in operation today.

Over the years the PAB, which meets annually, has supplied strong guidance and service when the need arose. Many of FSEC's most influential supporters and friends have served, or are still serving on the Policy Advisory Board. The PAB and its past and present members are discussed in Chapter 11.

Development of the Cape Canaveral Facilities

The Cape Canaveral facilities provided for the Center's operation were basically sound and operational. However, significant renovations and repairs were required to place the buildings in working order and to convert them into a facility adequate for research, development and testing efforts.

- *Renovated the cooling tower and the heating and cooling systems in all buildings*
- *Painted the interior of all buildings*
- *Installed an emergency lighting system*
- *Replaced conduit and wiring for the fire alarm system*
- *Installed an elevated floor in the computer room*
- *Landscaped around some buildings and cleared under-growth from the grounds*
- *Repaired severely corroded pipes serving the HVAC system.*

In addition, a solar collector was built on the premises and installed. This system provided hot water for a restroom and served as a solar energy display.



*FSEC Administration and R&D Building
(June 1979)*

In 1976, following one year of FSEC operations at Cape Canaveral, the following renovations and repairs had been completed: [Reference 11]

- *Purchased office and other furniture for all spaces*
- *Installed temporary partitions to divide five classrooms into office space and to improve two other working areas*
- *Upgraded lighting in every room and replaced transformers in most of the lighting fixtures*
- *Rebuilt the electrical substation serving the Center*

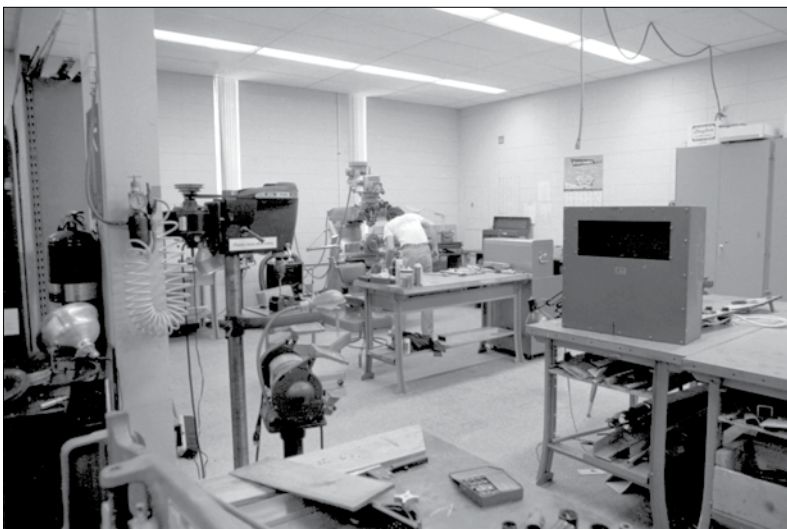


FSEC Aerial view (June 1979)

FSEC also purchased and installed equipment for outdoor testing of solar energy collectors. This equipment provided the testing capabilities required to comply with the Florida Solar Energy Standards Act of 1976 and for solar collector research efforts.

Early Organization of the Center

In the 1975-76 time frame, both non-state and state funds were used to hire staff, begin program activities and upgrade the physical facilities. A staff of seven individuals was already working before FSEC received its initial state funds on July 1, 1975. Dean Kersten had assembled this staff using CETA funds. These initial employees were: Iraida (Yayi) Rickling (hired May 1, 1975, and retired on October 30, 2003); Jim Roland (hired June 9, 1975, and retired June 30, 2003); Tom Tiedemann (hired May 15, 1975, and retired on March 9, 2001); Leroy Nash (hired April 28, 1975, and deceased on January 5, 1983); Omar Hancock (hired April 28, 1975, and retired on December 29, 1989); Paul Nawrocki (hired on May 27, 1975, resigned on June 15, 1977), and Milan Johnson (hired on April 28, 1975, and resigned on August 30, 1977). Figure 5-1 illustrates Dean Kersten's initial organization.



Machine and Electronics Shop (January 1990)



Tom Bowman of FIT, long-time PAB member, making a presentation at an ERDA Conference in June 1976

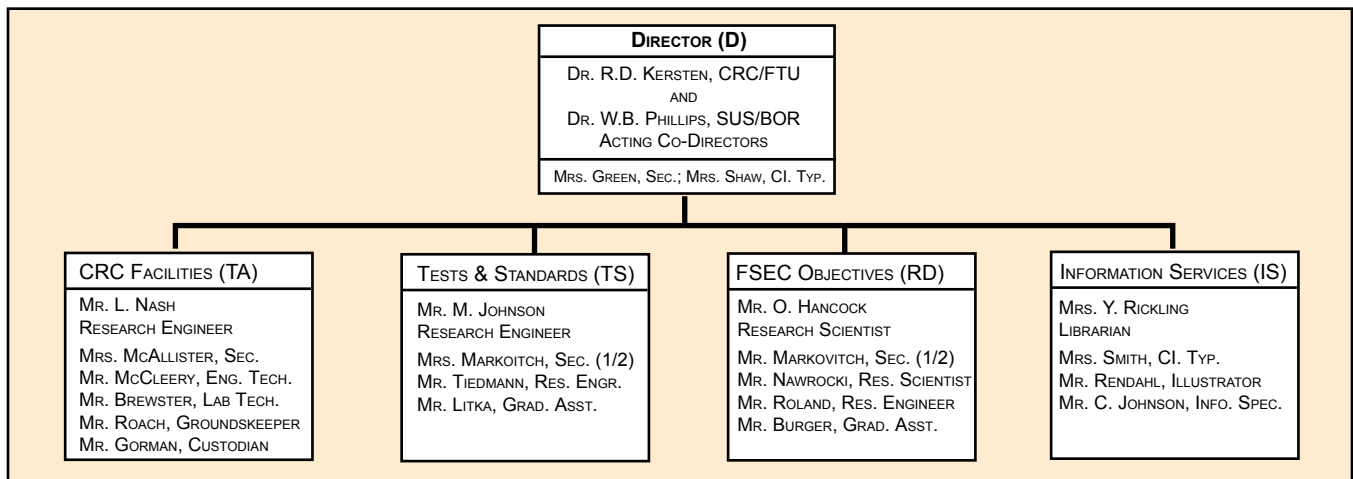


Figure 5-1 - Organizational Chart for Center Implementation Interim Period - Post July 1, 1975



*Iraida (Yayi) Rickling
(September 1978)*

Five of these initial staff members stayed with FSEC and became permanent, long-time employees. Two other initial employees at the Cape Canaveral site were working for UCF. They were Ms. Lillie Green (hired on September 13, 1973, and retired on March 28, 1997) and Mr. Bill Brewster (hired on March 26, 1975, and resigned on July 24, 1979).



Jim Roland (January 1979)

By June 30 of 1976, the staff numbered 40 people and a new organizational structure had evolved into three divisions under Director Howard Harrenstien. The three initial divisions were: the Research, Development and Demonstration

(RD&D) Division; the Education and Information (E&I) Services Division, and the Energy Systems Analysis (ESA) Division. Figure 5-2 shows the FSEC organizational chart under Harrenstien.

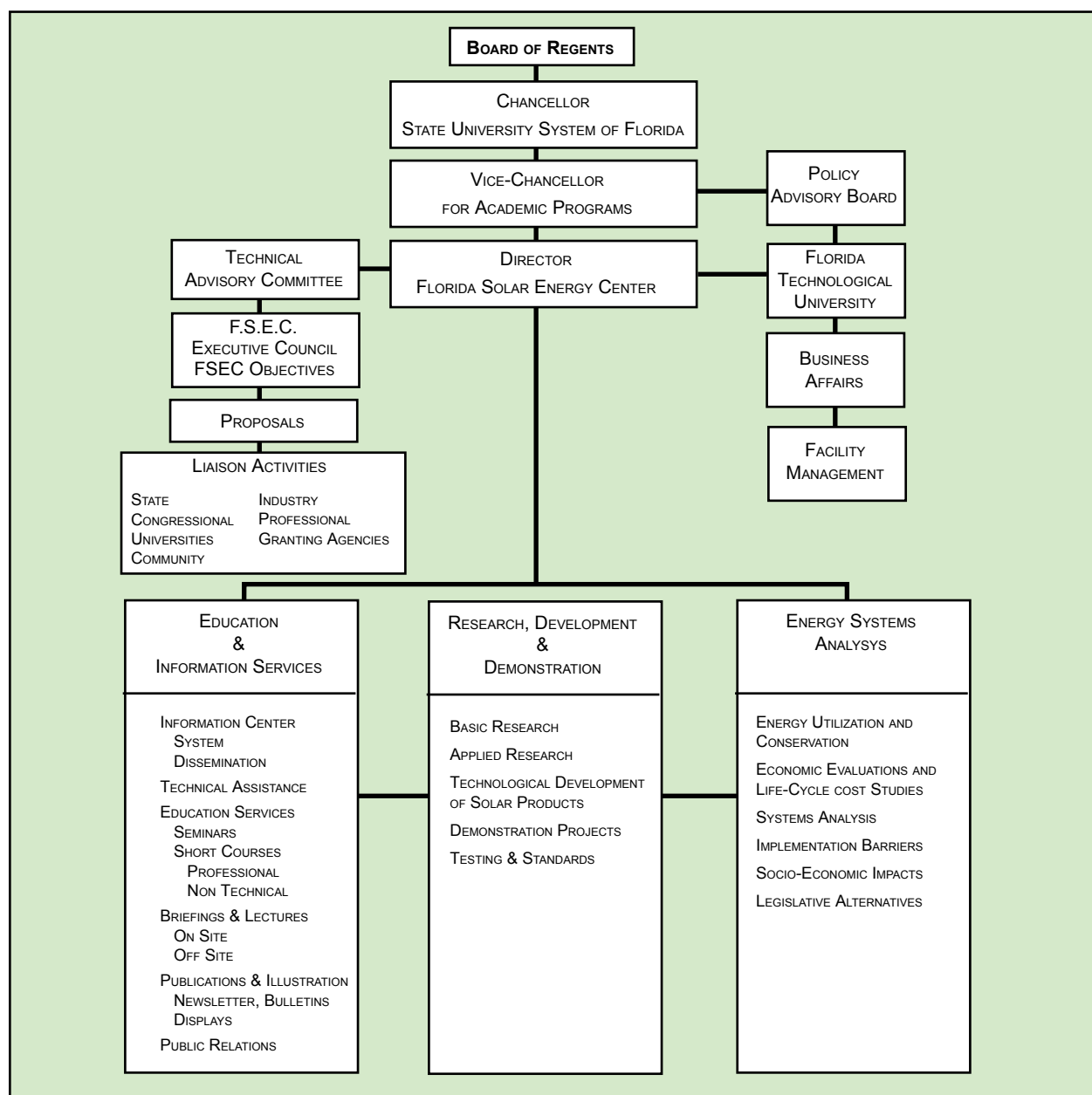


Figure 5-2 - Florida Solar Energy Center Organizational Chart, 1975 - 1976.

The following sections describe the activities in each of the divisions.

Research, Development and Demonstration Division

The RD&D Division was headed by Dr. Jerry Lowery (hired on December 12, 1975, and resigned on June 30, 1977). Lowrey, who joined FSEC from the University of Texas, passed away as a young man in about 1985. Following his resignation, FSEC staff member Dr. Charles Beach was appointed RD&D Division Director. Beach served in that capacity from September 1, 1977, until December 1982. After leaving FSEC, he became a faculty member at the Florida Institute of Technology and served there for many years before retiring.

By the end of 1976, the RD&D Division was the largest division with 15 staff members. The division was responsible for conducting research and development and for operating the testing program. At the time, the state had an urgent need for solutions to problems impeding widespread implementation of solar heating and cooling in Florida. So the division's major R&D efforts during the first years focused on solar water heating, and solar space cooling and heating. Other major activities revolved around the solar testing and standards program.



*Manufacturers Conference, Jerry Lowery
(June 1976)*



*Collector Testing -
Bill Brewster and
Chuck Beach (May 1977)*

Education and Information Services Division

The E&I Services Division was headed by Del Ward (hired on September 2, 1975, and resigned on October 21, 1977). An architect from Utah, Ward left FSEC shortly after David Block became Director. The division had two functions — the first was to develop and carry out E&I services programs, and the second was to provide supporting editorial and graphics services and to coordinate public programs for the Center.



Solar Crop Dryer with Leroy Nash (3rd from left), Chuck Beach (4th from left)



Graphics department - John Davis, Sandy Starr (January 1979)

Shortly after Ward left, Dr. Gerard (Jerry) Ventre was hired as Director of the E&I Services Division. Ventre became a long-time employee and was instrumental in developing the Center's education and information programs and outreach activities. He retired on October 31, 2003.

The first major education program involved development and installation of solar water heating systems. Ventre brought Doug Root, a long-time solar advocate from Orlando, to the Center to become a major part of the educational efforts. These solar water heating educational programs were highly successful and still operate today.



Jerry Ventre (January 1979)



Education consultant Doug Root at Solar Installation Workshop (1979)



Ann Fay, Lillie Green at workshop (September 1978)



Yayi Rickling, Chuck Johnson in library (June 1976)

The E&I Services Division developed extensive editorial and graphics capabilities to support FSEC publishing activities. The division also developed an extensive solar energy library to support the professional staff and to serve the public. The library at that time contained approximately 3,000 technical volumes and

500 documents related to solar energy. Today, the FSEC library has 9,600 books, 2,070 bound periodicals and 9,400 catalogued documents. Both of these functions provide critical support for FSEC operations. The growth of the library's holdings and services is attributed to Yayi Rickling, FSEC's first and only librarian.

Energy Systems Analysis Division

Marvin Yarosh, who was formerly Executive Director of the Florida Energy Committee, headed the ESA Division. The smallest of the three FSEC divisions, the ESA Division was principally responsible for planning for Center operations and objectives. The division also conducted economic and system analyses of alternative solar energy technologies. These investigations included economic analysis of near-term applications (such as water heating and space heating and cooling) and the analysis of considerations and incentives for state activities in longer-term solar technologies (such as ocean thermal energy conversion and solar biomass conversion).



Marvin Yarosh



Barbara Freeman of the ESA Division (June 1976)



VIP Visit - Dr. Carlos Warren, Florida Energy Office Director; Dr. Roy McTarnaghan, BOR Vice-Chancellor; Dr. Bill Phillips, Chancellor's Office and Bob Hock, Solar Energy Task Force (November 1975)

Solar Energy Research Institute (SERI) Proposal

In 1975, the federal Energy Research and Development Administration (ERDA) released a request for proposals (RFP) to locate, construct and operate the U.S. Solar Energy Research Institute (SERI).

Florida solar energy supporters saw this RFP as a major opportunity for FSEC to host a national research laboratory. They joined with FSEC in developing Florida's SERI proposal during 1975 to 1977.



Chuck Johnson at ISES Exhibit

Governor Rueben Askew kick-started the effort in 1975 when he appointed a nine-member task force to promote FSEC through a national solar energy proposal to submit to federal officials.

The members were Dr. Bill Phillips of the Board of Regents staff; Dr. Robert Kersten, Dean of Engineering at Florida Technological University; Bill Rock, NASA Kennedy Space Center; Dr. Erich Farber, University of Florida; Ted Carey, Canaveral Council of Technical Societies; Marvin Yarosh, Director, Florida Energy Committee; Dr. Harry Weber, Florida Institute of Technology, Melbourne; and Dr. Howard Harrenstien, University of Miami. Bob Hock was the Executive Director of the Task Force. [Reference 12]

The proposal's principal drafters were Brevard county residents Marv Olsen from Lockheed, and Bob Hock of Cocoa Beach. FSEC did not participate in preparing the proposal and did not receive a copy of it until a couple of years later.

In the early '70s, the American Section of the International Solar Energy Society (ISES) was headquartered in Rockville, Maryland. In 1976, the group chose to relocate to FSEC to help in Florida's bid for SERI. In doing so, it was promised a significant amount of state support. One

of David Block's initial tasks as FSEC Director in the fall of 1977 was to inform the American Section office that state funding was going to be discontinued. The American Section moved to Colorado shortly afterwards.

Florida ended up submitting two proposals to the federal RFP – one from FSEC and one from Miami. Governor Askew elected to support both efforts, which most likely weakened the Florida efforts.

In May 1977, ERDA announced that the national Solar Energy Research Institute would be located in Golden, Colorado. While this disappointed Florida solar supporters, it heightened FSEC's objectives to obtain and maintain strong state support. Lou Frey, who was Brevard's congressman in the 1970s, had major input into the SERI effort. He remarked 25 years later, in talking with David Block and as a member of Florida's Energy 2020 Study Commission, that losing the SERI RFP hurt Florida's energy efforts.



Southern Solar Energy Center meeting at FSEC (January 1980)

In making its SERI announcement, ERDA also indicated it would establish regional solar facilities for specialized work at important geographic locations. The Southeast was specifically mentioned as a potential regional facility location. In 1978, the Southern Solar Energy Center was created in Atlanta, Georgia. FSEC Director David Block served as Florida's representative on the new center's board of directors. Regional centers were also created in the Northeast, Midwest and the West. These Centers were abolished in 1981 during the first year of the Reagan administration.

SERI was renamed the National Renewable Energy Laboratory (NREL) in 1991. FSEC and SERI (NREL) have maintained good relations over the years, with exchanges in both directions. Two former FSEC staff members Tim Merrigan and Bill Marion are now NREL employees, and

one of FSEC's most important staff members – Mary Huggins – came to FSEC from NREL.

Establishment of the Research Agenda

FSEC was deemed a research organization from its very beginnings with initial research focused on solar water heating, solar air conditioning and space heating technologies.

From the very beginning, the Center tailored its research efforts toward the goal of attracting federal funds to the state. The next chapter will detail these activities, which were the beginning of the research agenda.

Another early and continuing goal was to support a solar energy industry in the state. University System Chancellor E.T. York highlighted this goal in a December 6, 1976, presentation to Lieutenant Governor J. H. Williams at a meeting of the

Board of Regents. Chancellor York singled out solar energy's potential for significantly positive impacts on the university system and on the state's economic development. The Chancellor expressed the importance of developing a viable solar energy industry in Florida in stating:

There is probably no other type of industry which is so needed and which fits so logically into Florida's economy than the solar energy industry. We believe we already have in place the essential components for development of a viable solar industry in the Florida Solar Energy Center and the recently created Florida Solar Industry Association. Through continuing Florida Solar Energy Center research and development, which is uniquely applicable to Florida's energy needs, the necessary components for a solar market may appear sooner than they would otherwise. As a direct result of the testing and certification programs for solar systems now being conducted at the Center, a program which has received enthusiastic support from Florida's fledgling solar industry, better products will be made and sold, and consumer confidence in solar systems will be developed to accelerate this process. It is suggested that several tax incentives, which could be effected with only insignificant losses in State revenues, should be pursued in the next legislative session. [Reference 11]