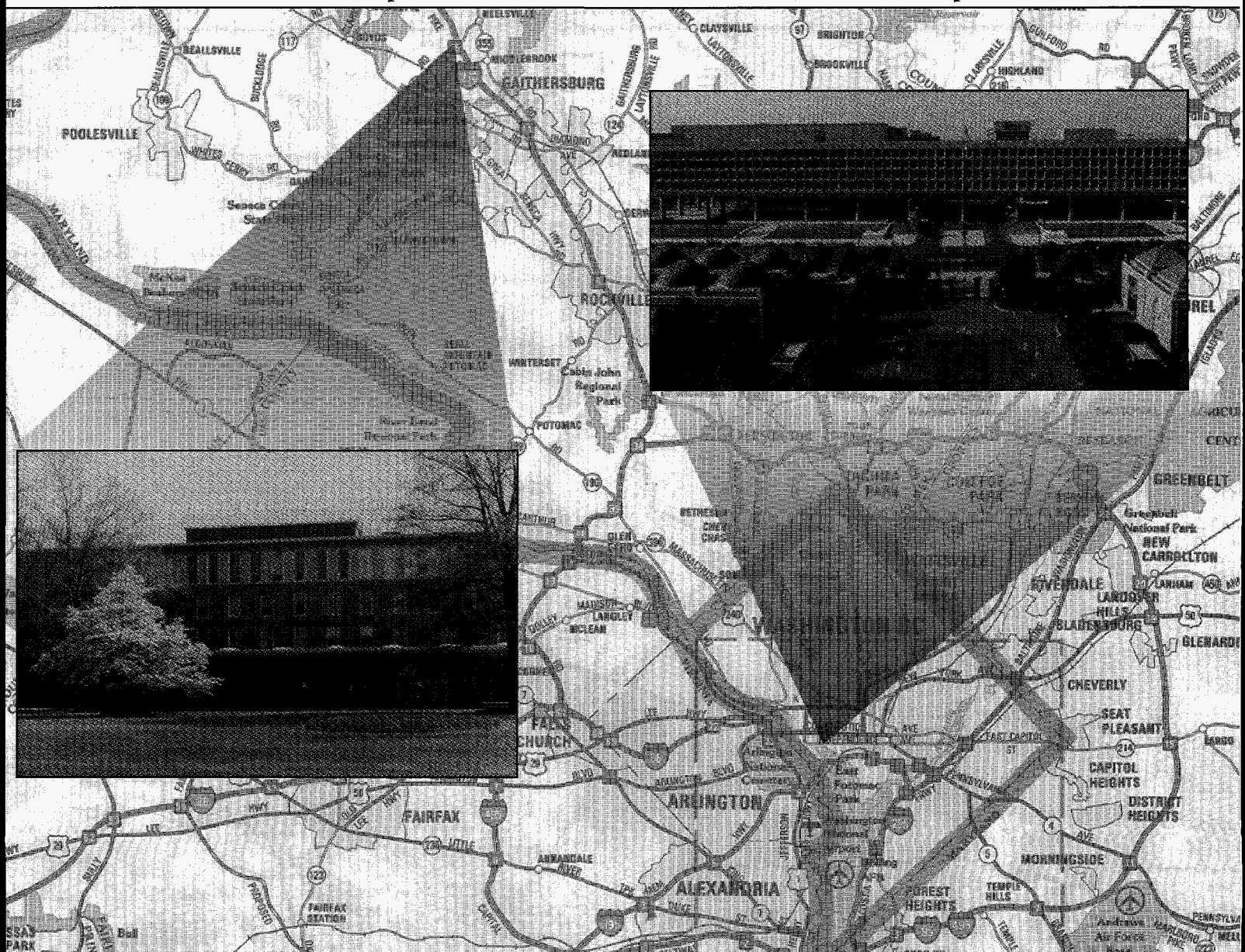
DOE/EE-0169

# The Greening of the U.S. Department of Energy Headquarters Washington, D.C.



*Second-Year Status Report*

*April 22, 1998*



***Presented to***

## *The Honorable Federico Peña*

***Secretary of Energy***

*By*

*The Assistant Secretary for Energy Efficiency and Renewable Energy and*

*The Assistant Secretary for Human Resources and Administration*


**Dan W. Reicher**
Assistant Secretary for Energy
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Assistant Secretary for Human
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This report serves as the 2-year update of the *Greening of DOE Headquarters: An Action Plan for Success, April 22, 1996.* We would like to thank the leadership and the management of the Office of Administrative Services, the Office of Information Management, and the Federal Energy Management Program. We thank them for their hard work and dedication in implementing practical and effective items of the *Action Plan* and for implementing other green ideas beyond the *Action Plan* that saved energy and/or resources.

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## DISCLAIMER

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# *THE GREENING OF THE DEPARTMENT OF ENERGY HEADQUARTERS SECOND-YEAR STATUS REPORT*

*APRIL 22, 1998*

## *INTRODUCTION*

The Greening of the Department of Energy Headquarters is a comprehensive, multi-year project designed to identify and implement specific actions DOE can take to save energy and money, improve the comfort and productivity of employees, and benefit the environment. It is part of the Administration's overall effort to promote "greening" in all of the nation's federal buildings. President Clinton started the Greening of the White House in 1993, and similar efforts have been undertaken by the Department of Defense at the Pentagon, the National Park Service at the Presidio, and now the Department of Energy at the Forrestal and Germantown buildings.

*The Greening of the Department of Energy Headquarters: An Action Plan for Success (Action Plan)*, unveiled on April 22, 1996, outlined more than 80 action items for DOE's Forrestal and Germantown buildings. The action items were designed to increase energy efficiency, improve resource management, improve air quality, reduce water use, reduce paper use, improve landscape management, improve maintenance and operational procedures, increase employee participation, and promote education and outreach. In the two years since the *Action Plan* was introduced, the Department of Energy has made major progress in implementing specific action items designed to target four major subject areas: (1) Energy Efficiency; (2) Resource Management; (3) Air, Water, Landscape; and (4) Human Factors. This report outlines the status of the recommendations of the *Action Plan* since they were introduced two years ago. In total, 60 percent of Action Plan initiatives have been addressed or accomplished (completed, pilot completed, or not pursued categories), 22 percent are in progress, and 18 percent are to be pursued, as shown in the *Executive Summary*. After the *Executive Summary*, the next section, *Recommendations Matrix*, provides a summary matrix of each initiative and indicates whether the initiative has been completed, in progress, to be pursued, pilot completed, or not pursued. *What has been done*? highlights the status of some of the *Action Plan* initiatives in more detail and identifies steps DOE took in conjunction with *Action Plan* initiatives. The last section reviews the current status of each *Action Plan* initiative.

## *EXECUTIVE SUMMARY*

### NUMERICAL SUMMARY

| *Action Plan* Initiative | Number Completed | Number In Progress | Number To Be Pursued | Number Pilot Completed | Number Not Pursued | Total Number of Initiatives |
|---|---|---|---|---|---|---|
| Energy Efficiency | 5 | 5 | 4 | 0 | 2 | 16 |
| Air, Water, and Landscape | 10 | 5 | 1 | 2 | 6 | 24 |
| Resource Management | 9 | 4 | 1 | 1 | 1 | 16 |
| Human Factors | 3 | 4 | 1 | 0 | 0 | 8 |
| Good Ideas | 2 | 1 | 8 | 0 | 10 | 21 |
| Total | 29 | 19 | 15 | 3 | 19 | 85 |

### PERCENTAGE SUMMARY

| *Action Plan* Initiative | Percent Complete | Percent In Progress | Percent To Be Pursued | Percent Pilot Completed | Percent Not Pursued | Total |
|---|---|---|---|---|---|---|
| Energy Efficiency | 31 | 31 | 25 | 0 | 13 | 100 |
| Air, Water, and Landscape | 42 | 21 | 4 | 8 | 25 | 100 |
| Resource Management | 57 | 25 | 6 | 6 | 6 | 100 |
| Human Factors | 38 | 50 | 12 | 0 | 0 | 100 |
| Good Ideas | 10 | 5 | 38 | 0 | 47 | 100 |
| TOTAL | 34 | 22 | 18 | 4 | 22 | 100 |

## *RECOMMENDATIONS MATRIX*

| [illegible] | STATUS OF DOE GREENING INITIATIVES | | | | | |
|---|---|---|---|---|---|---|
| **Number** | **Title** | **Completed** | **In Progress** | **To Be Pursued** | **Pilot Completed** | **Not Pursued** |
| **ENERGY EFFICIENCY** | | | | | | |
| EE1 | Increase Use of Electronic Documents | ● | | | | |
| EE2 | Increase Office Equipment Savings | ● | | | | |
| EE3 | Save Paper & Energy | | ● | | | |
| EE4 | Computer-based Faxing | ● | | | | |
| EE5 | Improve Efficiency of Vending Machines | | ● | | | |
| EE6 | Relocate LAN Equipment to LAN Park | | ● | | | |
| EE7 | Improve Lighting Controls | | ● | | | |
| EE8 | Sulfur Lamps | | ● | | | |
| EE9, 10 | Improve Daylighting Contribution | | | ● | | |
| EE11 | Fuel Cell Demo | | | ● | | |
| EE12 | Temperature Control for E-Corridor | ● | | | | |
| EE13 | Building Engineering Report | ● | | | | |
| EE14 | Insulate Induction Unit and Duct Risers | | | ● | | |
| EE15 | Return Cost Savings to Facility Managers | | | | | ● |
| EE16 | Back Pressure Turbine Generators | | | | | ● |
| **AIR, WATER, and LANDSCAPE** | | | | | | |
| AWL1 | Telecommuting, Alternate Work Sites, Flexi-Place | | ● | | | |
| AWL2 | Increase Metro Subsidies | ● | | | | |
| AWL3 | Icemaker CFC Maintenance and Replacement | ● | | | | |

| GREENING INITIATIVES | | STATUS OF DOE GREENING INITIATIVES | | | | |
|---|---|---|---|---|---|---|
| **Number** | **Title** | **Completed** | **In Progress** | **To Be Pursued** | **Pilot Completed** | **Not Pursued** |
| **AIR, WATER, and LANDSCAPE** | | | | | | |
| AWL4 | Retrofit Restroom Fixtures | ● | | | | |
| AWL5 | Utilize Sensor Operated Restroom Fixtures | | | | ● | |
| AWL6 | Retrofit with Water Efficient Fixtures | | | | ● | |
| AWL7 | Monitor Forrestal Water Consumption | ● | | | | |
| AWL8 | Negotiate Energy and Water Savings in Cafeteria | | | ● | | |
| AWL9 | Chilled Drinking Water | ● | | | | |
| AWL 10 - 24 | Integrated Landscape Actions | ● | ● | | | ● |
| **RESOURCE MANAGEMENT** | | | | | | |
| RM1 | Building Carpet Program | ● | | | | |
| RM2 | Use No-and Low-VOC Paints | ● | | | | |
| RM3 | Integrated Pest Management Program | ● | | | | |
| RM4 | Form a Recycling Committee | ● | | | | |
| RM5 | Don't Separate Trash. Utilize off-site separation | ● | | | | |
| RM6 | All Paper Recycling Program | ● | | | | |
| RM7 | Place Recycling Near Points of Sale | ● | | | | |
| RM8 | Polystyrene Recycling Program | | | | ● | |
| RM9 | Coffee Mug Program | | | | | ● |
| RM10 | Ensure Construction Contracts Requiring Recycling | ● | | | | |

| GREENING INITIATIVES | | STATUS OF DOE GREENING INITIATIVES | | | | |
|---|---|---|---|---|---|---|
| **Number** | **Title** | **Completed** | **In Progress** | **To Be Pursued** | **Pilot Completed** | **Not Pursued** |
| **RESOURCE MANAGEMENT** | | | | | | |
| RM11 | Recycling Revenue Policy | ● | | | | |
| RM12 | Consolidate Solid Waste Contracts | | | ● | | |
| RM13 | Paperless Office Program | | ● | | | |
| RM14 | Paper Policy | | ● | | | |
| RM 15 | Increase Procurement of Recycled-Content Items | | ● | | | |
| RM16 | GSA Advantage On-Line Shopping Service | | ● | | | |
| **HUMAN FACTORS** | | | | | | |
| HF1 | S-1 Affirmative Procurement Policy | | | ● | | |
| HF2 | Green System Architecture for Information Management System | | ● | | | |
| HF3 | Energy Efficiency Purchasing Implementation Support | | ● | | | |
| HF4 | Issuance of S-1 Memo on Energy Efficient Procurement | | ● | | | |
| HF5 | Optimize Business and Work Processes | | ● | | | |
| HF6 | Expand Televideo Conference Capabilities | ● | | | | |
| HF 7,8 | Public Outreach | ● | | | | |
| **GOOD IDEAS** | | | | | | |
| EE17 | Dry-Type Transformers | | ● | | | |
| EE18 | Install Point-of-Use Hot Water Heaters | | | ● | | |
| EE19 | Recommission Entire Building | | | | | ● |

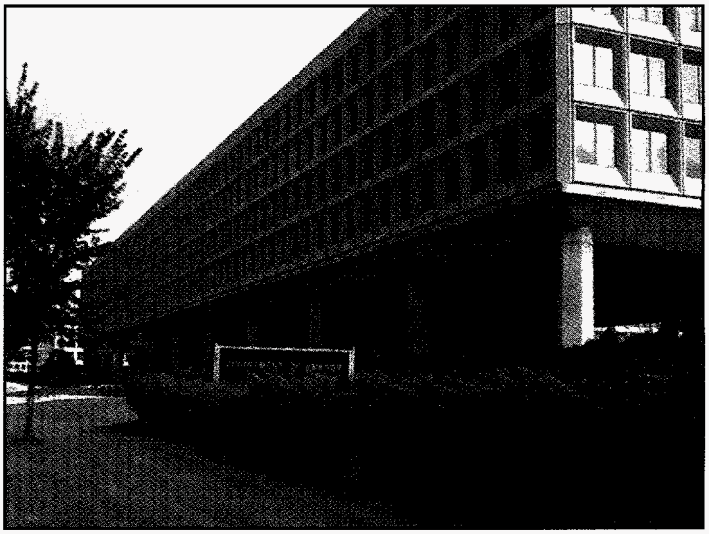
| GREENING INITIATIVES | | STATUS OF DOE GREENING INITIATIVES | | | | |
|---|---|---|---|---|---|---|
| **Number** | **Title** | **Completed** | **In Progress** | **To Be Pursued** | **Pilot Completed** | **Not Pursued** |
| **GOOD IDEAS** | | | | | | |
| EE20 | Solar Driven Desiccant Cooling | | | | | ● |
| EE21a | Change Out Windows Forrestal | | | ● | | |
| EE21b | Change Out Windows Germantown | ● | | | | |
| EE22 | South Building Atrium | | | | | ● |
| EE23 | Increase Use of Off-Peak Power | | | ● | | |
| EE24 | Ground Source Heat Pumps | | | ● | | |
| EE25 | Productivity Study | | | | | ● |
| EE26 | Implement NEMI and IAQ Recommendations | | | ● | | |
| EE27 | Better IAQ for Improved Productivity | ● | | | | |
| EE28 | VAV Damper System for Major Duct Branches | | | | | ● |
| EE29 | Increase Outside Air Intake with Heat Recovery | | | | | ● |
| EE30 | Establish Intelligent Retrofit Demonstrations | | | | | ● |
| EE31 | Employee Productivity Center | | | | | ● |
| EE32 | Coordinate Workspace Infrastructure | | | | | ● |
| EE33 | Individual Control at Workstation | | | | | ● |
| EE34-36 | EE and Renewables Demo | | | ● | | |
| TOTAL | | 29 | 19 | 15 | 3 | 19 |

**Note:** Since the status of several related initiatives has been combined and presented on one line, the actual number of spheres are not shown.

## WHAT HAS BEEN DONE?

*ENERGY EFFICIENCY*

### Energy and Water Conservation Audit



DOE ordered a comprehensive, preliminary audit of the Forrestal building complex, which was completed in September 1996. The purpose of the audit was to further develop *Action Plan* initiatives and identify other building energy and water conservation opportunities. GSA and DOE sponsored the audit, which examined energy consumption, water consumption and made recommendations. Several recommendations made through the audit are listed in **Table 1**. The table shows the recommendations, the possible savings if implemented, implementation cost, and simple payback. Some of the recommendations from the audit were similar to those identified by DOE's efforts in the *Action Plan*. *Action Plan* initiatives have addressed some of the recommendations, while other recommendations have not been implemented. DOE plans to award a task order using the mid-eastern regional Energy Savings Performance Contract (ESPC) that will perform those cost effective measures identified through the audit and explore other measures not yet identified.

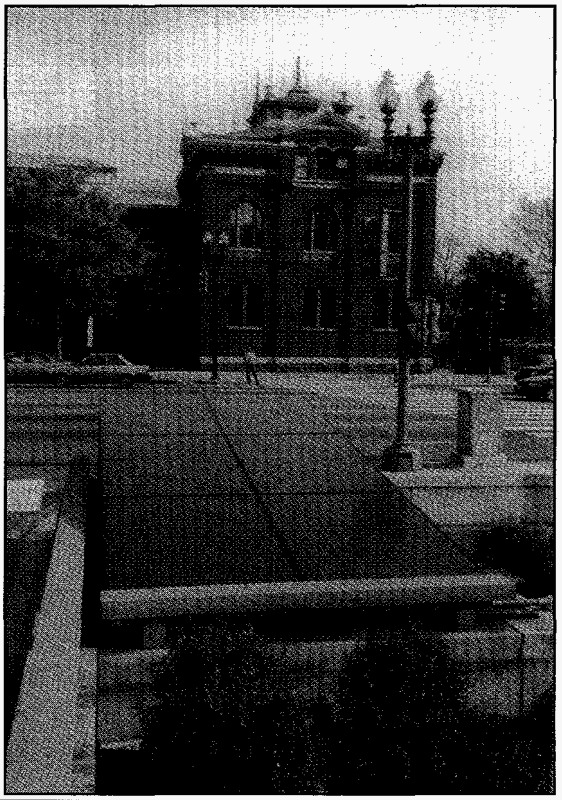
## Table 1
## Preliminary Building Audit Savings Summary

| Description | Annual MMBTU Savings (Source) | Annual Dollar Savings | Implementation Costs | Years Simple Payback |
|---|---|---|---|---|
| Replace Windows | 27,828 | $ 189,178 | $1,761,457 | 9.3 |
| Install Atrium on South Building | 25,552 | $ 131,720 | $1,562,928 | 11.9 |
| Install Atrium & Replace Windows | 43,350 | $ 240,442 | $2,851,279 | 11.9 |
| Install Desiccant System | (89) | $ 7,113 | $ 93,180 | 13.1 |
| Install Efficient Chiller System | 10,440 | $ 90,760 | $ 790,594 | 8.7 |
| Improve Efficiency of Elevator Cooling | 2,427 | $ 19,998 | $ 32,010 | 1.6 |
| Connect the EMCS with CDC EMCS | - | - | - | n/a |
| Install Variable Speed Drives | 1,856 | $ 10,450 | $ 106,847 | 10.2 |
| Install Elevator Phasing Controls | - | - | - | n/a |
| Install a Fuel Cell | 25,971 | $ 118,141 | $ 791,000 | 6.7 |
| Recommission the Building Complex | 8,633 | $ 33,152 | $ 775,400 | 7.8 |
| Install Back-Press Turbine Generator | 3,141 | $ 8,922 | $ 272,330 | 30.5 |
| Point-of-Use Water Heating | 3,457 | $ 34,121 | $ 51,975 | 1.5 |
| SOLARWALL Installation | 808 | $ 7,048 | $ 113,452 | 16.1 |
| Install Efficient Electric Motors (EEMs) | 2,959 | $ 26,454 | $ 171,532 | 6.5 |
| Improve Outdoor Lighting Control | 232 | $640 | $ 5,850 | 9.1 |
| Retrofit Outdoor Lighting | 811 | $ 2,238 | $ 76,358 | 34.1 |
| Install Cafeteria Lighting Controls | 50 | $ 821 | $ 2,400 | 2.9 |
| Expand the Sulfur Lamp System | 1,204 | $ 4,987 | $ 39,600 | 7.9 |
| Install Daylighting Controls | 366 | $ 1,331 | $ 33,138 | 24.9 |
| Retrofit Child Dev Center Lights | 172 | $ 1,548 | $ 8,926 | 5.8 |
| Install Power Factor Correction | - | - | - | n/a |
| Distribution Transformer Replacement | (58) | $ (210) | $ 199,038 | n/a |
| Install a Photovoltaic Array | 2,052 | $ 9,337 | $1,992,104 | 213.4 |
| Control Fresh Air Ventilation | 1,252 | $ 10,810 | $ 49,675 | 4.6 |
| Improve Irrigation System Control | 32,766 | $ 65,475 | $ 3,600 | 0.1 |
| Install Water-Saving Toilets and Urinals | 4,640 | $ 14,876 | $ 201,184 | 13.5 |
| Set Up Water-Only Irrigation Account | - | $ 83,656 | $ 50,477 | 0.6 |

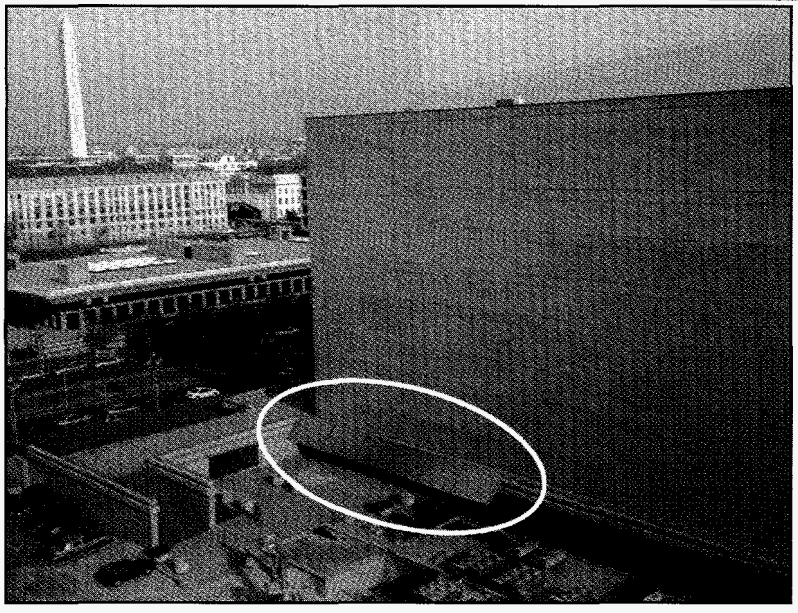
**Source:** *Energy and Water Conservation Audits, Preliminary Walk Through, Forrestal Building*, Geomet Technologies, Sept. 24, 1996. Shaded items will not be pursued, either in-house or with the assistance of an Energy Savings Performance Contract, due to system incompatibility, lengthy payback periods, or management program limitations.

## *EARTH DAY PARK*

On April 3, 1998, the Department of Energy activated the first array of photovoltaic solar panels located in Earth Day Park next to the Forrestal building. Later this year, DOE will install a second and larger solar array directly attached to the south side of the Forrestal building. The array located in Earth Day Park is rated at 1 Kilowatt and the array on the Forrestal building will be rated at 3 Kilowatts. Taken together, these solar panels will displace 63% of the park's night lighting load - a load currently supplied by PEPCO. The installation of these panels represents the completion of the park where ground was first broken on Earth Day 1995. As a completed project, it represents a living example of the U.S. Government's commitment to environmentally conscious landscape design and the use of the renewable resources. Earth Day Park embodies "green" principals on one of the last developed sites within the National Mall. It was a vision of former Secretary of Energy, Hazel R. O'Leary, in 1994, as she looked out her window toward the U.S. Capitol building.



*1 kW PV solar array located in Earth Day Park.*



*Artist Rendering of Site for additional 3kW solar array.*


*Earth Day Park.*

Earth Day Park, which forms the roof of the Interstate-395 tunnel, was once a vacant lot overgrown with weeds and littered with trash. Now its is a sustainable park with economically beneficial landscaping design that complements and enhances the local environment while minimizing the adverse effects of landscape maintenance. It has ornamental grass instead of traditional lawn and perennials instead of annuals. In addition, all plants are native to the local environmental conditions that exist in Washington, D.C. The design drastically reduces the need for gasoline powered movers, edgers, and trimmers along with fertilizers and pesticides.

### *Energy Management Performance Agreement*

In addition to the energy audit, DOE developed an energy management performance agreement that establishes requirements to meet or exceed, in a cost effective manner, all laws, Executive Orders, and federal regulations for energy efficiency, use of renewable energy, reduced paper consumption, and water conservation. The agreement was made between the Assistant Secretary for Energy Efficiency and Renewable Energy and the Assistant Secretary for Human Resources and Administration. The agreement outlines a cost effective energy management program that requires an update of The Forrestal and Germantown Facilities Comprehensive Energy Management Plan by the end of fiscal year (FY) 1998. This Energy Management Plan addresses the recommendations of the *Action Plan.* In addition, the agreement requires that DOE Headquarters energy use reductions are on target to meet the FY 2005 federal requirement of a 30 percent reduction in energy use per square foot from base year FY 1985. The agreement also addresses the increased use of alternative financing for energy efficiency projects, the initiation of renewable or alternative energy projects by DOE Headquarters, and the identification of no-cost or low-cost utility conservation programs. Finally, DOE is striving to have the DOE Headquarters facilities recognized as Federal Energy Saver Showcase facilities. To achieve this at either facility, DOE must complete the steps necessary to qualify, for example, highlighting energy or water efficiencies, continuing indoor air quality improvements, and using solar and other renewable energy technologies.

### *Energy Management and Control System*

An energy management and control system (EMCS) was installed in the Forrestal building beginning in 1993, with reheat control added as a separate contract in 1996. The EMCS provides many advantages to the building including central control over most of the HVAC systems, automatic monitoring of equipment status, temperature management, scheduled and optimum start of equipment, electric kilowatt hour (kWh) metering and real-time kW monitoring, heating system hot water temperature reset, air handling unit control of supply air temperature, and control of reheat coils. The EMCS eliminated the need to implement some of the *Action Plan* initiatives.

### *Increased Use of Electronic Document Management*

As part of the *Action Plan,* DOE has reduced paper consumption and increased electronic methods of communicating. The use of Electronic-mail (E-MAIL) is widespread at both buildings and DOE sends broadcast messages including vacancy announcements, news briefs, facility conditions, and other human relations notices to employees through DOECAST instead of by paper memo.

### *Increased Copy Efficiency*

As part of the *Action Plan,* DOE is replacing older, larger copiers with state-of-the-art smaller copiers that are more energy efficient. These new machines also have a power down feature and use less electricity when not being used. DOE is reducing the number of copies being produced by 1) requiring each office to pay for copying at staff copy centers, office, and walk-up machines; and 2) requiring all jobs be double-side printed at the staff copy center unless prior approval is given for single-sided copies.

*AIR, WATER, LANDSCAPE*

### *Improved Indoor Air Quality (IAQ)*

The Forrestal and Germantown buildings have been designated as smoke-free buildings. The "smoking" bathrooms were eliminated and replaced with dedicated smoking areas outside of the buildings.

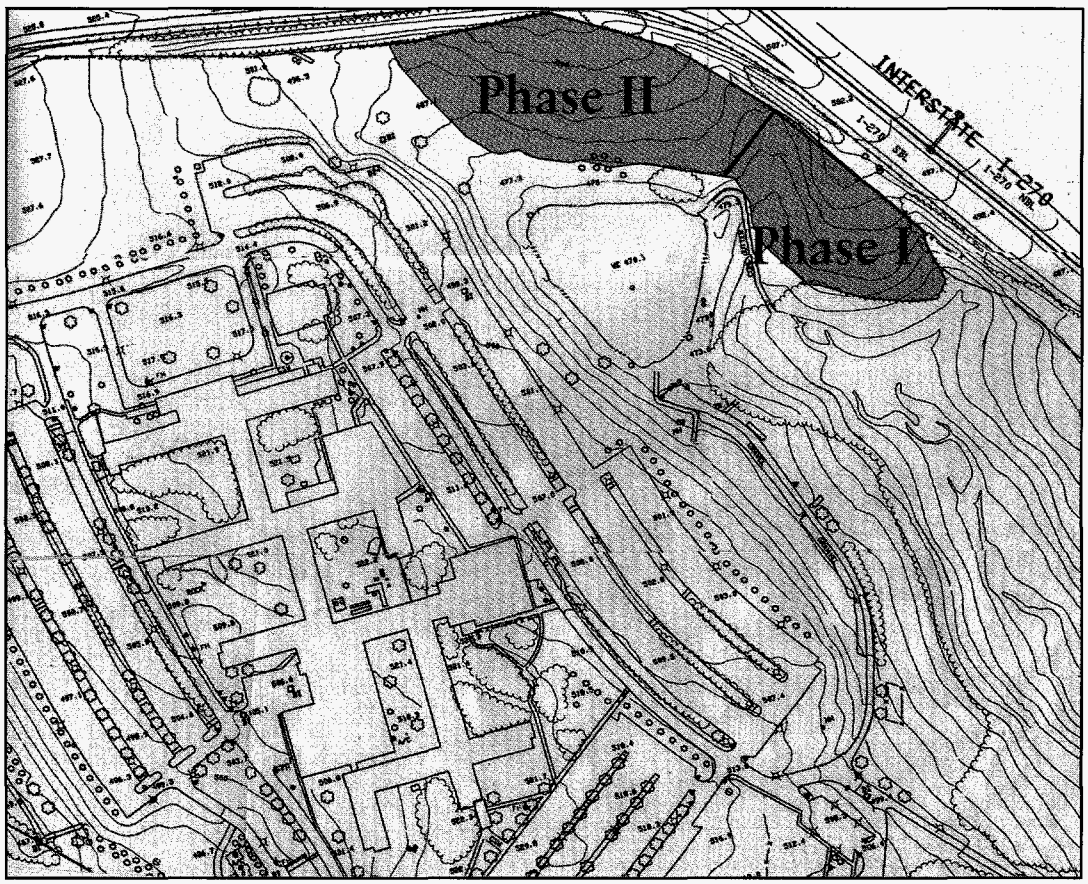
### *Naturalized Landscaping*

As called for in the *Action Plan,* DOE's effort to naturalize the landscape at Germantown is underway. Working with the Facility managers at Germantown and horticulturists at GSA, DOE has selected a 2 acre site to be naturalized. GSA horticulturists designed the project in 2 phases. The Phase I area will be planted in Spring of 1999 and covers behind the center of the pond and to the left to the existing forested area. Phase II, which will be implemented based on the success of Phase I, will cover behind the pond and to the right edge of the property **(See Figure 1)**. The development of the forest area will provide DOE with a savings in lower maintenance costs. The naturalization project also eliminates the need for fertilizers, pesticides, water and energy use. In addition, the area, as it develops into a forest, will be less appealing for duck and geese habitation.

### *Storm Water Management*

As part of the plaza deck project at the Forrestal building, the deck design and construction incorporated storm water management. The project included removing the 300,000 square foot deck, adding drains, replacing the plaza membrane and replacing the deck. The resulting storm water management system channels water into the drains. In addition, 30 percent of the deck was covered by plant material such as shrubs, trees, and lawn. This plaza deck project increased the R-value of the building envelope.

*Figure 1*
*Phases I & II of DOE's Naturalized Landscaping at Germantown*




*RESOURCE MANAGEMENT*

### *Use of Paper Containing Post Consumer Waste*

To meet a federal law requiring the use of 30 percent post-consumer waste content paper by January 1, 1999, DOE, working with the EPA, has selected paper to use and has ordered two truck loads. DOE will begin testing the paper in February 1998. Once the testing is finished, DOE will purchase additional paper for Headquarters and will advise the field offices on use of the paper. The new paper demands a higher price when recycled ($120/ton compared to $20/ton) because it is a "Type One" waste paper. In addition, the 30 percent post-consumer waste content paper costs less to purchase than no-waste content paper.

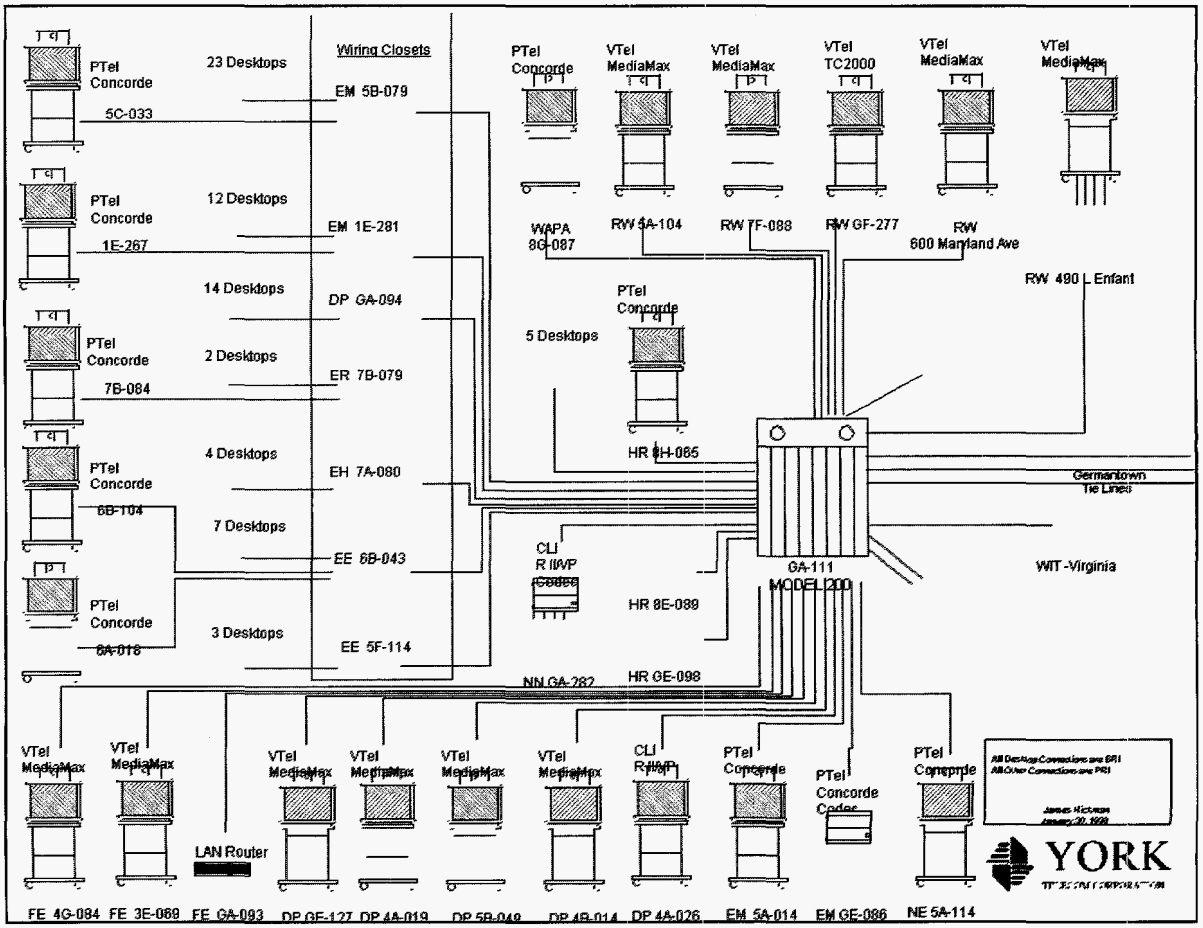
*HUMAN FACTORS*

## *Expanded Video Teleconferencing Capabilities*

DOE has expanded its video teleconferencing capabilities considerably in the last several years leading to increased use (See **Figure 2**). Video teleconferencing provides many crucial benefits to DOE including increased flexibility, increased communication, enhanced emergency management capability, reduced travel costs, and reduced use of the transportation network, saving gasoline, jet fuel, and travel time.

There are basically two types of video teleconferencing equipment used throughout DOE: Desk Top Video (DTV) Systems; and Multiple-person Studio Systems (Studio).

***Figure 2***
***Video Teleconferencing Capabilities at Forrestal***

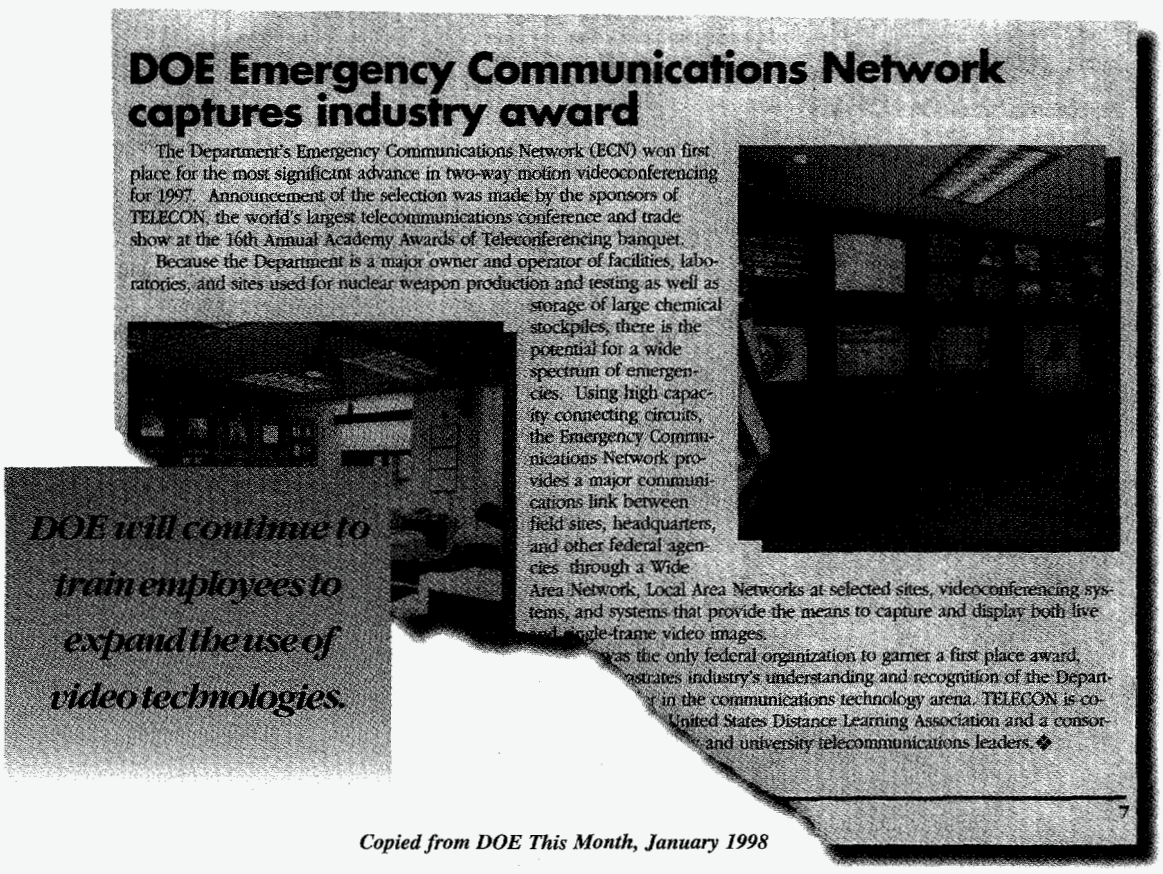


Both systems allow for point-to-point conferencing (for conferencing two locations) or multi-point conferencing (conferencing several locations). In multi-point conferencing, the systems are voice activated allowing all participants to view and hear the speaking party.

Currently, there are over 90 installed video teleconferencing systems at Forrestal, (70 of which are DTV systems and 21 Studio systems). DOE's Environmental Management Division (EM) has certified approximately 150 rooms across the country that use the EM multi-user bridge. At Germantown, EM alone has almost 48 DTV systems and 7 studio rooms. The DTVs are designed for individuals or smaller groups, while the studio systems are currently being used for larger groups. DOE also has the capability of providing connectivity into both the small and large auditoriums located at Forrestal and Germantown.

In all, this national system allows DOE employees to hold conferences and to communicate to the various field offices, national laboratories, other federal agencies, and private sector organizations.

*Figure 3*
*DOE's Network Wins Award*



**DOE Emergency Communications Network captures industry award**

The Department's Emergency Communications Network (ECN) won first place for the most significant advance in two-way motion videoconferencing for 1997. Announcement of the selection was made by the sponsors of TELECON, the world's largest telecommunications conference and trade show at the 16th Annual Academy Awards of Teleconferencing banquet.

Because the Department is a major owner and operator of facilities, laboratories, and sites used for nuclear weapon production and testing as well as storage of large chemical stockpiles, there is the potential for a wide spectrum of emergencies. Using high capacity connecting circuits, the Emergency Communications Network provides a major communications link between field sites, headquarters, and other federal agencies through a Wide Area Network, Local Area Networks at selected sites, videoconferencing systems, and systems that provide the means to capture and display both live and single-frame video images.

...was the only federal organization to garner a first place award, ...strates industry's understanding and recognition of the Depart... in the communications technology arena. TELECON is co-...United States Distance Learning Association and a consor... and university telecommunications leaders. ◆

*DOE will continue to train employees to expand the use of video technologies.*

7

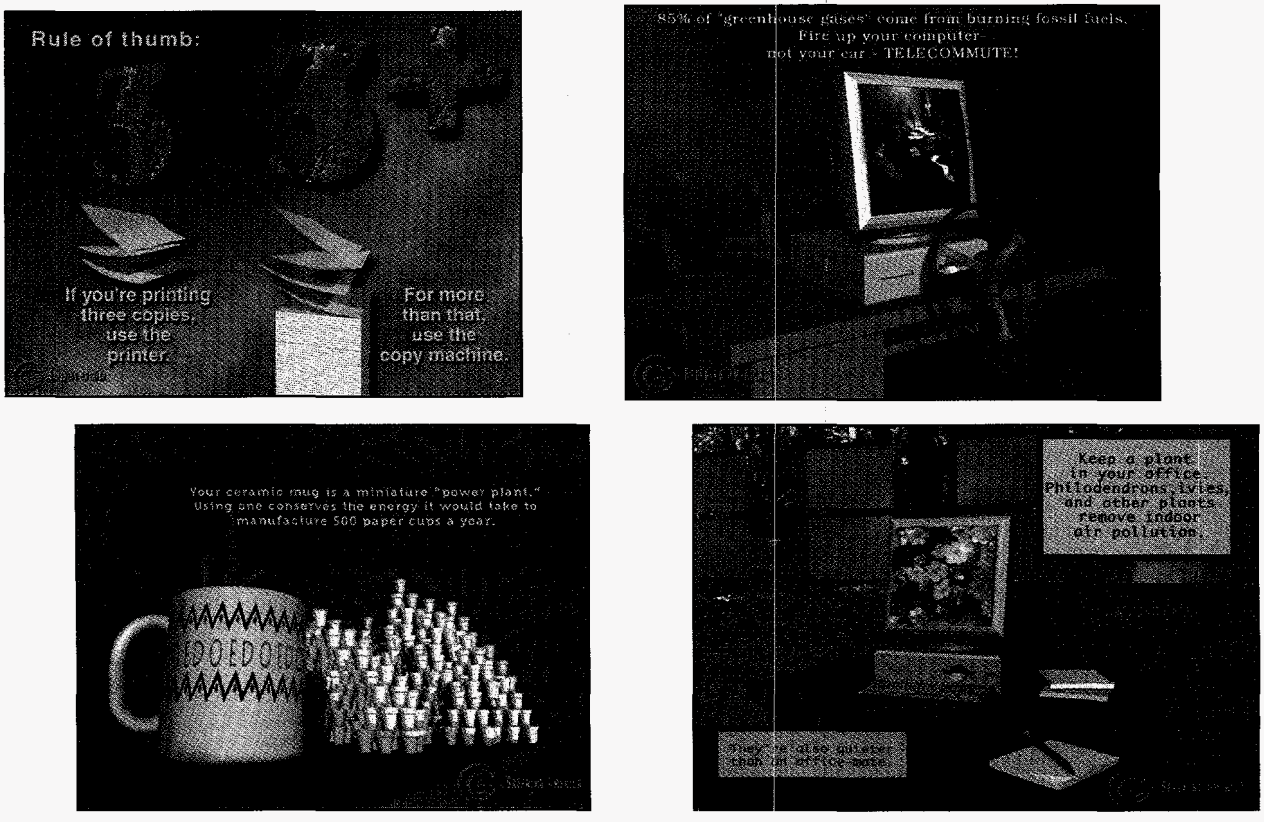
*Copied from DOE This Month, January 1998*

Several additional benefits that the video conferencing brings to DOE are driven by the technology. Video conferencing provides "Live Share™" applications where individuals can actually work on documents while in a video conference session. Also, document cameras can be used to display viewgraphs and data, interactive training can be accomplished, software applications can be displayed, movies can be viewed or conferences can be recorded.

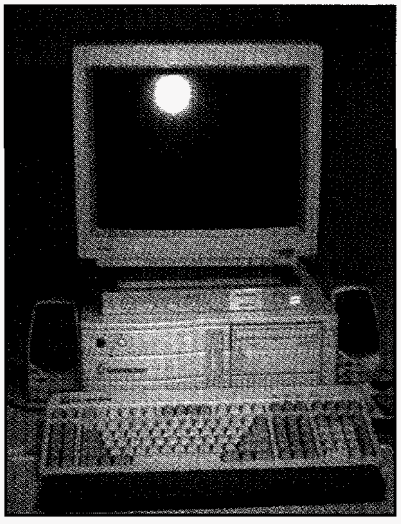
### *Outreach*

As an example of DOE's outreach to employees, computer screen messages provided employees with information on how to cut energy, water or resource use (See Figure 4). DOE, with help from Greening America, Inc., developed over 20 resource efficiency messages. DOE installed the messages on the DOE LAN to be viewed by employees. DOE also distributed these messages to other Federal Agencies. In addition, DOE participated in the "You have the Power Campaign" which highlighted energy champions throughout DOE and promoted energy use awareness and efficiency.

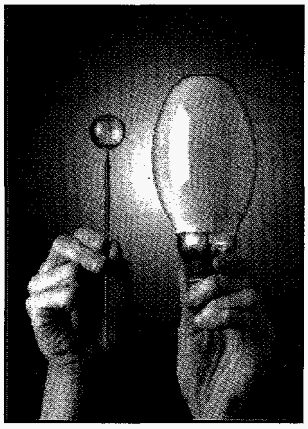
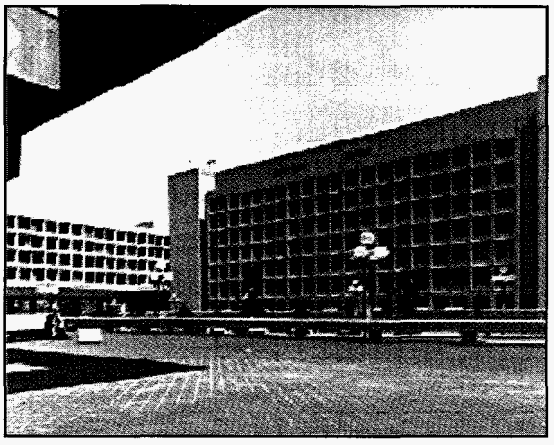
***Figure 4***
***Environmental Screen Savers at DOE***

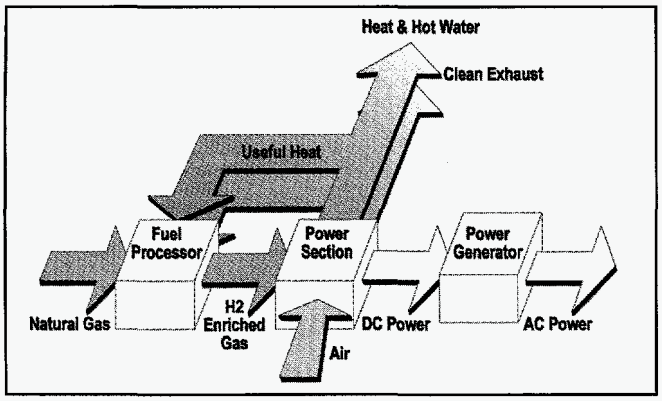


*STATUS OF THE ACTIONS*

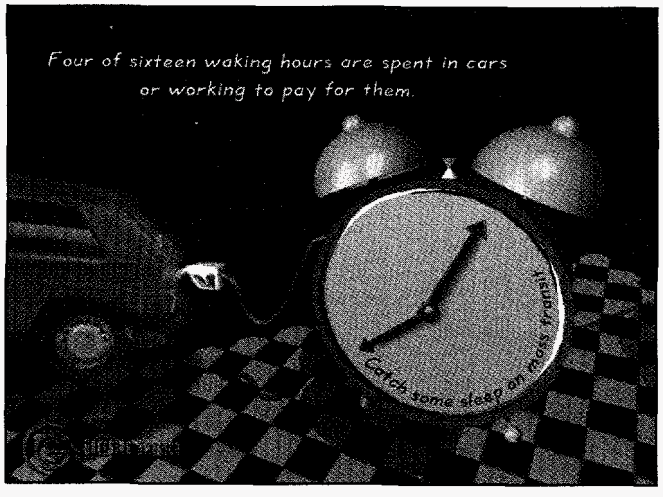
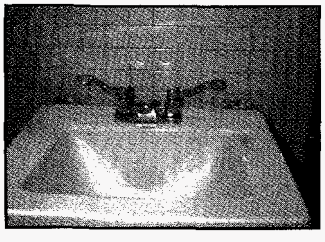
| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *ENERGY EFFICIENCY* | |
| EE 1 - Improve Productivity by Increased Use of Electronic Document Management. | Completed. Electronic document management is widespread in DOE and receives continued emphasis. In addition, DOE has aggressively pursued providing forms, reports, and information over the World Wide Web. |
| EE 2 - Increase Office Equipment Savings Through Power Management, Improved Purchase Criteria, Start-up Commissioning, User Training, Shared Equipment, and Ink Jet Technology. | Completed. Efforts by Human Resources (HR) within DOE have led to increased savings at both buildings in power management, user training, shared-equipment, and ink-jet technology. |
| EE 3 - Save Paper and Energy with State-of-the-Art Copiers. | In Progress. Smaller, more efficient copiers are being installed. In addition, DOE has reduced the amount of photocopying by requiring each office to pay for copying and tracking expenses through an identification badge access system. |
| EE 4 - Implement Computer-based "Paperless" Faxing.  | Completed. DOE has increased the number of Local Area Network (LAN) fax servers available. With these servers, employees can fax documents without printing a hard copy by directing their print job to a "Fax Print" server. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *ENERGY EFFICIENCY* | |
| EE 5 - Improve Efficiency of Vending Machines. | In Progress. The GSA Concessions Management division has approached vendors and required that they continually use the most energy-efficient vending machines. |
| EE 6 - Relocate LAN Equipment in "LAN-Parks". | In Progress. The LAN park has been expanded in three cycles of growth from 300 square feet to 450 square feet, to 750 square feet, and presently to 1050 square feet. Also, the air-conditioning sytem for the LAN-Park was replaced. In addition, 6700 square feet were set aside by the Energy Information Administration for a second LAN-Park to be planned by DOE's HR-4. The second LAN-Park, when needed, will cover new systems and expansion requirements. |
| EE 7 - Improve Lighting Controls. | In Progress. At Forrestal, 287 light occupancy sensors were installed as part of the original fluorescent lighting retrofit. This accounts for 15 percent of light fixtures in the building. However, not all fixtures in the building of the remaining 85 percent can be retrofitted with sensors. More sensors will be installed as part of future tenant alterations. DOE has partnered with GSA to obtain funding to install conduit in preparation for new equipment which will control garage perimeter lighting circuits not needed after normal working hours. |

| *ACTION PLAN INITIATIVES* | *STATUS* |
|---|---|
| *ENERGY EFFICIENCY* | |
| EE 8 - Expand Use of Sulphur Lamps Under Forrestal North.<br>  | In Progress. To complete this project, funding is needed to expand DOE's use of Sulphur Lamps (S-Lamps) under the east and west ends of the Forrestal North building. The project could also be completed as a task on an ESPC. In the meantime, however, the two existing S-Lamps under the North building that each previously consumed 5.9 kW were changed to lamps that use 1.4 kW. |
| EE 9 - Improve Daylighting Contribution and Optimize Artificial Lighting Effectiveness.<br>  | To Be Pursued. Current daylighting contributions in the Forrestal building are significantly curtailed due to energy saving film on the windows. Improved daylighting contribution could be achieved through window replacement. DOE will study the possibility of replacing the windows and incorporating other daylighting strategies as a part of the ESPC delivery order. |
| EE 10 - Improve Daylighting Contribution and Optimize Artificial Lighting Effectiveness. | See EE 9. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *ENERGY EFFICIENCY* | |
| EE 11 - Fuel Cell Demonstration.<br>  | To Be Pursued. DOE is considering conducting two natural gas fuel cell demonstrations, a smaller one at the Forrestal building and another larger installation at Germantown. DOE plans to include installing the fuel cell as part of a future ESPC delivery order request. |
| EE 12 - Temperature Control for E Corridor Conference Rooms. | Completed. Facility management incorporated temperature controls as part of building Energy Management Control System (EMCS). |
| EE 13 - Recommendations of Building Engineering Report by Peck, Peck and Associates. | Completed. Many recommendations of the Peck report have been completed such as the replacement of local air-conditioning units, replacement of steam piping insulation, and replacement of chilled water and hot water pump seals and bearings. Other recommendations that were not practical will not be pursued, for example, replacement of the perimeter fan coil units, replacement of air troffers, and replacement of air handling units. Other cost effective recommendations that have not, to this point, been completed will be considered under the ESPC delivery order. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *ENERGY EFFICIENCY* | |
| EE 14 - Insulate Behind the Induction Units. | To Be Pursued. Not currently cost effective. However, upon further study, may be pursued in the future, perhaps bundled as part of a comprehensive ESPC. |
| EE 15 - Return All Energy/Materials Cost Savings to Facility Management for Reinvestment. | Not Pursued. DOE decided not to pursue retention of savings for reinvestment by facility management. Instead, DOE will donate all cost savings to the Child Development Center as a supplement for their operations. |
| EE 16 - Back Pressure Turbine Generators. | Not Pursued. Based upon a life-cycle analysis, DOE has not found this initiative to be cost effective. |

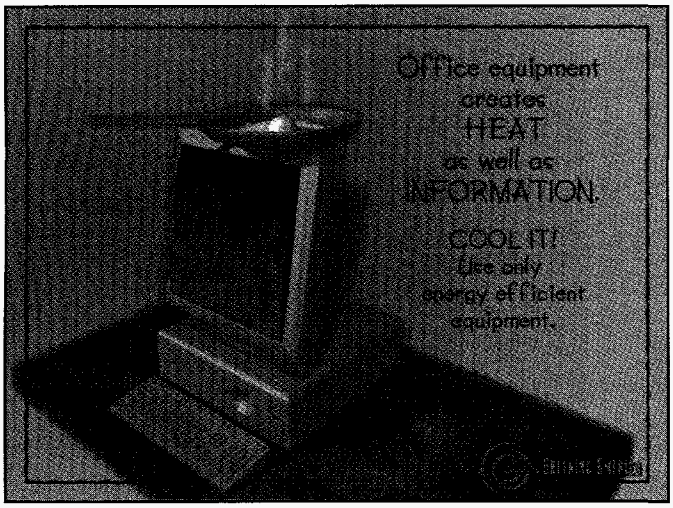
| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *AIR, WATER, AND LANDSCAPE* | |
| AWL 1 - Telecommuting, Alternate Work Sites, and Flexiplace | In Progress. |
| AWL 2 - Increase Metro Subsidies.<br>  | Completed. Subsidies have been increased from $21/month to $33/month. |
| AWL 3 - Ice Maker (CFC) Maintenance and Replacement. | Completed. R-134a, an environmentally acceptable refrigerant, replaced all R-12 refrigerants in ice makers. |
| AWL 4 - Pilot Demonstration of Water Efficient Restroom Fixtures.<br>  | Completed. Installed water saving sink fixtures in the Forrestal building. Use of waterless urinals is not cost effective. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *AIR, WATER, AND LANDSCAPE* | |
| AWL 5 - Utilize Sensor Operated Restroom Fixtures. | Pilot Completed. Many of the Germantown fixtures have been modified with sensor operated flush valves. |
| AWL 6 - Retrofit Restrooms with Water Efficient Fixtures. | Pilot Completed. Waterless urinals are not cost effective. |
| AWL 7 - Monitor Forrestal Water Consumption. | Completed. Management takes daily meter readings of water use and uses the data as a diagnostic tool. |
| AWL 8 - Negotiate Energy and Water Savings in Cafeteria Contract. | To Be Pursued. DOE will pursue different contract options with the DOE Cafeteria Officials and GSA. |
| AWL 9 - Chilled Drinking Water Quality. | Completed. The Forrestal cafeteria has four independent drinking water systems. Particulate matter filters were installed in all four systems; the charcoal filters added will improve the taste. In addition, the chillers were replaced and a more efficient dishwasher system was installed. The results of the water tests will be distributed to building occupants. |

**ACTION PLAN INITIATIVES** **STATUS**

*AIR, WATER, AND LANDSCAPE*

AWL 10 to 24 - Integrated Landscape Actions




Completed: AWL - 12 Landscape Courtyards for Shade and Accessibility - Interbuilding areas at Germantown were enhanced by the planting of small trees and shrubs; AWL - 14 Storm Water Management - The new roof deck project incorporated storm water management. AWL - 16 Ban the Use of Toxic De-icing Agents - DOE no longer uses toxic de-icing agents and instead uses potassium chloride; AWL - 18 Outreach - Extensive outreach to employees included the "You Have the Power Campaign," which kicked off on Earth Day, April 22, 1997 and a series of specialized energy efficiency messages that were designed and installed onto the DOE LAN to be viewed on individual employee computer screens.

In Progress: AWL-15 - Utilize Electric or Alternative-fueled Grounds Maintenance Equipment - DOE plans to purchase two electric pickup trucks

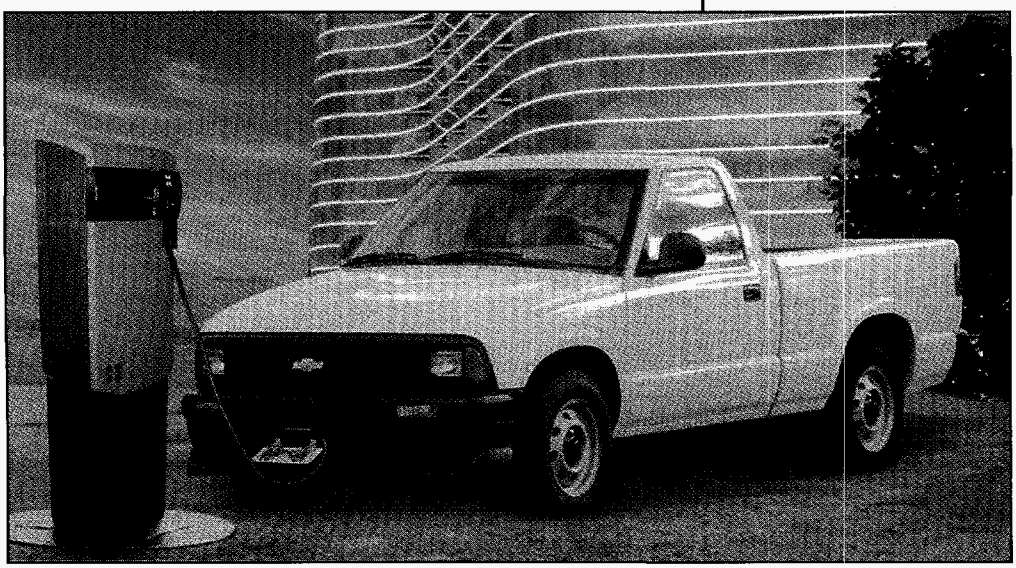


*Photo courtesy of Cheverolet. Chevy electric S-10 pickup with electric charging system.*

| ACTION PLAN INITIATIVES | STATUS |
| --- | --- |
| *AIR, WATER, AND LANDSCAPE* | |
| AWL 10 to 24 - Integrated Landscape Actions (Continued) | for grounds maintenance and install electric charging stations at Forrestal and Germantown within the next year; AWL 20 and 21 - Naturalize the Landscape at Germantown and Pond Management - Working with the facility managers at Germantown and horticulturalists at GSA, DOE selected a 2-acre site to be naturalized; AWL 24 - Introduce Compressed Natural Gas (CNG) shuttle vans - DOE has added 9 natural gas Ford Contour sedans and 1 dedicated CNG van to their fleet. In addition, DOE is negotiating with Washington Gas, Inc., to place a CNG fueling station at Forrestal.<br><br>Not Pursued: AWL 13 - Create 'Adopt-a-Planting' and AWL 22 - Provide Employee Garden Space - DOE has insufficient resources to manage these types of projects at this time. |

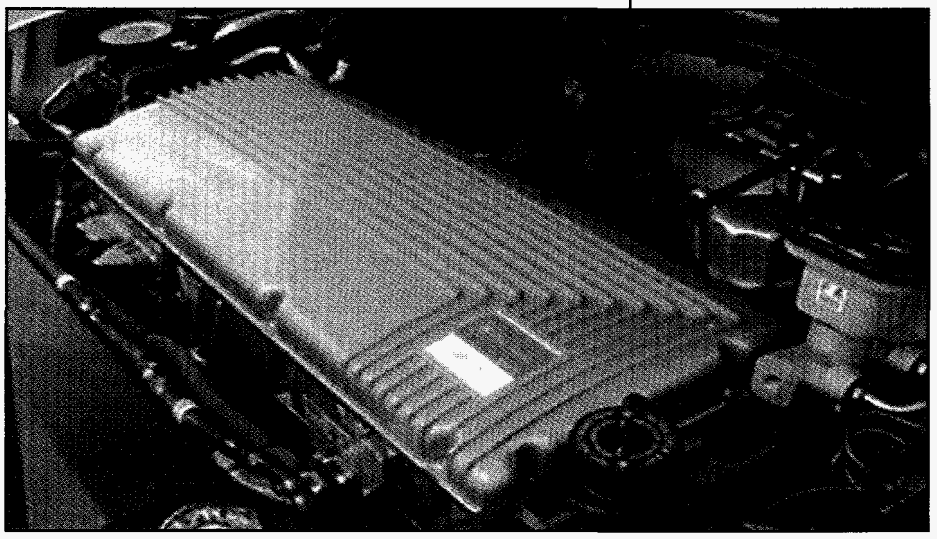
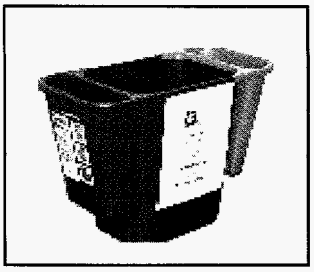


*Photo courtesy of Cheverolet. The electric motor of an S-10 pickup.*

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *RESOURCE MANAGEMENT* | |
| RM 1 - Close the Loop and Improve Indoor Air Quality by Changing the Building Carpet Program. | Completed. Only low-volatile organic compound (VOC) carpet tiles are used and installed during tenant renovations. |
| RM 2 - Change Building Renovation Materials Specifications so that only No- and Low- VOC Paints are specified. | Completed. No- and Low- VOC paints are the only types now being used. |
| RM 3 - Improve Indoor Air Quality by Implementing an Integrated Pest Management (IPM) Program. | Completed. IPM programs that use a "least toxic" approach have been implemented at both buildings. |
| RM 4 - Form a Recycling Committee. | Completed. A recycling committee was formed within DOE's Facility Management to work with GSA in order to maintain optimum use of recycling opportunities. |
| RM 5 - Don't Separate the Trash. | Completed. |
| RM 6 - "All Paper Recycling Program".  *Example* | Completed. Both buildings have implemented an all paper recycling program, which uses specific recycling containers for paper at employee work stations. |

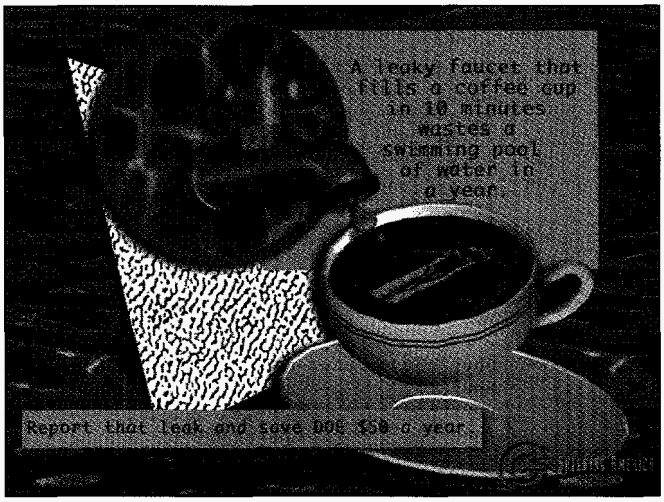
| *ACTION PLAN INITIATIVES* | *STATUS* |
|---|---|
| *RESOURCE MANAGEMENT* | |
| RM 7 - Place Aluminum Cans and Glass Recycling Containers Near the Street Vendors.  | Completed. Recyclable beverage containers were placed outside the Forrestal building. |
| RM 8 - Implement a Polystyrene Program. | Pilot Completed. DOE conducted a 1-year pilot program, purchasing a styromelt machine and collecting used polystyrene cups. The machine required excessive maintenance and in the end, failed to produce the melted gel from the recycled cups. DOE will continue to explore polystyrene recycling options as technology progresses. |
| RM 9 - Begin a Coffee Mug Program. | Not Pursued. The program was not feasible. |
| RM 10 - Develop Green Construction Contracts. | Completed. DOE recycles doors, door jams and batteries. Future tenant renovations will include recycling old carpet tile. |
| RM 11 - Recycling Revenue Policy. | Completed. DOE donates cost savings to the two HQ child development centers as a supplement for their operations. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *RESOURCE MANAGEMENT* | |
| RM 12 - Consolidated Solid Waste Management Contracts. | To Be Pursued by GSA. |
| RM 13 - "Paperless Office" Policy. | In Progress. DOE intends to implement "Paperless Office" policies and to continue its widespread use of electronic communication such as the DOECAST network. DOE will release another DOECAST message encouraging employee waste prevention efforts. |
| RM 14 - Paper Policy. | In Progress. To meet a federal law requiring the use of 30 percent post-consumer waste content paper by January 1, 1999, DOE, working with the EPA, has ordered two truck loads of this type of paper. DOE will begin testing the paper in February 1998. Once the testing is finished, DOE will advise the field offices on its experience with this paper. The new paper has a higher salvage value ($120/ton compared to $20/ton) because it is a Type One waste paper. In addition, it will cost less to purchase than what it costs to purchase paper with no-waste content. |
| RM 15 - Increase Procurement of Recycled-Content Items. | In Progress. DOE will continue to purchase recycled-content items, improve outreach, coordinate with affected organizations and track purchases of recycled-content items. |
| RM 16 - Increase Procurement of Recycled-Content Items Through GSA's *Advantage!* | In Progress. DOE will continually purchase recycled-content items through GSA whenever possible. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *HUMAN FACTORS* | |
| HF 1 - S-1 Affirmative Procurement Policy. | To Be Pursued. DOE's Office of Human Resources (HR) will send out a Secretarial policy memorandum on the use of recycled-content products. |
| HF 2 - Develop a Green System Architecture for Information Management Systems. | In Progress. HR is working on a standard configuration for specific work stations that includes green system architecture. |
| HF 3 - Energy Efficient Purchasing Implementation Support. | In Progress. DOE's Federal Energy Management Program is writing and publishing procurement recommendations. |
| HF 4 - Issue a S-1 Memo on Energy Efficient Products. | To Be Pursued. DOE's Office of Energy Efficiency and Renewable Energy will distribute a Secretarial-level memorandum on procurement of energy efficient products. |
| HF 5 - "Work Out" Ways to Optimize Work and Develop and Use a Process for Simplifying Business Practices. | In Progress. DOE's Extensive Quality Management (QM) initiatives are underway at DOE, and DOE will continually work to improve its organization. |
| HF 6 - Expand TeleVideo Conference Capabilities. | Completed. DOE has installed video teleconferencing systems at both the Forrestal and Germantown buildings. The extensive video conferencing network provides many crucial benefits to DOE including: increased flexibility, increased communication, reduced travel costs and reduced use of the transportation network, gasoline and jet fuels, and reduced travel time. |

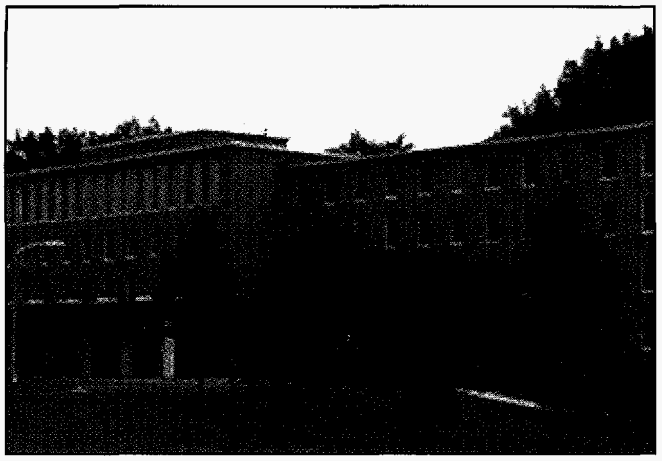
| ACTION PLAN INITIATIVES | STATUS |
| --- | --- |
| *HUMAN FACTORS* | |

HF 7 and HF 8 - Outreach.




Completed. With help from Greening America, Inc., DOE conducted extensive outreach to employees. This included the "You Have the Power Campaign," which was kicked off on Earth Day, April 22, 1997. LAN administrators can now incorporate these images into system initialization routines so that employees will briefly view them automatically when they start their machines.

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *GOOD IDEAS* | |
| EE 17 - Dry-Type Transformers. | In Progress. DOE is currently partnering with GSA on the Germantown campus transformer replacement project. DOE will install new energy- efficient transformers. |
| EE 18 - Install Point-of-Use Hot Water Heaters. | To Be Pursued. DOE installed Point-of-Use Water Heaters at the Forrestal fitness center. DOE is considering their use elsewhere in the Forrestal building as part of the ESPC task order. |
| EE 19 - Recommission the Entire Building Now and Every 10 years. | Not Pursued. Not Pursued due to resource limitations. |
| EE 20 - Solar Driven Desiccant Dehumidification and Cooling. | Not Pursued. Subsequent analysis deemed it not cost effective - a 13-year payback from Forrestal's Energy and Water Conservation Audit. |
| EE 21a - Change Out Windows - Forrestal. | To Be Pursued. Analysis showed changing out all windows to be marginally cost effective. DOE will consider the possibility of window change-outs as part of the ESPC task order in conjunction with the daylighting measures. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *GOOD IDEAS* | |
| EE 21b - Change Out Windows - Germantown  | Completed. Low Emission windows have been installed in all offices, lobbies, the cafeteria, and auditorium. |
| EE 22 - South Building Atrium. | Not Pursued. Subsequent study showed this to be not cost effective - an 11-year payback. |
| EE 23 - Reduce Operational Expenditure by Utilizing Off-Peak Power. | To be pursued. DOE will explore off-peak power opportunities as part of the ESPC Task Order. In the meantime, DOE will examine custodial and security contracts to include turning off lights in an effort to reduce building load power use. |
| EE 24 - Ground Source Heat Pumps. | To Be Pursued. DOE may consider this as part of the ESPC task order. |
| EE 25 -Productivity Study Based on Energy and Indoor Air Quality. | Not Pursued. Subsequent analysis found this to be too expensive. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *GOOD IDEAS* | |
| EE 26 - Implement Recommendations of NEMI study and Indoor Air Quality Survey. | To Be Pursued. The new EMCS systems partially alleviates balance problems noted in the report. In addition building management will continue to evaluate and correct air distribution system problems. The southern half of the south building has already been completed. |
| EE 27 - Better Indoor Air Quality. | Completed. Several actions were completed as part of this initiative, including: Forrestal and Germantown buildings were both designated as smoke-free buildings; "smoking" bathrooms were eliminated and replaced with dedicated smoking areas outside; green cleaning products are purchased when possible; the installation of the EMCS at Forrestal aided the rebalance of the air-distribution system; and at Germantown, the supply, return and exhaust systems were rebalanced including individual induction units to ensure proper airflow circulation. |
| EE 28 - Set up a Variable Air Volume Damper System. | Not Pursued. Cost prohibitive. |
| EE 29 - Increase Outside Air Intake with Heat Recovery. | Not Pursued. Not cost effective to increase outside air intake. |

| ACTION PLAN INITIATIVES | STATUS |
|---|---|
| *GOOD IDEAS* | |
| EE 30 - Establish Model "Intelligent Retrofit" Demonstrations. | Not Pursued. |
| EE 31 - Establish "Employee Productivity Center". | Not Pursued. |
| EE 32 - Coordinate Work Space Infrastructure. | Not pursued. Not practical with the existing building configuration. Will consider when major renovation activities take place including the replacement of asbestos-containing ceiling. |
| EE 33 - Provide Individual Control of Environmental Services for Each Workstation. | Not Pursued. |
| EE 34 to EE 36 - Energy Efficiency and Renewables Demo Site for DOE. | To Be Pursued. Will be incorporated into an ESPC if cost effective. |

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