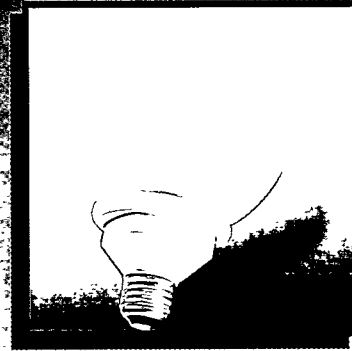
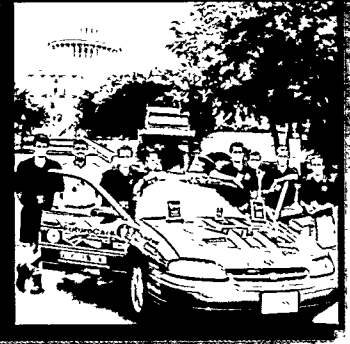
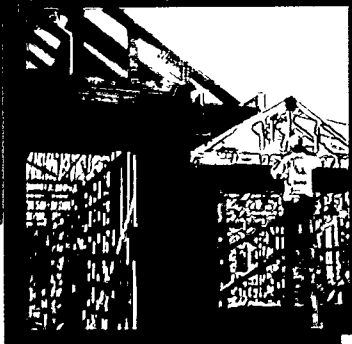


1999 *Accomplishments Report*



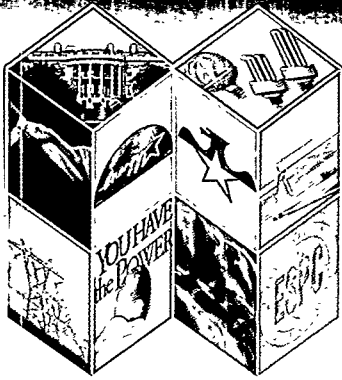
Clean Energy for the 21st Century

Federal Energy Management Program

Office of Energy Efficiency and Renewable Energy

United States Department of Energy





Letter from the Director



Dear Colleagues,

I am pleased to write this letter in my new job as Director of the Federal Energy Management Program (FEMP). This position brings many exciting professional challenges as well as many new opportunities for partnership. As a prime example, President Clinton's Executive Order 13123, *Greening of the Government through Efficient Energy Management*, presents us with both.

As outlined in Executive Order 13123, we are required to reduce the energy intensity of Federal buildings by 30 percent in 2005 and 35 percent in 2010. FEMP estimates that between \$4 and \$6 billion in funding will be needed to meet these energy savings goals. As a result, FEMP is increasing its reliance on private sector financing in the form of energy savings performance contracts (ESPCs) and utility services. Clearly, successful partnerships will help us to reach the goals set forth in Executive Order 13123.

It is also important for FEMP to raise awareness about saving energy in the workplace. Partnerships are also required with our co-workers so that we can help each other do the things that will make a valuable difference to achieving energy and tax dollar savings. We need to make people aware of the ease with which energy can be saved and the benefits that often result in productivity and comfort.

I look forward to the new challenges and partnerships that will be realized in the Year 2000, and continuing FEMP's leadership in overseeing the Government's work to save energy, money, and resources for the future.

Sincerely,

Beth Shearer, Director

Federal Energy Management Program

**CLEAN
ENERGY
NOW**

DISCLAIMER

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The Challenge

The responsible use and conservation of energy in America involves dedicated teamwork. As the largest consumer of energy in the nation, our own Federal government bears the mantle of leadership in managing our energy wisely so that we all can ultimately win.

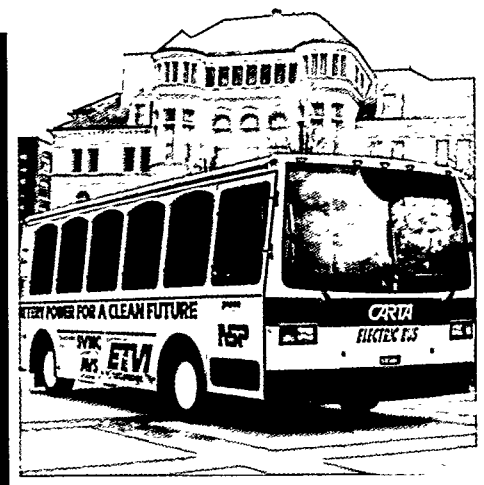
The Government leads the way in managing energy that helps house and support our servicemen and women; fuels our vehicles, aircraft and ships; keeps government offices lighted, heated, and cooled; and allows Federal employees to keep America strong and secure.

This mammoth effort includes facilities at home and abroad including 500,000 Federal buildings, with more than 3.0 billion square feet of floor space, located in all climates. High-rise offices, power plants, aircraft hangars, libraries, hospitals, tourist areas, parks, and prisons must all be considered. In total they consume almost 54 billion

kilowatt-hours of electricity each year, costing taxpayers more than \$3.1 billion annually.

Clearly, the Federal government has an obligation to manage energy wisely. The leadership shown by the government to save energy, money, and future resources sets an example for the rest of the country to follow.

From 1985 to 1997, the Federal investment in energy efficiency totaled \$2.0 billion. Adjusted for inflation, this investment represents cumulative savings of \$16.7 billion in the Nation's energy bill. Still, President Clinton believes we can do even better. The Energy Policy Act of 1992 (EPAAct) and Executive Orders (E.O.) 12902 and 13123 require a rate of energy savings even greater than that already set. To meet these mandates Federal agencies must double their current rate of energy savings.



FEMP helps Government agencies realize Clean Energy for the 21st Century

Leadership in the Federal Sector

Since 1973, the Federal Energy Management Program has led the way, with the help of its Federal customers, toward reducing energy use. FEMP's mission is to lower the cost of govern-

ment by promoting and practicing energy efficiency, water conservation, utility management, and the use of solar and other renewable energy resources in Federal facilities.

FEMP provides economic and technical resources to create a more productive and competitive Federal workforce, offering agencies the skills, the means, and the initiative to undertake projects that save energy, water, and

money. FEMP also sets an example for the Nation by passing along the best of its knowledge and practices to State and local governments and ultimately to the private sector.

Of course, the key beneficiaries of FEMP's energy saving efforts are its primary customers—the Federal agency facility managers and coordinators, the procurement, design, operations, maintenance, and engineering staffs. These dedicated teams oversee critical energy management activities, guide large investments in energy efficient practices, and direct the training programs that keep them up to

date with the most cost-effective technology.

Over the years, FEMP has implemented numerous energy- and cost-saving projects to help improve facility energy management and operations. Since 1985, the Government has decreased energy consumption in buildings by 18.7 percent, measured by Btu-per-square-foot. It is now more than halfway to its goal of achieving a 30 percent reduction by 2005.

FEMP's leadership and accomplishments have:

- ◆ Increased Federal employee energy awareness,
- ◆ Increased partnerships with the private sector,
- ◆ Increased energy efficient standards into product procurement,
- ◆ Provided cost-effective, high quality services and equipment,
- ◆ Influenced outcomes by promoting good energy habits, and
- ◆ Increased the number and scope of energy efficiency projects.

By focusing on its customers with a clear purpose, FEMP has helped Federal agencies meet their challenges and attain many of their goals.

When FEMP leads the way, agencies have the skills, the means and the initiative to undertake projects that save energy, water and money.

Executive Order 13123

Responsible leadership starts at the top. On June 3, 1999, President Clinton issued a new Executive Order that bolsters the Federal government's current commitment to energy and environmental efficiency in the operation of its facilities. Entitled "Greening the Government Through Efficient Energy Management," Executive Order 13123 provides the means to carry out the Administration's energy and environmental policies, with huge cost savings to the taxpayer.

The goals of this Order bring new challenges to the provisions set forth in the President's 1994 E.O. 12902, "Energy Efficiency and Water Conservation at Federal Facilities," expanding its scope and strengthening its purpose. With respect to efficiency, its goal is to reduce energy consumption per gross square foot by 30 percent in 2005 and 35 percent in 2010, compared to 1985.

Achieving this goal will cut current levels of greenhouse gas emissions by 2.4 million tons and save taxpayers more than \$750 million annually.

The Order sets new goals for energy intensive facilities that were previously exempt from reduction goals. Moreover, it directs agencies to identify energy saving opportunities associated with water use at these sites.

E.O. 13123 also establishes the first Federal goal to reduce greenhouse gas emissions associated with energy use, calling for a 30 percent reduction by



2010, compared to 1990. The Order directs government agencies to strive to use electricity from clean, efficient, and renewable energy sources. In addition, agencies must adopt policies that include green power as a component of their requests for bids to procure electricity.

The Executive Order encourages agencies to use both ESPCs and utility service contracts to accomplish energy efficiency projects bundled with renewable projects.

The Order cites using "life cycle analysis" as the best methodology for determining the cost-effectiveness of potential projects. These include all energy-related decisions including water use, choice of energy source, new building design, use of renewable energy, and replacement of obsolete equipment.

The procurement of energy-efficient products is another important focus of the Order. Agencies are directed to purchase Energy Star products whenever possible, or else to purchase products that FEMP has determined to be in the top 25 percent of efficiency.

Partnering with the Private Sector

Over the years, FEMP has established effective working partnerships with utilities, energy service companies, and product manufacturers to help its customers achieve the savings mandated by EPAct and Executive Orders 12902 and 13123. These partnerships help Federal agencies and State governments meet energy efficiency requirements, streamline procurement, improve operations, and provide financial incentives.



Shelley Fidler of the White House and NORESKO's George Sakellaris (front row seated) at the kick-off of EPA's Ann Arbor ESPC.

These partnerships benefit all members of the team. Utilities and private sector companies who are willing to make front-end investments in retrofits and energy efficient technologies are offered long-term contracts that allow them to

share in the savings. The Federal sector achieves its energy efficiency goals and at the same time will create as many as 150,000 new jobs in the private sector. This innovative strategy is setting standards in agencies and industry around the world.

FEMP has strong working relationships with energy sector participants nationwide. FEMP works closely with manufacturers, utilities, trade

associations, community organizations, professional societies, universities, and State and local governments to ensure the best public-private energy-saving opportunities.

FEMP continues to pursue utility energy services, financing, procurement, and other incentives to support Federal projects in a constantly changing utility environment. The Federal Utility Partnership Working Group, which includes 44 members, develops partnerships and communications channels among agencies and utilities. In addition, a total of 21 Partner Resource Centers across the country are equipped to provide Federal energy managers with convenient, localized support and access to FEMP software, publications, and training.

Alternative Financing

Another winning program is the Energy Savings Performance Contract (ESPC), which allows Federal agencies to finance energy improvements in Federal buildings without having to spend treasury funds. Under this alternative financing arrangement, an agency contracts with a private energy service company (ESCO), which pays all up-front costs. These costs include an energy needs assessment, followed by the purchase, installation, operation, and maintenance of energy-efficient equipment. In exchange, the contractor receives a share of the subsequent cost savings for the life of the contract, which can be up to 25 years. After that time, the Federal government retains all savings and equipment.

Agencies can also take advantage of regional and technology-specific "Super ESPCs" awarded by the DOE. Super ESPCs allow agencies to negotiate site-specific delivery orders with an ESCO without having to begin contracting from scratch. In this way, agencies can effectively "piggyback" their own ESPC projects onto the broader Super ESPC to save time and money.

The Super ESPC award process is intended to take six to eight months. To date, all six regions

have issued awards: Western, Southeast, Central, Midwest, Mid-Atlantic, and Northeast.

In FY 1999, 21 delivery orders were awarded under the Super ESPC program and will result in contractor investments of more than \$65 million.

The Technology-Specific Super ESPC program typically emphasizes a particular renewable technology and applies to all regions. Under these contracts, one or more ESCOs who have unique capabilities and experience with the installation of

a particular technology are chosen by DOE to provide energy services. For example, in FY 1999, a Geothermal Heat Pump Technology-Specific Super ESPC was awarded to five ESCOs. The contract is worth \$500 million and covers the entire nation.

ACT NOW

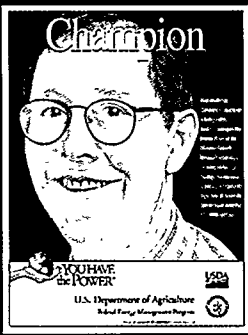
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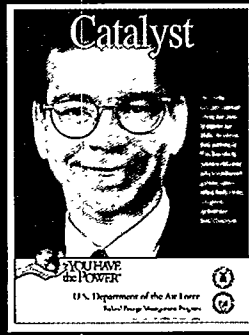
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Department of Agriculture



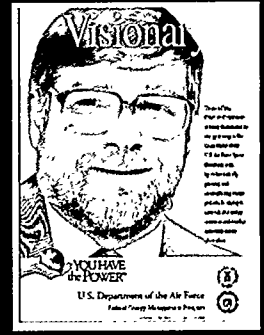
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Department of Agriculture



Cathy O'Brien
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Michael Anderson
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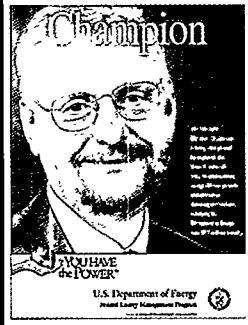
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Tad Dickinson | David Wolfe
Department of Energy

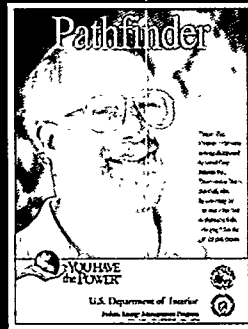


Shelley Fidler
The White House



Steve Krstulovich
Department of Energy

1999 YOU HAVE the POWER ENERGY CHAMPIONS



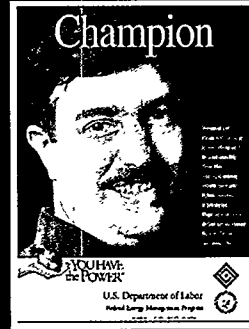
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Department of the Interior



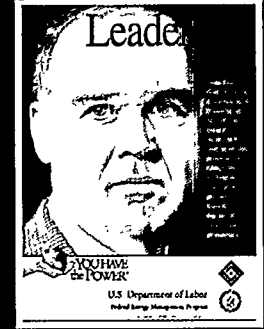
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Department of Justice



Anthony Wildgruber
Department of Justice



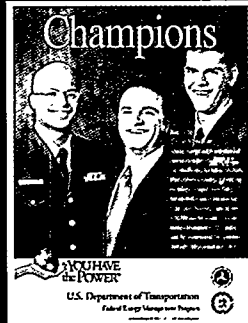
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Department of Labor



James Sheehy
Department of Labor



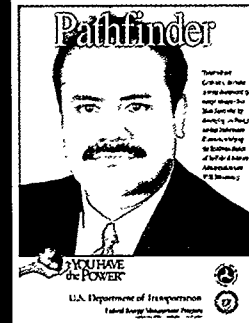
Barbara Martin
Department of State



J. Barresi, J. Adamo, A. Went
Department of Transportation



Richard Hanks
Department of Transportation



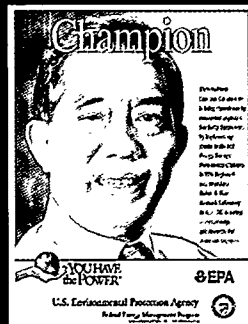
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Department of Transportation



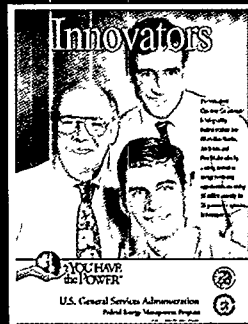
Tim Harper, Patricia Newman
Department of the Treasury



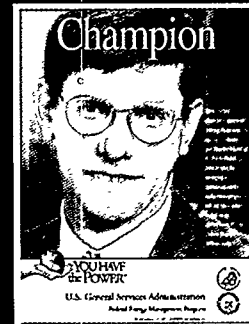
Carolyn Gangmark
EPA



Rolando Santos
EPA



K. Shutika, D. Smith, D. Stiteler
GSA

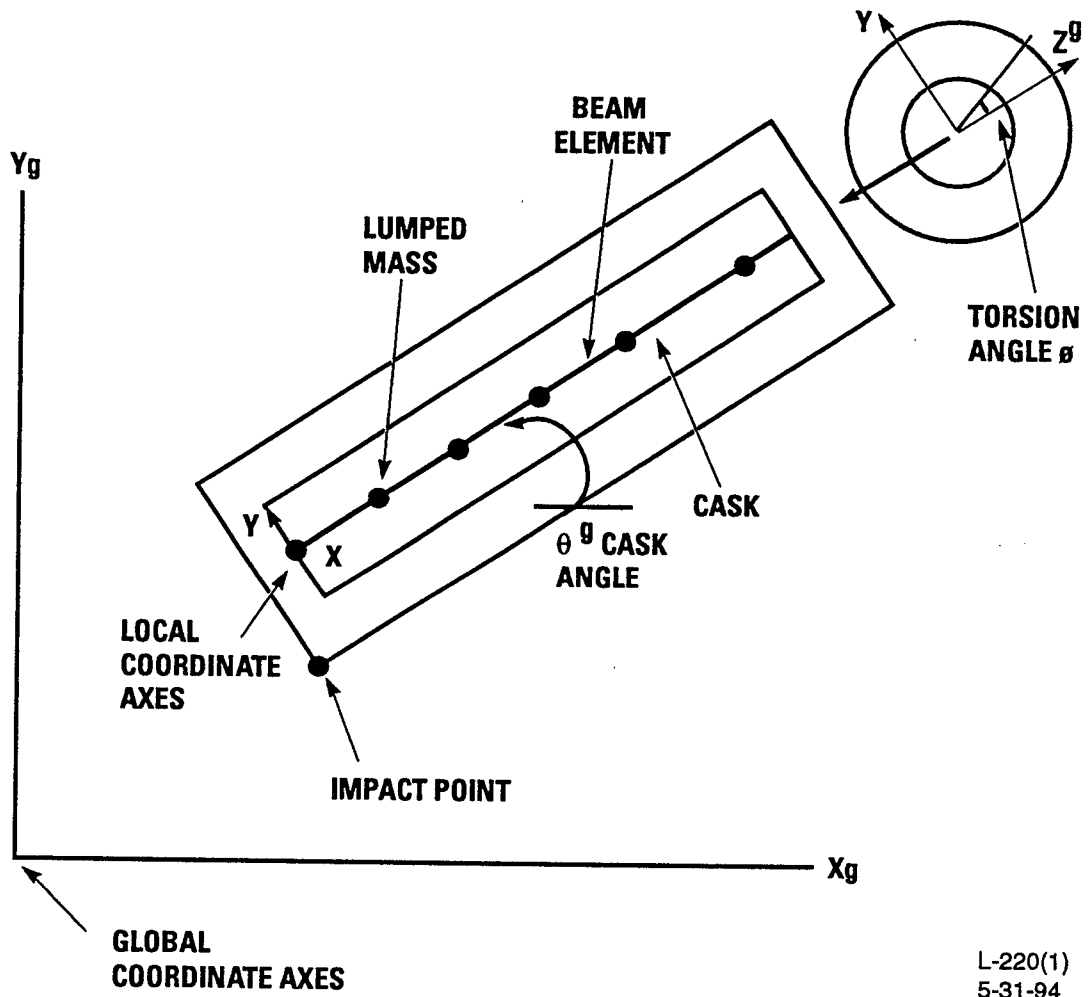


Tim Wisner
GSA



Mike Ziskind
GSA

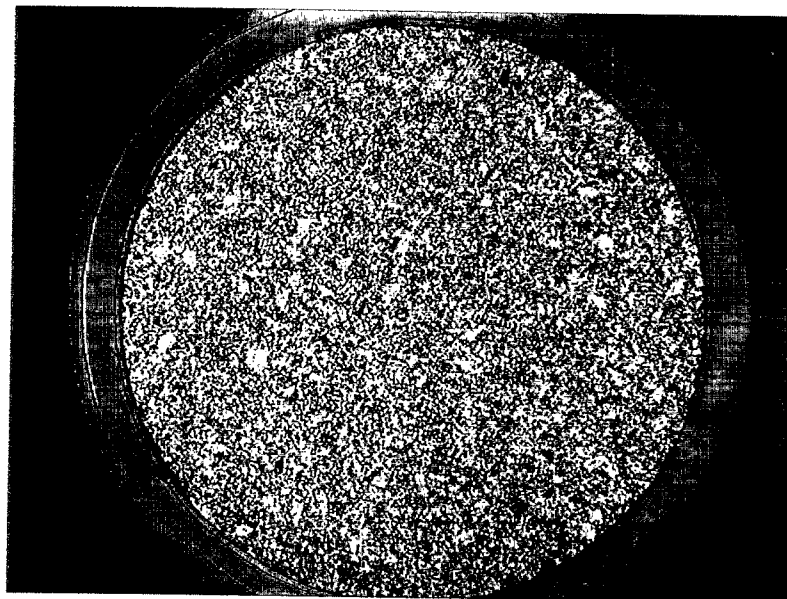
Fig. 3.5.1-1. Model of a cask using lumped mass and beam representation



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98-1029-01 BN Coated Graphite 13X

Figure 1. Low magnification photo of CVD BN sheath.

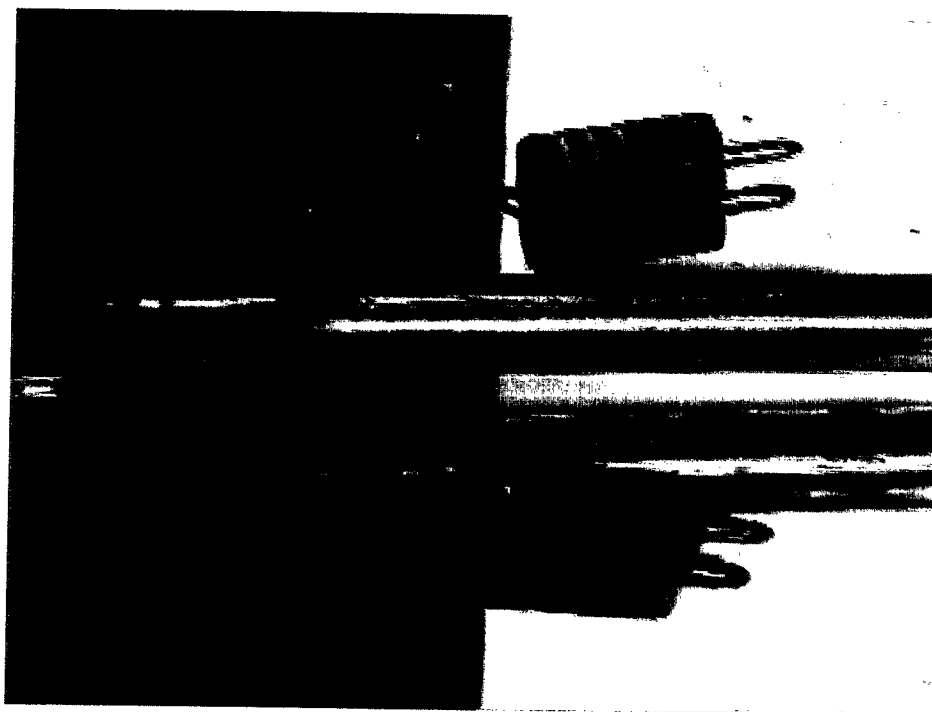


Figure 2. Top portion of stainless steel fixture showing thermocouple leads and markings.

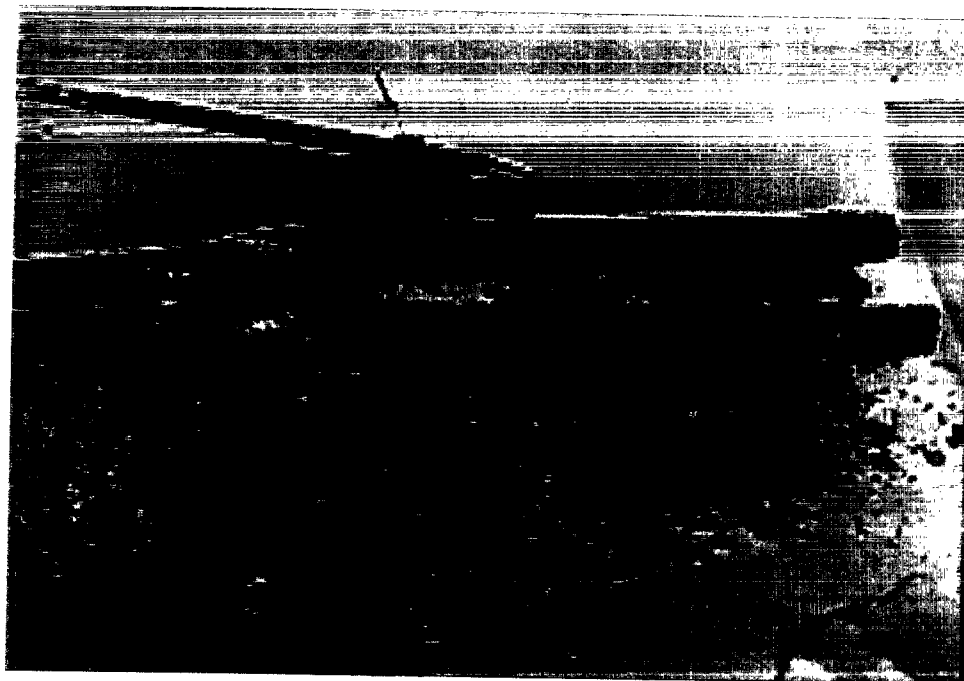


Figure 3. Ends of stainless tubes after cryolite was removed.

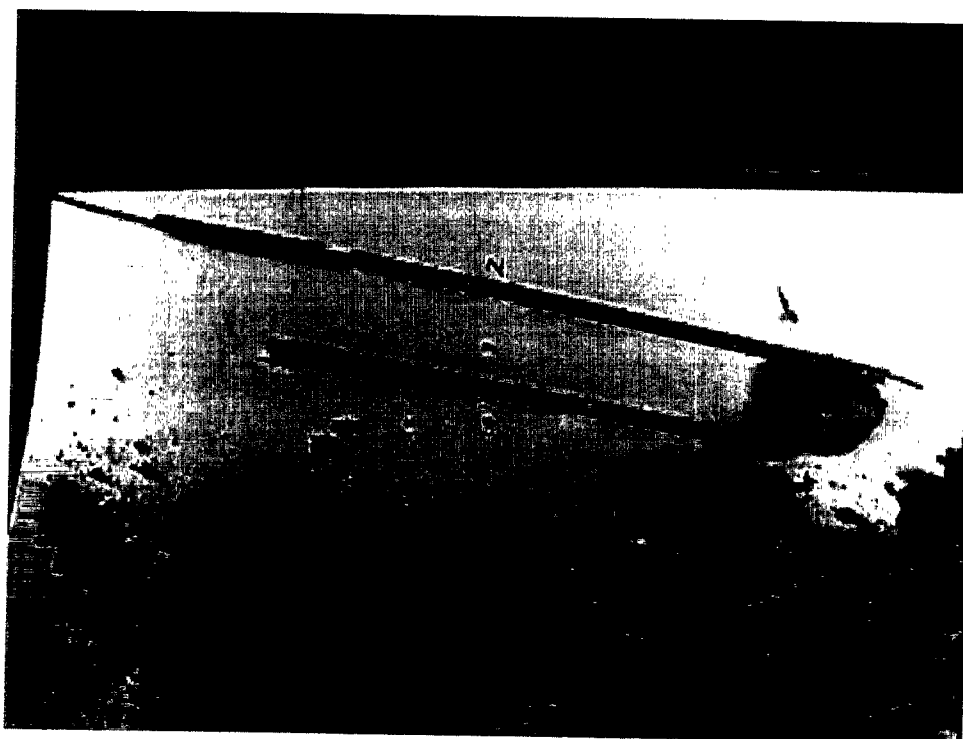


Figure 4. BN sheaths after removal from fixture.



Linda Sisk
Department of the Air Force



Scott Bly
Department of the Army



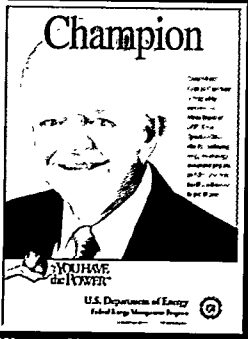
Soheir Ibrahim
Department of the Army



Ann Olson
Department of the Army



K.C. Patel, Lorenzo Taylor
Department of Commerce



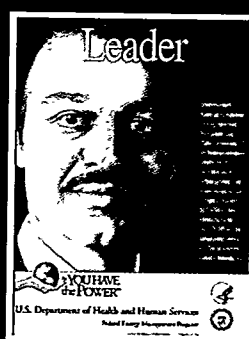
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Department of Energy



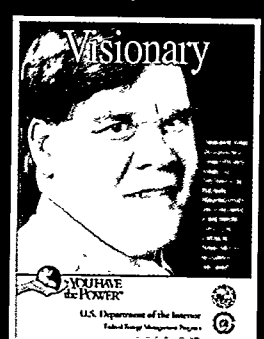
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Health and Human Services



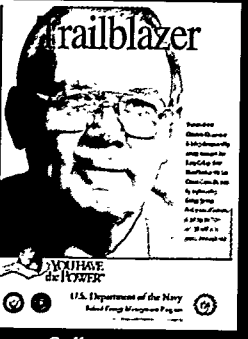
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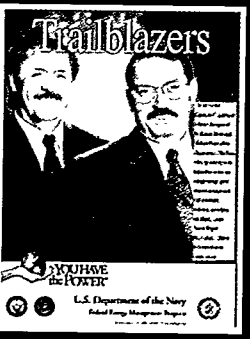
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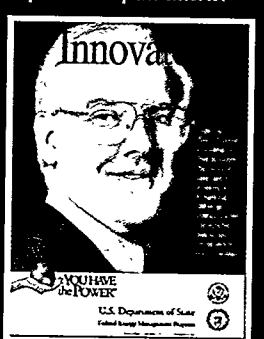
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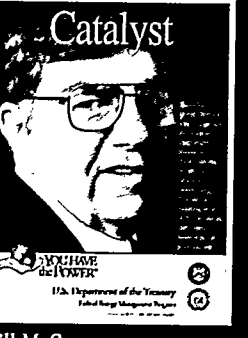
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Randy Sawyer, Bev Thompson
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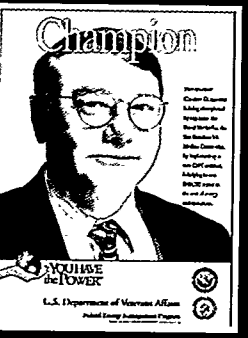
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Mouris Ibrahim
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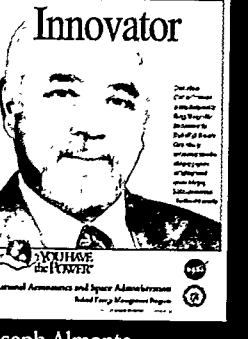
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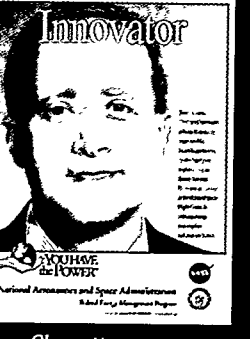
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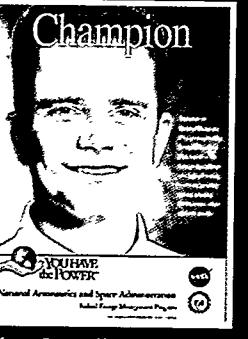
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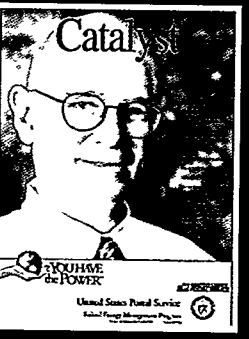
Joseph Almonte
NASA



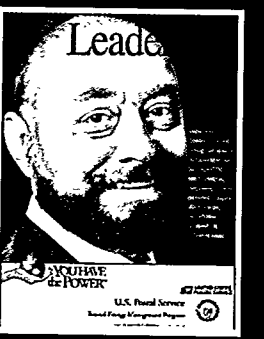
Sam Chupetta
NASA



Chris Iannello
NASA



Paul Fennewald
USPS



Sam Grego
USPS

Procurement

It comes as no surprise that the U.S. Federal government leads the world in terms of purchasing power. Along with this power comes the responsibility to promote continuous improvement

FEMP worked closely with the Office of Management and Budget and the White House Council on Environmental Quality to initiate the Federal Procurement Challenge.

among suppliers and to influence the availability and cost of products that save energy and conserve our natural resources.

Federal facility managers and purchasing officers buy \$10-20 billion of energy-related products annually. Their decisions dramatically affect the types of

products created, manufactured, and marketed by a wide range of businesses. EPA Act and E.O.s 12902 and 13123 encourage all Federal employees to shop wisely and to select only those products ranked in the top 25 percent most energy efficient in their class.

To this end, FEMP continues to work closely with the Office of Management and Budget and the White House Council on Environmental Quality

to uphold the Federal Procurement Challenge. This program shares a commitment to:

Save Energy and Money

Agencies can save substantial amounts of money by buying products that consume much less energy and thus have lower lifetime operating costs (and often, lower maintenance costs), even if the initial purchase price is slightly higher.

Reduce Pollution

Lower energy consumption also reduces air and water pollution, as well as reducing the emission of greenhouse gases such as carbon dioxide.

Provide Market Leadership

It is now the policy of all Federal agencies to actively promote the purchase of energy efficient products and renewable energy technologies and to set an example for other governmental, corporate, and institutional purchasers.

The Challenge has been taken up by more than 22 Federal agencies so far, representing more than 95 percent of Federal purchasing power. Together they have committed to specify and purchase only best-practice energy and water saving products that will reduce agency operating costs. Federal employees, citizens, and taxpayers all benefit from Federal cost savings by as much as \$900 million per year, and from a reduction in carbon dioxide emissions by as much as 11 million metric tons.



EPA

DOE

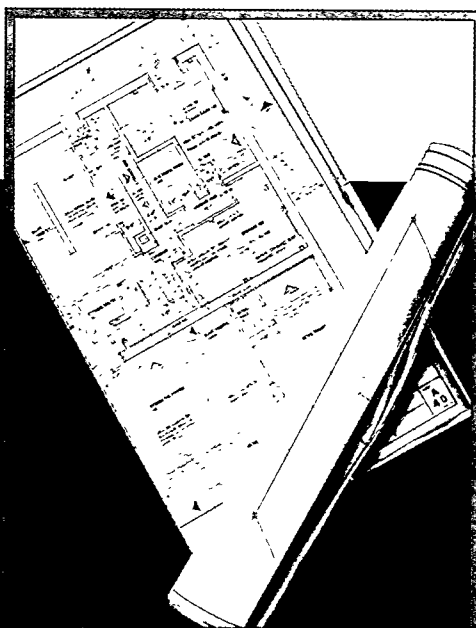
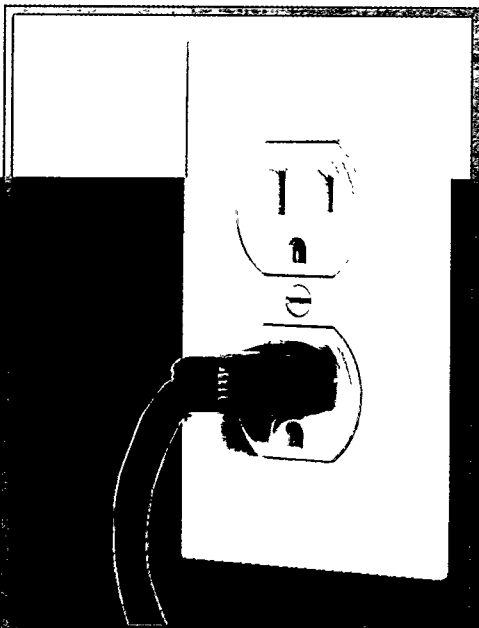
In FY 1999, FEMP's Product Energy Efficiency Recommendations grew from 25 to 31, ultimately representing more than 60 products in the following categories:

- residential appliances and equipment,
- water saving technologies
- lighting technologies
- commercial appliances and equipment
- office technologies
- construction products, and
- commercial/industrial technologies.

The EPA/DOE Energy Star program already covers 17 products, with more to follow. The Recommendations help Federal buyers make intelligent decisions about the efficiency level for products that comply with the mandates. They

also provide tips on cost effectiveness, purchasing, and where to find additional information. By increasing demand for energy-efficient products in a large, reliable market, Federal workers provide a model for other levels of government and for corporate and institutional buyers as well. They even help lower the costs of these products for all consumers.

By increasing demand for energy-efficient products in a large, reliable market, Federal workers help lower the costs of the products for all consumers.



Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
Without Through-the-Door-Ice Service

XV2 Compressor
Model A9S-W
Capacity: 23 Cu. Ft.

Compare the Energy Use of this Refrigerator with Others before You Buy.

This Model Uses 776 kWh/year	
Energy Use (kWh/year) range of all similar models	
Uses Least Energy 742	Uses Most Energy 836

1 kWh/year (kilowatt-hours per year) is a measure of energy (electrical) use. Your utility company uses it to compute your bill. Only models with 22.5 to 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate.
This model's estimated yearly operating cost is:

\$68

Based on a 1995 U.S. Government national average cost of 8.4¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Product Name: [unreadable] Model: [unreadable] © 1999

Training / Technical Assistance

Managing a Federal facility and making it energy compliant involves learning and understanding a broad range of regulations, technologies, financing options and projects. This is a daunting task for even the most experienced facility manager.

To help managers make informed decisions, FEMP provides technical project assistance through a wide array of services. These include energy audits, technical training, new and emerging energy technology demonstrations, design assistance, and energy saver showcase facilities.

The SAVEnergy Audit Program helps identify opportunities for energy efficiency and water con-

To help make informed decisions, FEMP provides technical assistance through a broad range of services.

servation and is available to all Federal agencies. The program provides staff assistance and direct financing of energy and water audits, and provides Federal facility managers with a step-by-step Action Plan to implement opportunities identified in the audit. During FY 1999,

the SAVEnergy Audit Program performed more than 48 Federal energy audits.

Federal employees can take advantage of a variety of high quality training programs provided by FEMP. These include technical courses, work-

shops, and symposia in several areas, such as project financing, project design and screening, life-cycle costing, and technical software tools.

During FY 1999, FEMP conducted 55 workshops and symposia, training more than 4,700 attendees in the efficient use and conservation of energy, water, and renewable energy in Federal facilities.

Helping government workers keep pace with the private sector, FEMP's New Technology Demonstration Program provides real world demonstrations of emerging technology. Through Cooperative Research and Development Agreements, demonstrations bring together a Federal host site, a technology manufacturer, a trade association, a local utility, and a national laboratory. Together they evaluate energy and water saving technologies that are available in the market, but not yet in general use by the Federal sector, and FEMP reports their findings. In more brief reports, the program evaluates technologies as diverse as ice storage air conditioning, heat pumps, and roof spray cooling. 26 such technical reports were published in FY 1999.

The Design Assistance Program provides assistance in Federal energy efficiency, renewable energy, water conservation, and greening initiatives. FEMP has helped agencies design several hundred energy retrofits and installations nationwide, including national landmarks such as the National Air and Space Museum, the Thoreau Center for Sustainability at the Presidio in San

FEMP technical assistance helped to 'green' Thoreau Center for Sustainability at The Presidio, San Francisco, CA

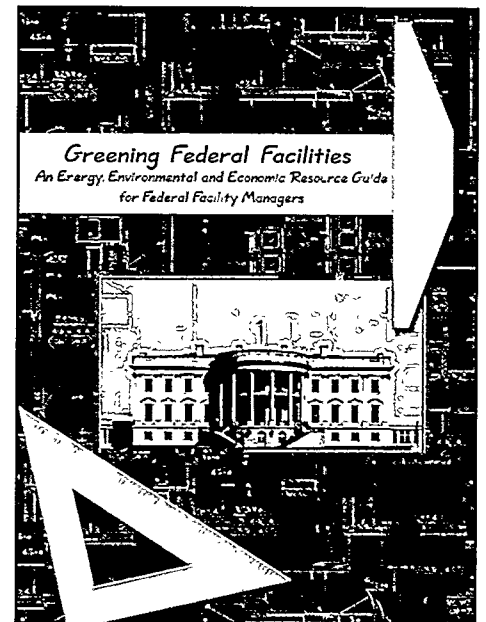
Francisco, and Yellowstone National Park. FEMP has also helped conserve resources at many typical Federal buildings, such as courthouses, administrative offices, and military bases.

The President's Million Solar Roofs Initiative continues to expand its scope and influence as part of FEMP's Renewables Program. Through its network of experts, this program will help Federal agencies identify, design, and implement solar projects in 20,000 Federal buildings by 2010.



For those needing informational resources, FEMP has compiled numerous reports to help Federal facility managers maximize energy and minimize costs.

The popular *Greening Federal Facilities* guide provides a step-by-step approach to lowering energy consumption and costs, improving the work environment, and reducing the environmental impacts of facility operations. Another useful tool is the Federal Lighting Guide. By simply improving their lighting systems, facilities effect cost savings, occupant comfort, improved productivity, and environmental responsibility. This helpful guide contains information on how to implement lighting improvements, and serves as a "one-stop-shopping" resource that directs building and energy managers to a broad range of lighting topics.



The Greening Federal Facilities Guide helps provide the tools needed to modernize Federal buildings.

Outreach Efforts

Good leadership means knowing how to build strong teams that continue to grow even stronger. FEMP relies on dynamic communications and outreach programs to continually provide Federal energy managers with up-to-date information, and to ensure employees' ongoing awareness of the economic and environmental benefits of improved energy efficiency.

In addition to its roster of Federal customers, FEMP partners with technology developers, manufacturers, trade associations, utilities, and energy consulting firms to better communicate the need for improved products and services and to increase the range of market-ready technologies available to Federal workers.

Designed to appeal to a broad range of Federal managers and employees, FEMP's outreach efforts encourage team building across the board.

Programs inspire and challenge individuals at all levels within the Federal government, encourage wise energy habits, and recognize exemplary energy leadership.

In 1999, FEMP:

- ◆ Announced 51 winners of the 1999 Federal Energy and Water Management Awards who, through public and private partnerships, collectively saved more than \$60 million, 3.2 trillion Btu, and more than 20 billion gallons of water.

- ◆ Published eight issues of the FEMP Focus newsletter.

- ◆ Held its annual conference, "Energy 1999," in August, which was attended by more than 600 people from the U.S. and abroad. Federal, military, state and local government, and private sector energy managers attended sessions on a range of topics that included "Process Systems" and "Leasing Sustainable Buildings".

- ◆ Broadcast FEMP's seventh teleconference training program, TeleFEMP VII, "Accessing Alternative Financing Mechanisms," in June 1999 to approximately 2,000 people at 202 downlink sites nationwide.

- ◆ Realized 240,588 hits on its Web site in September 1999, an almost 120 percent increase from the same month in 1998.

Clean Energy for the 21st Century

Due to the size of its workforce, the Federal government has both an enormous responsibility and a tremendous opportunity to implement energy-saving measures for the benefit of all taxpayers. FEMP's message—that saving energy saves money—speaks directly to the Federal employee who is being asked to do more with less. By fostering responsible energy management and encouraging energy efficiency as a standard business practice, FEMP can reach its goals—to enhance the economic vitality and productivity of all Federal agencies; reduce harmful effects on the environment; promote sustainable energy practices; and contribute to a secure national defense.