

FISCAL YEAR 2000
ANNUAL REPORT
ON
U.S. ENVIRONMENTAL PROTECTION AGENCY'S
ENERGY MANAGEMENT AND
CONSERVATION PROGRAMS

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December 18, 2000

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EXECUTIVE SUMMARY

Through innovative measures and commonsense initiatives, the U.S. Environmental Protection Agency (EPA) has made great strides in decreasing its energy and water consumption. This report describes EPA's energy and water conservation progress in fiscal year 2000. In the past year, EPA completed implementation of its first Energy Savings Performance Contract (ESPC) and began a second; continued to incorporate energy- and water-efficiency standards for building systems into its leases and construction projects; purchased 100 percent green electricity for additional laboratories, bringing the total to four; and invested in energy- and water-efficient products and sustainable design techniques for retrofit, repair, and design projects. These efforts helped EPA reduce its overall energy consumption by 3 percent over the past year, on pace to reduce energy consumption 20 percent by 2005, as required under Executive Order 13123, *Greening the Government Through Efficient Energy Management*.

Although total energy use rose by a little more than 1 percent from 1990 to 2000, EPA built 7 additional facilities during those years and will add another facility next year. The original 12 facilities that existed in 1990 reduced energy consumption by 1.7 percent from 1990 to 2000 and reduced water consumption by 4.4 percent from 1997 to 2000.

Over the past six years, EPA has upgraded heating, ventilation, and air conditioning systems in many of its facilities to make them more energy-efficient and environmentally sound. In addition, the Agency is using cutting edge renewable and low emission technologies, such as photovoltaic lighting, a solid oxide fuel cell power station, and electricity generated from wind, methane, and other renewable resources. Information on these energy savings and pollution prevention projects is included in this report.

This report also discusses ESPCs, the innovative funding mechanism EPA is using to finance comprehensive energy- and water-efficiency upgrades. EPA's experiences with its first ESPC at its Ann Arbor, Michigan, facility are highlighted. Also included are plans for the other facilities that are scheduled for ESPCs in the future.

As evidenced by the projects and goals discussed in the following pages, EPA is striving to virtually eliminate Agency reliance on polluting energy sources and significantly reduce its water usage.

Through ESPCs, green power purchases, and an Agency-wide commitment to sound energy and water management, we are confident EPA will achieve this goal.

Romulo Diaz

Assistant Administrator

EPA Office of Administration and Resources Management

SECTION I

MANAGEMENT AND ADMINISTRATION

EPA recognizes that efficient energy and water management must involve all facility management employees as well as senior EPA management. This section describes EPA's energy management infrastructure and the management tools it uses to implement Executive Order 13123, *Greening the Government Through Efficient Energy Management*.

ENERGY MANAGEMENT INFRASTRUCTURE

EO 13123 requires each federal agency to assemble a technical support team to encourage the use of appropriated funds and ESPCs to meet the energy-efficiency goals and requirements of the order. In November 2000, EPA consolidated these activities in a newly formed Sustainable Facilities Practices Branch (SFPB). The SFPB will give full-time attention to sustainable practices policies and project implementation, which reflects the importance that EPA places on this issue.

Senior Agency Official and Energy Team

EPA has designated the Assistant Administrator for Administration and Resources Management as the Agency Energy and Environmental Executive. He is supported by a national energy coordinator and team manager. The energy team is supplemented by architects and engineers from EPA's Architecture, Engineering, and Real Estate Branch and by the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory on a project-specific basis. Site energy managers for each of the Agency's 19 facilities are listed in Appendix D.

MANAGEMENT TOOLS

EPA realizes that the commitment of its employees to improve energy efficiency is vital to achieving the Agency goal to reduce energy and water consumption. EPA's energy management team uses awards, incentives, and performance evaluations, as well as continuing education and training programs, to support individual and team efforts in energy efficiency.

Awards (Employee Incentive Programs)

The DOE-sponsored “You Have the Power” campaign was initiated to increase awareness of energy efficiency throughout the federal government. EPA is an active participant and has recognized 19 employees as energy champions. Criteria for selection is based on an individual’s effort and success in striving to conserve energy through building design and operation, real estate transactions, and overall promotion of energy-efficiency awareness. Energy champion posters highlighted the selected EPA individuals and their achievements. For more information on this campaign, visit the Web site at <www.eren.doe.gov/femp/yhttp/epa.html>.

EPA has an Agency-wide awards program. These awards are not specifically for energy management performance, but are more inclusive, addressing sustainable design and resource conservation. In 1999, for example, the Fort Meade (Maryland) Environmental Science Center Construction Team received the Gold Medal for Exceptional Service by creating the Agency’s first official Federal Energy Saver Showcase facility pursuant to EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*. The gold medal is EPA’s highest honor award and is given on a highly selective basis for distinguished service of major significance to environmental improvement and to public service. In addition, EPA established a Silver Medal for Superior Service and an Award for Excellence in Management for individuals or groups that have exhibited superior energy and water management.

Performance Evaluations

All employees who have energy management responsibilities are evaluated annually against criteria based on the Agency’s energy management principles.

Training and Education

EPA uses several education and training programs to ensure that employees are aware of the latest technologies and opportunities to increase energy efficiency:

Laboratories for the 21st Century

In 1997, EPA, in cooperation with the Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory, instituted an annual conference for federal laboratory managers interested in energy upgrades for their facilities. The “Laboratories for the 21st Century” initiative, which grew out of that conference, provides information on energy-efficient technology alternatives for laboratory applications and creates a forum for laboratory designers, owners, and operators to obtain up-to-date information and support for implementing energy-efficiency programs.

The Labs21 conference has become an annual event and includes plenary and panel sessions to discuss ways in which successful strategies and technologies are being implemented to improve the energy efficiency and environmental performance of laboratories. Breakout sessions following the presentations provide opportunities to explore specific issues in greater detail. The conference features speakers from EPA, DOE, Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, academia, and the private sector who present views and technical information on subjects as varied as utility deregulation, passive solar design, and laboratory design, construction, and operation issues. Informal sessions enable attendees to highlight current issues and projects and exchange views and experiences with their peers.

The fourth annual “Laboratories for the 21st Century” conference took place September 6 to 8, 2000, in San Francisco, California. More than 250 participants attended the conference, which was open to both federal and nonfederal participants and to representatives from other countries including Canada and Australia. The conference agenda, presentations, and speaker biographies are posted on the conference Web site at <www.epa.gov/labs21century>.

Buildings and Facilities Conference

Also conducted on a yearly basis is a 3-day Buildings and Facilities conference, which all EPA facility managers must attend. Conference attendees include facility managers from EPA-operated laboratories and GSA-operated regional offices and headquarters. One day is spent on issues related to energy-efficient design and management, including renewable energy purchases, ESPCs, and energy-efficient retrofits.

Credit Card Purchasing Guidelines

Credit card purchasing guidelines on EPA's Environmentally Preferable Purchasing Program's Web site provide easy access for credit card holders to ensure their purchases comply with environmental laws and EPA policies. The guidelines identify specific environmental attributes to look for when selecting products, including the ENERGY STAR® label or other energy-efficiency designations. They also recommend the purchase of products with recycled content, reduced packaging, and those containing minimal hazardous materials or toxic chemicals. In addition, the guidelines provide information on the procurement process, including specific EPA requirements, sources for obtaining the products (e.g., through GSA's Environmental Products Guide or office supply catalogs), and other information and guidance.

Greening EPA Newsletter

Greening EPA is distributed to all EPA facility managers and others interested in renewable energy and energy- and water-efficiency activities in EPA facilities. Topics of recent *Greening EPA* articles include: the use of ESPCs to increase energy efficiency, protect the environment, and save money; renewable energy projects at EPA facilities, including photovoltaic and geothermal heat pump technologies; EPA green power purchases; and updates on EPA's Laboratories for the 21st Century initiative.

Earth Day House Exhibit

For Earth Day 2000, EPA created a 50-foot by 8-foot model of a “green” home and an accompanying 50-foot time line tracing the 30-year history of environmental improvements since EPA’s founding. Every feature in the house from the construction materials to the furnishings was selected to highlight specific environmental benefits that were explained with more than 100 interpretive signs. Almost one-quarter of the signs featured energy-efficiency strategies, including the use of ENERGY STAR®-labeled windows, light fixtures, bulbs, appliances, and computers. The time line also prominently displayed the ENERGY STAR® Program’s successful efforts to improve energy efficiency and reduce greenhouse gas emissions. EPA estimates more than 280,000 people visited the exhibit on Earth Day. In May 2000, an additional 80,000 people saw the display on the Mall during Public Service Recognition Week. This display highlights EPA’s commitment to energy efficiency and its role in educating the public about the important relationship between energy efficiency and environmental performance.

Office of Administration Web Site

EPA’s Office of Administration’s new Web site has been reorganized to provide more information more efficiently. The site, which is expected to be posted in Spring 2001, will contain square footage, energy and water data, facility manager contact information, and “green” building highlights for each facility EPA manages.

Showcase Facilities

EPA did not designate any showcase facilities in FY 2000. In 1999, however, the Agency designated its Ann Arbor, Michigan, facility a showcase for the energy and water efficient measures undertaken as part of an ESPC. A second showcase facility is at Fort Meade, Maryland, the future home of EPA’s first solid oxide fuel cell. See page 25 for more information on the fuel cell.

SECTION II

ENERGY EFFICIENCY PERFORMANCE

This section highlights the data reported on the accompanying A-11 Data Report and Energy Scorecard (see Appendices A and B). In addition to a narrative of energy and water consumption in FY 2000, this section also discusses EPA's green power purchases, onsite renewable energy generation, and contributions to the Million Solar Roofs initiative.

ENERGY REDUCTION PERFORMANCE

Standard Facilities

EPA has been reporting its energy and water consumption data since 1993. Under the Energy Policy Act of 1992 (EPACT), EPA was not required to report this data because all of its facilities are laboratories, which were exempt from EPACT requirements. In 1993, EPA decided to meet the 30 percent and 35 percent energy reduction goals, even though they were set for less energy-intensive nonindustrial facilities. Since 1993, the Agency has measured and reported laboratory energy and water consumption using EPACT's standard facility 1985 baseline and reduction requirements.

In the spring of 1999, the President signed EO 13123, which included industrial and laboratory facilities in energy reduction goals. Fiscal Year 2000 is the first full reporting year under that executive order. Therefore, EPA is no longer reporting its laboratory energy and water consumption under the standard facility designation as it has in the past. Instead, the Agency is now using the more appropriate industrial designation under the executive order.

Industrial and Laboratory Facilities

All of EPA's facilities are laboratories and are identified in Appendix D (page 38). EPA compiled its energy and water consumption data using a quarterly report form that is completed by the site energy manager for each facility. The quarterly report includes consumption and cost information for all forms of energy, including electricity, natural gas, propane, fuel oil, and purchased steam, as well

as square footage information. Total energy consumption is converted into Btus and reported as Btus per square foot.

EPA's energy consumption database shows that the Agency's facilities consumed the following energy in FY 2000:

- # 143 million kilowatt hours (kWh) of electricity
- # 5.4 million hundred cubic feet (ccf) of natural gas
- # 254,037 gallons (gal) of fuel oil
- # 6,064 gal of propane
- # 48.4 million pounds (lbs) of purchased steam

EPA has implemented an aggressive strategy to reduce energy consumption. EPA reduced energy consumption in Agency-owned laboratories from 399,992 Btus/sq. ft. in 1985 to 361,933 Btus/sq. ft. in 2000—a reduction of 9.5 percent. **Energy use rose from 357,334 Btus/sq. ft. in 1990 to 361,933 Btus/sq. ft. in 2000—an increase of 1.3 percent—because the Agency built 7 additional facilities during those years. The original 12 facilities that existed in 1990 reduced energy consumption from 357,334 Btus/sq. ft. in 1990 to 351,302 Btus/sq. ft. in 2000—a reduction of 1.7 percent.** In 2001, the Agency will have begun operations at three new energy-efficient laboratories. It will take approximately one year for systems adjustments to be made in these new laboratories; therefore, reliable energy consumption figures will not be available until 2002.

Exempt Facilities

EPA has not exempted any facilities from its annual energy reporting.

Tactical Vehicle and Equipment Fuel Use

EPA's Compliance Strategic Plan for the Reduction of Petroleum-based fuels in Tactical Vehicles and Other Equipment has been developed to meet the provisions of EO 13123 and provides a precise approach for achieving the fuel reduction goal. The approach requires:

- # Reducing the current number of tactical vehicles and other equipment provided as Government Furnished Equipment to Agency contractors.
- # Acquiring better fuel-efficient equipment, which would decrease fuel usage.
- # Re-evaluating mission requirements and eliminating equipment where possible.
- # Creating incentives for EPA employees and managers to reduce fuel consumption.

RENEWABLE ENERGY

EPA is committed to buying green power whenever possible. Recent deregulation of electric utilities makes it difficult for renewable energy production generators to compete with cheaper, but more polluting, electricity generation sources such as coal and natural gas. EPA can play an important role in assisting the federal government to accelerate the growth of renewable energy sources by requiring the purchase of green power for a percentage of its overall energy requirements.

In 1998, the Restructuring Subcommittee of the Interagency Energy Management Task Force developed a draft Renewable Power Action Plan that included provisions for federal government pilot purchases of renewable power. In the summer of 1999, with assistance from the General Services Administration (GSA), the EPA laboratory in Richmond, California, became the first federal building entirely powered by renewable energy. EPA signed a 3-year contract with the Sacramento Municipal Utility District (SMUD) to purchase 100 percent of its power from electricity generated from an existing geothermal plant and a new landfill gas plant.

Based on the success of the Richmond pilot and further exploration of green power purchasing opportunities nationwide, EPA announced its goal of converting all EPA laboratories to 100 percent green power over a 10-year time-frame. EPA has focused its initial green power procurements on its laboratories because it owns and operates these facilities and pays the utility bills. GSA is responsible

for purchasing electricity at EPA's other facilities, which the Agency often shares with multiple tenants. Ultimately, EPA hopes it can work with GSA to purchase green power for these facilities as well.

Recent green power procurement efforts at other EPA laboratories include:

- Golden, Colorado—Since November 1, 1999, EPA's laboratory has met approximately 17 percent of its electricity needs through wind power generated by the WindSource Program of the Public Service Company of Colorado. In October 2000, the Golden facility began purchasing 100 percent of its energy from wind power.
- Manchester, Washington—The Manchester lab's green power purchase is unique because Washington has not deregulated its utility supply industry. This means that the lab is required to purchase electricity from Puget Sound Energy, which currently supplies only a small amount of renewable power generated from hydroelectric dams. Based on current market prices, the lab determined that purchasing green power from Puget Sound Energy would cost approximately 2.2 cents more per kilowatt hour, representing an additional \$50,000 annually. EPA decided to provide that amount of money to Bonneville Environmental Foundation in the form of a 10-year grant to build a wind turbine. The turbine, scheduled to go on line in October 2000, will produce approximately 2.1 million kilowatt hours of electricity annually. That is enough energy to power the Manchester lab and to produce additional power to the regional electric grid.
- Chelmsford, Massachusetts—EPA issued a 100 percent green power Request for Proposals (RFP) to power EPA's New England Regional Laboratory, currently under construction. EPA accepted a bid to supply the laboratory with energy derived totally from wind. EPA worked with GSA to contract for the green power purchase, and EPA's Region 1 office will fund the incremental cost.
- Edison, New Jersey—EPA issued an RFP for green power in April, 2000; however, only one bid was received. The Agency elected not to award the contract because of limited competition. EPA has decided to try again when the green power market is more mature in this part of the country.

Self-Generated Renewable Energy

Roof-top Solar Array in Research Triangle Park, North Carolina

The installation of the National Computer Center's photovoltaic (PV) roof, one of the two largest on the East Coast, is set to begin in winter of 2001. EPA has taken delivery of all the roof panels. The 100-kilowatt, integrated roof power system will convert the sun's light into energy, feeding it directly to the building and supplementing the main power utility. PV technology for the computer

center is produced by Solarex Corporation, and financial assistance was provided in part by DOE's Renewable Energy Project Demonstration Program. The system incorporates PV cells backed with insulating polystyrene foam, turning solar energy into usable power while increasing the building's thermal insulation. The RTP Computer Center gives EPA the opportunity to demonstrate the effectiveness and marketability of an alternative technology, while serving as a powerful example of the Agency's commitment to sustainable energy principles. In addition, the PV system supports the Million Solar Roofs initiative. EPA expects the PV roof to go online by July 30, 2001, and occupancy of the computer center to begin in September 2001.

Net Metering in Manchester, Washington

By the end of 2000, EPA's wet laboratory in Manchester, Washington, one of the facility's multiple laboratory buildings, should become the first commercial, solar-powered "net metering" project in the Northwest. Under net metering, any excess electricity produced by the lab's 28 new solar panels will flow directly into the local utility power grid, spinning the electricity meter backwards and offsetting the lab's energy costs. The new solar panels are installed and fully operational, generating approximately 2 kilowatts (kW) of electricity.

EPA undertook the project to demonstrate the benefits of net metering and solar technology. Although net metering is now an option for consumers and businesses in 27 states, it is still an emerging practice. EPA hopes to demonstrate how net metering can offer a simple, inexpensive, and easily-administered way to capture the full value of solar energy production. Under net metering, the laboratory will be credited for any electricity it produces but does not use. This is especially important during weekends or holidays when the facility is not in use but the solar cells produce power.

Geothermal Heat Pump in Ada, Oklahoma

EPA's Ada, Oklahoma, laboratory is installing a geothermal heat pump (GHP) as part of an ESPC upgrade. The GHP will eliminate the use of natural gas and significantly lower energy consumption in the Ada laboratory, reducing carbon dioxide production by 68.6 million pounds, sulfur oxides by 11 million pounds, nitrogen oxides by 17.3 million pounds, and carbon monoxide by 84 million pounds over the useful life of the system. In addition to the environmental benefits, geothermal

systems require lower maintenance than conventional systems, which will reduce Agency expenditures. EPA estimates the energy costs for operating the laboratory with the GHP will be less than \$1 per square foot, compared to the current cost of \$2.72 per square foot.

The GHP also will be used to provide domestic hot water, eliminating the need for a boiler or cooling tower. The current cooling tower consumes more than 51,000 gallons of domestic potable water per year as an HVAC heat transfer medium. By eliminating the need for a cooling tower, the geothermal system will reduce the lab's water consumption by more than 80 percent. This reduction in water usage will save more than 938,000 gallons of cooling tower water over the estimated life of the system.

Solar Water Heaters in Edison, New Jersey

In December 1998, EPA's Edison, New Jersey, lab installed three solar energy water heating systems that are now the primary source of hot water in their respective facility areas. All three solar heating systems consist of a preheat tank (between 66 and 120 gallons) and various numbers of roof-mounted, single glazed, liquid evacuated tube collectors. Because the building relies on the electrical systems only for auxiliary heating, the solar heaters allow the facility to conserve electricity and fossil fuel.

Photovoltaic Lighting in Gulf Breeze, Florida

In FY 1998, EPA installed a photovoltaic system to generate onsite electricity to light two of the facility's four piers. The photovoltaic project was recommended in a renewable energy assessment performed by the National Renewable Energy Lab. The 600-watt photovoltaic system saves the facility 900 kWh of electricity. Further renewable energy measures will be examined during ESPC audits.

Purchased Renewable Energy

In FY 2000, Richmond, California, purchased 100 percent green power, and Golden, Colorado, purchased 17 percent green power. Combined, these facilities purchased 2.2 megawatt hours of

renewable energy. This represented 1.6 percent of EPA's total electricity purchases. This is the first step in EPA's plan to surpass DOE's voluntary goal of 5 percent green power in federal agencies.

Million Solar Roofs

EPA has installed solar panels at its laboratories in Golden, Colorado; Athens (Environmental Service Division), Georgia; Manchester, Washington; and Edison, New Jersey. This represents 26 percent of the facilities the Agency manages. Next year, the new facility at Research Triangle Park, North Carolina, will begin using its solar panels to generate electricity. The New England Regional Laboratory in Chelmsford, Massachusetts, currently under construction, also will include solar panels in its design. In addition, EPA has funded solar panels in facilities it occupies but does not manage, including its Waterside Mall facility in Washington, DC, and the Region 5 headquarters building in Chicago, Illinois.

PETROLEUM

In FY 2000, eight EPA laboratories (Narragansett, Edison, Ft. Meade, RTP, Ann Arbor, Cincinnati, Golden, and Manchester) used fuel oil, and two of those eight (Edison and Manchester) also used propane. Combined, these facilities used 254,037 gallons of fuel oil and 6,064 gallons of propane in FY 2000. In FY 1990, three facilities (Narragansett, Cincinnati, and Manchester) used fuel oil, and one of those three (Manchester) also used propane. Combined, these facilities used 41,749 gallons of fuel oil and 1,123 gallons of propane in FY 1990. Two of the facilities (Ft. Meade and Golden) using fuel oil in FY 2000 were not operational in FY 1990.

WATER CONSERVATION

In FY 1999, EPA's laboratories used 184,335,233 gallons of water. In FY 2000, EPA used 187,252,375 gallons of water. **The original 12 facilities in operation in 1990 used 161,457,246 gallons of water in FY 2000—a reduction of 4.4 percent from 1997 to 2000.** EPA expects water consumption to further decrease in its facilities as ESPC improvements begin to take effect.

SECTION III

IMPLEMENTATION STRATEGIES

With Executive Order 13123, the federal government is poised to become a leader in sustainable energy management. EPA is committed to using a variety of strategies to reduce energy consumption and improve energy efficiency in its facilities, including lifecycle cost analysis, energy audits, third party financing through ESPCs, use of energy-efficient products, sustainable building design, green lease riders, green power purchases, renewable energy technologies, and water conservation measures.

LIFE-CYCLE COST ANALYSIS

When designing, constructing, and maintaining its facilities, EPA uses natural resources conservatively and seeks to incorporate innovative technologies that are cost-effective and environmentally sound throughout their life cycles.

EPA currently is focusing on ESPCs to achieve its energy- and water- reduction goals. ESPCs are effective avenues for addressing life-cycle cost analysis (LCCA) decisions, because energy-efficiency projects can be clustered and bundled together. This clustering method allows the Agency to benefit from overall lifecycle cost savings. If certain projects within an ESPC are not the most cost-effective option, but provide a much higher level of energy efficiency, bundling allows the ESPC package of projects to achieve the highest efficiency possible, while still ensuring cost-effectiveness. In Ann Arbor, for example, the ESPC project team evaluated a list of possible energy conservation measures (ECMs), weighed the merits of certain combinations of ECMs, calculated the effect of any relevant rebate programs or more favorable rate structures, and determined the optimal energy conservation system (ECS). This process allows EPA to identify significant energy-efficient upgrades and life-cycle savings that would have gone unnoticed under the traditional process, which emphasized initial cost.

EPA also is expanding the time frame it uses to examine lifecycle cost savings. While many LCCA models only examine savings over a 5- to 10-year time frame, EPA is investigating project

savings over a 15- or 20-year time frame. In contrast to ESPCs, these projects involve greater project-by-project decision-making and trade-offs when performing a LCCA. Some renewable technologies have payback periods of 15 to 20 years, and in Fort Meade, for example, the payback period for the solid oxide fuel cell is approximately 25 years. EPA considers the reasonable life of these products and the potential for decreased energy consumption, as well as the cost of product, when making investment decisions about which projects to pursue.

FACILITY ENERGY AUDITS

In accordance with EPACT and EO 13123, and to help identify opportunities for energy system improvements, EPA's facilities are regularly audited for energy and water efficiency. Facilities participate either through a contracted audit process, or as part of the ESPC evaluation process. The contracted audit involves the federal facility, the auditing firm, and occasionally the DOE's Federal Energy Management Program (FEMP). The firms are hired to help identify opportunities for energy and water conservation measures, and the findings are compiled in a report. The contracted energy audit report, however, does not address the implementation of the projects. Using ESPCs, federal agencies can integrate the audit report process into the overall ESPC project evaluation process. A single firm, known as an Energy Services Company (ESCO), evaluates the federal facility for energy-saving opportunities, and develops an implementation plan. The ESCO is responsible for purchasing, installing, and maintaining any new equipment. Audits performed through an ESPC tend to be more aggressive and thorough, and often result in energy projects because the ESCO's payment is generated from the savings in the facility's energy costs. Since 1995, the following facilities, representing 63 percent of all EPA-owned facilities, have been audited:

- # Ann Arbor, Michigan
- # Athens, Georgia (Office of Research and Development)
- # Cincinnati, Ohio
- # Corvallis, Oregon
- # Duluth, Minnesota
- # Edison, New Jersey
- # Fort Meade, Maryland
- # Houston, Texas

- # Manchester, Washington
- # Narragansett, Rhode Island
- # Newport, Oregon
- # Richmond, California

EPA facilities in Research Triangle Park, North Carolina, and Athens, Georgia (Ecosystem Support Division), were considered for energy audits, but the process is on hold until major building construction and demolition projects are completed.

FINANCING MECHANISMS

EPA is pursuing ESPCs to finance the initial cost of comprehensive energy upgrades. ESPCs are a form of third party financing that fund energy-saving upgrades using future utility cost savings. ESPCs enable agencies to obtain energy-efficient technologies, reducing energy use and costs, through private investments.

An ESPC is an agreement between a federal facility and an Energy Services Company (ESCO). The ESCo evaluates a facility for energy and water conservation opportunities, and then designs a project to increase the facility's energy and water efficiency. The ESCo purchases and installs the necessary equipment, such as new energy-efficient windows, automated controls, and updated heating, ventilation, and air conditioning (HVAC) equipment. In exchange for not having to pay the up-front costs of the equipment, the federal agency promises to pay the ESCo a share of the savings resulting from the energy-efficiency improvements. The ESCo is responsible for maintaining the equipment, as well as measuring the energy consumption and savings.

In FY 2000, EPA awarded one ESPC at its laboratory in Ada, Oklahoma, worth more than \$4 million. In FY 2002, EPA plans to award an ESPC at its facility in Gulf Breeze, Florida, worth an estimated \$4 million (See Appendix A). EPA expects to achieve a greater than 50 percent reduction from current energy consumption levels for each facility undergoing a comprehensive upgrade paid through an ESPC.

In FY 2001, EPA will amend its leases at its facilities in Las Vegas, Nevada, and Richmond, California. Using different financing techniques, the lessor will finance the energy-efficiency project. The Agency will amend the lease by transferring the utility expenses into lease payments.

ENERGY STAR® AND OTHER ENERGY-EFFICIENT PRODUCTS

EPA actively promotes the purchase of energy-efficient products that carry the ENERGY STAR® label, including photocopier equipment. The Agency reviews and updates its purchasing specifications regularly.

EPA encourages its employees to become involved and responsible participants in the Agency's energy management activities. The Environmentally Preferable Purchasing program helps train government purchase card users on buying energy-efficient and sustainable products. The Agency also distributes product guides that explain in greater detail the environmental attributes of available products, such as light bulbs, light fixtures, and air conditioning equipment.

Several EPA newsletters promote the use of energy-efficient products and provide resources to EPA purchasers, including the Environmentally Preferable Purchasing (EPP) Program's *EPP Update* and the Office of Administration and Resources Management's *Greening EPA*. Articles on specific product categories and purchasing procedures help EPA spread the word about energy efficiency. In addition, a recent Earth Day exhibit on the National Mall helped citizens understand how they can make their own homes more energy-efficient. The Earth Day House is described on page 7.

ENERGY STAR® BUILDINGS

EPA approaches facility upgrades from a systemic perspective and incorporates holistic design principles in its construction projects. Currently, the ENERGY STAR® Buildings program does not encompass energy-intensive facilities such as laboratories, therefore EPA cannot designate its 19 laboratory facilities as ENERGY STAR® buildings. The Agency is working with GSA, however, to achieve the ENERGY STAR® Buildings label in its leased office facilities. Currently three EPA office buildings, either owned or leased by GSA, have been awarded the ENERGY STAR® label. They are the regional office buildings in New York, Chicago, and Denver.

SUSTAINABLE BUILDING DESIGN

To promote a healthy, efficient, and productive working environment, EPA incorporates sustainable design principles into the siting, design, and construction of new facilities, as well as the renovation and maintenance of existing facilities. The Agency developed a Green Buildings Vision and Policy Statement which serves as a guide for a holistic, systems approach to building design.

Several EPA facilities are applying the green building principles outlined in the policy statement. In Fort Meade, Maryland, the new Environmental Science Center features many green building technologies, including energy-saving lighting, use of natural light, an environmentally sound climate control system, a variable air volume system, direct digital controls, environmentally preferable building materials, natural landscaping, and water conservation. The facility is also pursuing certification of its environmental management system (EMS) under the international ISO 14001 standard.

The facility in Research Triangle Park, North Carolina, received GSA's Demolition Derby Award for successful construction waste management disposal—recycling more than 80 percent of its construction debris. Onsite cement production reduced by nearly 75,000 miles the amount of cement mixer truck trips, conserving fossil fuels and avoiding air pollution. The facility incorporates low volatile organic compound (VOC) paints, sealants, and adhesives to improve indoor air quality; direct digital controls and high efficiency boilers and chillers to ensure peak energy performance; and recycled carpet and other recycled building materials to conserve virgin materials and divert waste from landfills. Fume hoods are serviced by a centralized air flow system and customized sashes that save energy by avoiding the loss of heated or cooled air and by reducing the need for numerous energy-consuming fans. Outside the building, EPA minimized ground clearing to preserve forests, streams, and wetlands, and a plant rescue saved thousands of native plants. Additionally, the campus will be designated and maintained as a Corporate Wildlife Habitat.

The new Region 7 Headquarters in Kansas City, Kansas, is a “green” office building incorporating significant environmental features. EPA leases the building and worked with GSA and the building developer to increase the building's environmental performance. Environmental components at the new office building include energy-efficient and passive solar design (using natural

light, motion sensors, T-8 fluorescent bulbs, low-E windows), an advanced water management system, erosion control, landscaping and use of indigenous plants, recycled materials, and indoor air quality.

ENERGY EFFICIENCY IN LEASE PROVISIONS

EPA does not own most of the buildings it uses. They are leased by the Agency directly from the building owners or are owned by GSA. As part of its mission to protect and improve the environment, however, EPA decided to exert some control over the energy and water management of its office buildings and recently began requiring “green riders” as part of its leases for newly constructed leased buildings. The green rider, which includes environmentally preferable criteria such as energy- and water-efficiency measures, is an amendment to the Agency’s solicitation for offers (SFO) for constructing or retrofitting EPA facilities. EPA used green riders for its new Region 3, Region 7, and Region 10 office buildings and the Region 7 and Region 1 laboratories currently under construction. When potential contractors submit bids to build a new facility for EPA’s use, they are required to address the green rider as part of the proposal process.

At the Region 3 office in Philadelphia, Pennsylvania, the Agency included environmental criteria in its solicitation for remodeled office space in an existing building. The green rider requirements included reusing materials; recycling of construction and demolition debris; and using low environmental impact materials. The Agency also required that the building be located in Philadelphia’s central business district to promote the use of public transportation by staff.

The green rider for the Region 7 office building provided environmentally preferable specifications and guidelines for the HVAC systems to improve the facility’s energy efficiency. The rider enabled the Agency to create an educational document for the contractor, providing access to information on environmentally preferable and recycled-content products and guidelines. A copy of Region 7’s green rider is available at <www.epa.gov/region7>.

At the Region 10 office in Seattle, Washington, the “Green Futures Team” developed detailed interior remodeling specifications for the 14th floor of its office building. The remodeling incorporated environmental attributes including minimizing use of toxic and harmful substances and release of toxics

during manufacturing, as well as using recycled-content products and only those with no impact on rare or endangered natural resources.

The Region 1 laboratory in Chelmsford, Massachusetts, is currently under construction. The laboratory will incorporate numerous environmental attributes in its design and construction. When constructed, the laboratory will be eligible for a silver rating from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program. A silver rating is rare for a laboratory because the LEED criteria were developed for office buildings, which have significantly lower energy and air flow requirements than laboratories. The lab is also preparing to purchase 100 percent green power to meet its electricity needs.

The Region 7 laboratory in Kansas City, Kansas, is using green language in its SFO to ensure that the facility and all its construction features promote energy efficiency and environmentally preferable materials and design. The SFO encourages contractors to address energy and water conservation and other environmental factors. The Region 7 lab also is striving to achieve a LEED silver rating.

INDUSTRIAL FACILITY EFFICIENCY IMPROVEMENTS

EPA is maximizing the energy and water efficiency and environmental performance of its facilities through a variety of innovative projects and commonsense initiatives. Following are synopses of the energy-efficiency activities at EPA's 19 laboratories. Efficiency improvement opportunities are still being assessed for the remaining facilities.

- # *Ada, Oklahoma.* As part of the recently awarded ESPC, an HVAC system renovation/upgrade will install a ground source heat pump (see page 12), variable air volume fume hoods and air supply, new and upgraded fan motors, and integrated direct digital control system for HVAC, energy, fire, and security management. The facility also is pursuing a 40-kW photovoltaic system to power the ground source heat pump.
- # *Ann Arbor, Michigan.* As part of the ESPC renovations, the first under the Labs21 program, a new energy and HVAC infrastructure was installed. As of August, 2000, all new air handling units, a new cooling tower, a 200 kW fuel cell (see page 24), and a new direct digital control system were in place. The new chilled water plant consists of 900 tons of high-efficiency, double-effect chiller/heaters, which do not use CFC or HCFC refrigerants. The new chiller/heaters come equipped with units to recover waste heat from the condensers in the

cooling cycle. The chiller/heaters will recover up to 25 percent of the input energy from the condenser water stream. The testing equipment requires substantial air flow and constant temperatures (complicated by heat from the engines). The natural gas fuel cell will be installed to provide both base load power and emergency backup for the facility.

- # *Athens, Georgia* (Office of Research and Development). The facility is examining the feasibility of using bioenergy, due to the large quantities of biofuels available (see page 24). In addition, the Lifespan Childcare Center installed a solar hot water heater, which contributed to a 17 percent decrease in energy consumption at the Athens facility from 1997 to 1999.
- # *Cincinnati, Ohio*. The facility installed a closed-loop glycol cooling tower, energy-efficient elevator motors, boiler controls, a revolving door to help maintain temperature and building pressure, a new HVAC system, improved windows and insulation, a new energy-efficient boiler, and enthalpy recovery from boiler exhaust, as well as adopting the Green Lights program.
- # *Corvallis, Oregon*. The facility installed new energy-efficient chillers and boilers, and replaced all CFCs used by the facility. The facility also completed a Green Lights upgrade.
- # *Duluth, Minnesota*. The facility installed an energy and environmental management system to minimize energy waste through improved equipment controls. This system has helped the facility decrease its energy consumption by 18 percent from FY 1997. In FY 2000, EPA will replace two large boilers with ten smaller boilers to improve the heating system's efficiency.
- # *Edison, New Jersey*. The facility installed three solar energy water-heating systems that are now the primary source of hot water in their respective facility areas (see page 13). In addition, EPA issued a green power RFP in early April 2000. The poor response to the RFP resulted in no contract award.
- # *Fort Meade, Maryland*. The facility is designed to maximize natural light and uses energy-efficient electrical lighting when needed. Direct digital controls monitor the status of mechanical systems throughout the building to maintain efficiency. Variable air volume fume hoods for lab spaces minimize heating and cooling costs while maintaining a safe working environment. Also, the facility is working with DOE and others to demonstrate the world's first megawatt-class solid oxide fuel cell power generation system (see page 25).
- # *Golden, Colorado*. The facility installed a direct digital control system to monitor operating conditions of the HVAC unit. The Golden lab's ventilation system conserves energy after work hours by cutting the system back to 25 percent of its maximum volume. The system is divided into 7 zones to enable air exchange in selected areas when employees work late. The facility incorporates Green Lights and uses T-8 fluorescent bulbs and motion sensors. The building is fitted with 1-inch thick, double-paned, thermal windows with solar flexing film. The building's roof has been insulated to an R value of R-30. A solar panel for the south wall of the facility will augment the heating and cooling system. The Golden Lab is also purchasing 100 percent green power through the Colorado Public Service Company, which is supplying the facility with wind power through Windsource (see page 11).

- # *Gulf Breeze, Florida.* The facility installed timers on approximately 20 electric water heaters and is installing nodal direct digital controls (NDDCs). The NDDCs will minimize energy waste and monitor building security, fire protection, and indoor environmental quality. In October, 1996, a Dinh-style heat pipe dehumidification system was installed in the air handling system. A 1998 EPA study showed that the heat pipe saved 153,775 kWh in annual energy consumption (about 10 percent of the total) and \$7,700 in annual energy costs. In FY 1998, EPA installed a photovoltaic system to generate onsite electricity to light two of the facility's four piers (see page 13). The 600 watt photovoltaic system saves the facility 900 kWh of electricity per year.

- # *Houston, Texas.* The facility conducted air system modifications and upgraded an existing DDC system. It incorporated a cooling tower condensate return system to reduce water consumption and operating costs and enhance environmental conditions. Without this system, large volumes of water would have to be supplied by the local water utility. EPA is incorporating the use of a night setback system to control exhaust fans, laboratory fume hoods, and supply air. In addition, EPA is evaluating technology and operational options to reduce the levels of cooling and reheating required to reach temperature set-points.

- # *Las Vegas, Nevada.* This leased laboratory facility is being reviewed for an energy-efficiency upgrade through a third party financing agreement with the owner, University of Nevada of Las Vegas, to replace constant volume HVAC and fume hoods with variable air volume systems.

- # *Manchester, Washington.* The Manchester laboratory has contracted for 100 percent "green" power generated from wind farms, a renewable source of energy (see page 11).

- # *Montgomery, Alabama.* EPA relocated and installed a 150-ton chiller from Ann Arbor to Montgomery. This move and installation saved money for purchase of a new chiller to condition furnace hood wake-up air.

- # *Narragansett, Rhode Island.* EPA is investigating the purchase of green power for this facility.

- # *Research Triangle Park, North Carolina.* EPA installed a Building Automation System that enables operations staff to monitor and control energy-consuming aspects of the building, including temperature, pressures, humidity, electrical systems, refrigeration and boiler equipment, maintenance indicators and alarms, lighting, security, and communications. Fume hoods are serviced by a centralized air flow system and customized sashes that save energy by avoiding the loss of heated or cooled air and by reducing the need for numerous energy-consuming fans. In addition, a 100-kilowatt, integrated roof power system is being installed and will be operational by July, 2001 (see page 11).

- # *Richmond, California.* The facility is purchasing 100 percent green power from the Sacramento Municipal Utility District (SMUD), which is generating power from landfill gas (see page 10).

HIGHLY EFFICIENT SYSTEMS

EPA is using the ESPC process to further its installation of combined cooling, heating, and power systems and locally available renewable energy sources.

Ada, Oklahoma. The Ada, Oklahoma, laboratory is installing a geothermal heat pump (GHP) as part of an ESPC upgrade (see page 12).

Ann Arbor, Michigan. A natural gas fuel cell is being installed to provide both base load power and emergency backup power for the facility. The fuel cell will generate 200 kW of power and will provide heating water for the reheat water loop serving the air handling units. By integrating the heating and cooling plant, EPA will recover significant amounts of energy that would have otherwise been wasted in cooling towers or radiators.

Athens, Georgia (ORD). Results of a bioenergy feasibility study sponsored by EPA for the EPA and U.S. Department of Agriculture (USDA) co-located laboratories in Athens indicated that large quantities of biofuels are available locally. Though biofuel technology was not incorporated into the design of the EPA facilities, consideration of biomass technologies are being included in the USDA laboratory renovation and new construction programs. A strong partnership between EPA, DOE, USDA, and state agencies provide the foundation for making biomass an energy technology option.

OFF-GRID GENERATION

To promote environmentally-sensitive energy generation, EPA facilities are using renewable energy technologies to supplement or replace a large portion of their energy requirements. EPA recognizes that incorporating renewable energy sources and technologies combined with increased energy efficiency is the most environmentally beneficial method to reduce greenhouse gas emissions. In all ESPCs, EPA requires the installation of renewable technologies as part of the overall upgrade. The following facilities incorporate renewable energy technologies:

Ada, Oklahoma. The Ada, Oklahoma, laboratory, is installing a geothermal heat pump (GHP) as part of an ESPC upgrade (see page 12).

Ann Arbor, Michigan. A 200 kW natural gas fuel cell is being installed as part of an ESPC upgrade (see page 24).

Athens, Georgia (ORD). The facility installed a solar hot water heater at the onsite day-care center (see page 22).

Edison, New Jersey. The facility installed three solar energy water-heating systems that are now the primary source of hot water in their respective facility areas (see page 13).

Fort Meade, Maryland. EPA is working with the DOE, Siemens-Westinghouse Power Corporation, and Cinergy Corporation to demonstrate the world's first megawatt-class solid oxide fuel cell (SOFC) power generation system. Never before has a fuel cell been built of this size, scale, or capacity. The hybrid power system will demonstrate the highest electrical efficiency (60 percent) and lowest emissions of any power plant fueled by natural gas. SOFC technology has the potential to virtually eliminate NO_x and SO_x emissions and drastically reduce greenhouse gases.

Golden, Colorado. EPA is planning to build a transpired solar collector panel for the south wall of the facility's hazardous materials building. The solar panel will save energy by preheating ventilated air when heating is required.

Gulf Breeze, Florida. The laboratory installed a photovoltaic system to generate onsite electricity to light two of the facility's four piers (see page 13).

Manchester, Washington. EPA's wet laboratory in Manchester, Washington, one of the facilities multiple laboratory buildings, may become the first commercial solar powered "net metering" project in the Northwest (see page 12).

Research Triangle Park, North Carolina. A 100-kilowatt, integrated roof power system is being installed and will be operational by July, 2001 (see page 11).

WATER CONSERVATION

During the past 5 years, EPA has required its facilities to monitor and report water consumption and costs and energy consumption data on a quarterly basis. Since 1994, EPA has required the use of water conserving equipment in all newly leased and built facilities. Assessments of water efficiency opportunities are part of EPA's facility site visit program and have led to operational and management measures that have reduced water consumption. Following are brief highlights of the water conservation efforts at EPA's facilities.

Ada, Oklahoma. As part of the recently awarded ESPC, EPA expects water consumption at the Ada facility to decrease by 80 percent when the upgrade is completed.

Ann Arbor, Michigan. As a result of the improvements made under the ESPC, EPA expects the Ann Arbor facility's water consumption to decrease by 80 percent.

Fort Meade, Maryland. The facility used native plants and other natural landscaping techniques to reduce irrigation requirements.

Houston, Texas. The facility incorporated a cooling tower condensate return system to reduce water consumption and operating costs and enhance environmental conditions. Without this system, large volumes of water would have to be supplied by the local water utility.

Manchester, Washington. The lab replaced its 4-inch PVC water lines with 6-inch ductile iron water lines. The bigger, stronger lines reduce the frequency of leaks and the lab's overall water consumption rate. The lab also replaced a 20-year-old water cooling tower with a new, more efficient tower, which reduced the water volume needed to run the cooling system. These upgrades have dropped the facility's average water bill from \$596 to \$203 per month, and reduced water consumption 66 percent, from 204,000 to 70,000 gallons per month.

Research Triangle Park, North Carolina. EPA incorporated water-efficient fixtures throughout the facility, including flow-restricting nozzles, automated shutoff, and hot and cold water delivery systems with automatic temperature controls. The lavatories have sensor-operated metered faucets that regulate the amount of water flow, which will save water and the energy needed to heat it.

SECTION IV

DATA TABLES AND INVENTORIES

Appendix A: OMB CIRCULAR A-11, EXHIBIT 55

Appendix B: ENERGY SCORECARD FOR FY 2000

Appendix D: INDUSTRIAL AND LABORATORY FACILITIES INVENTORY

Appendix E: EXEMPT FACILITIES INVENTORY

(EPA does not exempt any of its facilities.)

FY 2000 ENERGY MANAGEMENT DATA REPORT

Agency: Environmental Protection Agency

Prepared by: Philip Wirdzek

Date: 29-Dec-00

Phone: 202 564-2094

ENERGY CONSUMPTION AND COST DATA

Standard Buildings/Facilities NOTE: EPA does not manage and is not responsible for utility costs in standard facilities.

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Electricity	MWH						
Fuel Oil	Thou. Gal.						
Natural Gas	Thou. Cu. Ft.						
LPG/Propane	Thou. Gal.						
Coal	S. Ton						
Purch. Steam	BBtu						
Other	BBtu						
Total Costs			-		-		-

Standard Buildings/Facilities
(Thous. Gross Square Feet) _____

Industrial, Laboratory, Research, and Other Energy-Intensive Facilities

NOTE: Traditionally, EPA has reported its laboratories as standard buildings and has strived for energy efficiency improvements from the 1985 baseline. Since 1985, EPA has decreased Btu/SqFt. energy use by 9.5 percent.

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Electricity	MWH	143,042.0	7,751.8	141,374.0	7,788.6	139,938.2	7,936.3
Fuel Oil	Thou. Gal.	254.0	227.3	225.2	204.2	225.4	210.339
Natural Gas	Thou. Cu. Ft.	543,325.4	2,751.3	516,027.7	2,713.7	515,103.6	2,780.3
LPG/Propane	Thou. Gal.	6.1	7.8	6.1	8.0	6.1	8.3
Coal	S. Ton	-	-	-	-	-	-
Purch. Steam	BBtu	45.1	557.8	45.1	574.6	45.1	591.8
Other	BBtu	-	-	-	-	-	-
Total Costs			11,295.9		11,289.1		11,526.9

Energy-Intensive Facilities
(Thous. Gross Square Feet) _____

3,119.8

3,155.7

3,167.6

Exempt Facilities

NOTE: EPA has no exempt facilities

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Electricity	MWH						
Fuel Oil	Thou. Gal.						
Natural Gas	Thou. Cu. Ft.						
LPG/Propane	Thou. Gal.						
coal	S. Ton						
Purch. Steam	BBtu						
Other	BBtu						
Total Costs			-		-		-

Exempt Facilities

(Thous. Gross Square Feet) _____

Tactical Vehicles and Other Equipment

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Auto Gasoline	(Thou. Gal.)	45.0	54.0	47.0	56.0	49.0	58.0
Diesel-Distillate	(Thou. Gal.)	101.0	88.0	105.0	91.0	109.0	94.0
LPG/Propane	(Thou. Gal.)						
Aviation Gasoline	(Thou. Gal.)						
Jet Fuel	(Thou. Gal.)						
Navy Special	(Thou. Gal.)						
Other	(Billion Btu)						
Total Costs			142.0		147.0		152.0

WATER CONSUMPTION AND COST DATA

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Water	Million Gal.	187.3	769.6	181.4	752.0	178.0	767.7

RENEWABLE ENERGY PURCHASES

	Consumption Units	FY 2000		FY 2001		FY 2002	
		Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)	Annual Consumption	Annual Cost (Thou. \$)
Electricity from Renewables	MWH	2,235.95	203.27	7,462.95	559.97	17,449.70	1,425.56
Natural Gas from Landfill/Biomass	Thou. cubic ft.						
Renewable Thermal Energy	MMBtu						
Average annual savings/costs anticipated from expenditures (show costs as negative)							

ENERGY EFFICIENCY IMPROVEMENTS

DIRECT AGENCY OBLIGATIONS

NOTE: EPA has already completed all of its chiller, boiler, and lighting upgrades. Further efficiency improvements will be made through the ESPC process and through green power purchases.

	FY 2000		FY 2001		FY 2002	
	Annual Savings		Annual Savings		Annual Savings	
	(MMBTU)	(Thou. \$)	(MMBTU)	(Thou. \$)	(MMBTU)	(Thou. \$)
Average annual savings anticipated from obligations	0	0	0	0	0	0
Direct obligations for facility energy efficiency improvements, including facility surveys/audits		0		0		0

ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPC)

	FY 2000		FY 2001		FY 2002	
	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)
Number of ESP contracts awarded in fiscal year & annual energy (MMBTU) savings	11,199.3	1	26,116.1	2	9,547.7	1
Total value of ESP contracts awarded in fiscal year		4,276		3,000		4,000
Estimated life-cycle cost savings of ESPCs awarded in fiscal year (Contractor share)		0		0		0
Estimated life-cycle cost savings of ESPCs awarded in fiscal year (Government share)		8,997		9,000		8,000
Total annual payments made to all ESP contractors		24		30		24

UTILITY ENERGY SERVICES CONTRACTS (UESC)

	FY 2000		FY 2001		FY 2002	
	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)
Number of utility energy services contracts awarded in fiscal year	0	0	0	0	0	0
Total value of utility energy services contracts awarded in fiscal year		0		0		0
Estimated life-cycle cost savings of UESCs awarded in fiscal year (Contractor share)		0		0		0
Estimated life-cycle cost savings of UESCs awarded in fiscal year (Government share)		0		0		0
Total annual payments made to all UES contractors		0		0		0

UTILITY INCENTIVES (REBATES)

	FY 2000		FY 2001		FY 2002	
	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)	Annual savings (MMBTU)	(number/Thou. \$)
Incentives received and estimated energy savings	0	0	0	0	0	0
Funds spent in order to receive incentives		0		0		0

TRAINING

	FY 2000		FY 2001		FY 2002	
	(number)	(Thou. \$)	(number)	Thous. \$	(number)	Thous. \$
Number of personnel trained/Expenditure	25	10	25	10.3	25	10.6

IDENTIFICATION OF FUNDS

Note: For the budget year **only**, identify where you have requested funds for the specified efficiency activities.

Efficiency Activity	Amount (Thou. \$)	Account	Program	Annual Cost (Thou. \$)	Line item	Page in budget request
ESPC or utility service contracts negotiation/management						
Direct spending on efficiency						
Direct spending on training						
Energy Star building design/ construction incremental costs						
"Green Power" purchases						
On-site generation and renewable energy						

Executive Order 13123 FY 2000 Energy Scorecard

Department/Agency Name	Contact Name and Phone
U.S. Environmental Protection Agency	Philip Wirdzek 202 564-2094
Name of Senior Energy Official	Signature of Senior Energy Official
Romulo L. Diaz, Jr.	

Did your agency . . .	Yes	No	Anticipated Submittal Date
Submit its FY 2000 energy report to DOE for its Report to Congress (Sec. 303)?	X		January 1, 2001
Submit an Implementation Plan with its Annual Report (Sec. 302)?	X		January 1, 2001
Did your agency . . .	Yes	No	Comments
Perform energy audits of 10% of its facility space during the fiscal year (Sec. 402)?	X		What percentage of facility space was audited during the fiscal year? <u> 10 </u> % How much facility space has been audited since 1992? <u> 63 </u> %
Specifically request funding necessary to achieve the goals of the Order in its FY 2002 budget request to OMB (Sec. 301)?	X		If yes, how much: <u> \$ 1,800,000* </u>
Invest direct appropriations to accomplish projects contributing to the goals of the Order (Sec. 301)?	X		If yes, how much: <u> \$ 2,125,732 </u>
Issue to private-sector energy service companies (ESCOs) any energy savings performance contracting (ESPC) task orders or contracts (Sec. 403(a))?	X		How many? <u> 1 </u> Total value: <u> \$4,276,000 </u> Est. life-cycle cost savings: ESCO share <u> \$0 </u> Gov't share <u> \$8,997 </u>
Issue any utility energy services contracts (Sec. 403(a))?		X	How many? <u> </u> Total value: <u> \$ </u> Est. life-cycle cost savings: Utility share <u> \$ </u> Gov't share <u> \$ </u>

Please enter data from annual energy report pertinent to performance toward the goals of Executive Order 13123	Base Year	Previous Year (1999)	Current Year (2000)	% Change (Current vs. Base)
Site Energy Efficiency Improvement Goals (Sec. 202). 1985 Base Year	N/A Btu/Ft ²	N/A Btu/Ft ²	N/A Btu/Ft ²	N/A %
Source Energy Use (Sec. 206). 1985 Base Year	N/A BBtu	N/A BBtu	N/A BBtu	N/A %
Industrial/Energy Intensive Facilities Goals (Sec. 203). 1990 Base Year	357,334 Btu/Ft ²	360,452 Btu/Ft ²	351,302 Btu/Ft ²	-2.5 %
Greenhouse Gas Reduction Goal (Sec. 201). 1990 Base Year	23,050 MTCE*	29,080 MTCE*	28,399 MTCE*	23.2 %
Water Conservation Goal (Sec. 207). 2000 Base Year	161.5 MGal	N/A	161.5 MGal	0%
Renewable Energy (Sec. 204). Energy used from self-generation and RE power purchases	N/A	N/A BBtu	N/A BBtu	N/A

* Agencies may ask DOE to calculate this value and insert it for them

Abbreviation Key: Btu/Ft² = British thermal units per gross square foot
 Btu/unit = British thermal units per unit of productivity (or gross square foot when such a unit is inappropriate or unavailable)
 MTCE = Metric tons of carbon equivalent
 MGal = Million gallons
 BBtu = Billion British Thermal Units
 RE = Renewable energy
 N/A = Not applicable

APPENDIX D - INDUSTRIAL AND LABORATORY FACILITIES INVENTORY

Robert S. Kerr Environmental Research Lab

Ada, Oklahoma

Site Energy Manager: Frank Price

National Vehicle and Fuel Emissions Laboratory

Ann Arbor, Michigan

Site Energy Manager: Steven Dorer

National Exposure Research Laboratory

Athens, Georgia

Site Energy Manager: Alan Tasker

Science and Ecosystem Support Division

Athens, Georgia

Site Energy Manager: Betty Kinney

Andrew W. Breidenbach Environmental Research Center

Cincinnati, Ohio

Site Energy Manager: Robert Bateman

National Health and Environmental Effects Research Laboratory - Western Ecology Division

Corvallis, Oregon

Site Energy Manager: Jay Gile

National Health and Environmental Effects Research Laboratory - Mid-Continent Ecology Division

Duluth, Minnesota

Site Energy Manager: Rod Booth

Region 2 Laboratory
Edison, New Jersey
Site Energy Manager: Joseph Pernice

Environmental Science Center
Fort Meade, Maryland
Site Energy Manager: Rick Dreisch

Region 8 Laboratory
Golden, Colorado
Site Energy Manager: Sue Datson

National Health and Environmental Effects Research Laboratory - Gulf Ecology Division
Gulf Breeze, Florida
Site Energy Manager: Clay Peacher

Environmental Laboratory
Houston, Texas
Site Energy Manager: Larry Streck

University of Nevada, Las Vegas - On Campus EPA Facilities
Las Vegas, Nevada
Site Energy Manager: May Fong

Region 10 Laboratory
Manchester, Washington
Site Energy Manager: Cathy Reese

National Air and Radiation Environmental Laboratory
Montgomery, Alabama
Site Energy Manager: Herb Reed

National Health and Environmental Effects Research Laboratory - Atlantic Ecology Division

Narragansett, Rhode Island

Site Energy Manager: Russ Ahlgren

National Health and Environmental Effects Research Laboratory - Western Ecology Division

Newport, Oregon

Site Energy Manager: Reene Watt

Central Regional Laboratory

Richmond, California

Site Energy Manager: Jennifer Mann

Research Triangle Park

Research Triangle Park, North Carolina

Site Energy Manager: E.B. Roberts

U.S. Environmental Protection Agency
FY 2001 Implementation Plan

December 18, 2000

2001 IMPLEMENTATION PLAN

SECTION I MANAGEMENT AND ADMINISTRATION

EPA recognizes that efficient energy and water management must involve all facility management employees as well as senior EPA management. This section describes EPA's energy management infrastructure and the management tools it will continue using to implement Executive Order 13123, *Greening the Government Through Efficient Energy Management*.

ENERGY MANAGEMENT INFRASTRUCTURE

EO 13123 requires each federal agency to assemble a technical support team to encourage the use of appropriated funds and Energy Savings Performance Contracts (ESPCs) to meet the energy-efficiency goals and requirements of the order. In November 2000, EPA consolidated these activities in a newly formed Sustainable Facilities Practices Branch (SFPB). The SFPB will give full-time attention to sustainable practices policies and project implementation, which reflects the importance that EPA places on this issue.

Senior Agency Official and Energy Team

EPA has designated the Assistant Administrator for Administration and Resources Management as the Agency Energy and Environmental Executive. He is supported by a national energy coordinator and team manager. The energy team is supplemented by architects and engineers from EPA's Architecture, Engineering, and Real Estate Branch and by the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory on a project-specific basis. Site energy managers for each of the Agency's 19 facilities are listed in Appendix D of the annual report.

MANAGEMENT TOOLS

EPA will encourage its employees' commitment to improving energy efficiency. EPA's energy management team will continue to use awards, incentives, and performance evaluations, as well as continuing education and training programs, to support individual and team efforts in energy efficiency.

Awards (Employee Incentive Programs)

EPA will continue to use the DOE-sponsored "You Have the Power" campaign to increase awareness of energy efficiency throughout the Agency. EPA is an active participant and has recognized 19 employees as energy champions. EPA will continue encouraging and recognizing its employees for their achievements in conserving energy and in overall promotion of energy-efficiency awareness. For more information on this campaign, visit the Web site at <www.eren.doe.gov/femp/yhtp/epa.html>.

EPA has an Agency-wide awards program. These awards are not specifically for energy management performance, but are more inclusive, addressing sustainable design, resource conservation, and overall environmental improvement. EPA plans to continue honoring those employees who make a significant contribution to public service.

Performance Evaluations

All employees who have energy management responsibilities will continue to be evaluated annually against criteria based on the Agency's energy management principles.

Training and Education

Continuing to use several education and training programs, EPA will ensure that employees are aware of the latest technologies and opportunities to increase energy efficiency.

Laboratories for the 21st Century

In 1997, EPA, in cooperation with the Lawrence Berkeley Laboratory and the National Renewable Energy Laboratory, instituted an annual conference for federal laboratory managers interested in energy upgrades for their facilities. The “Laboratories for the 21st Century” initiative, which grew out of that conference, provides information on energy-efficient technology alternatives for laboratory applications and creates a forum for laboratory designers, owners, and operators to obtain up-to-date information and support for implementing energy-efficiency programs.

Next year’s conference will be held in Washington, DC, in October. Details on registration, the annual call for papers, and other details will be made available on the conference Web site at <www.epa.gov/labs21century>.

The Labs21 conference has become an annual event and includes plenary and panel sessions to discuss ways in which successful strategies and technologies are being implemented to improve the energy efficiency and environmental performance of laboratories. Breakout sessions following the presentations provide opportunities to explore specific issues in greater detail. The conference features speakers from EPA, DOE, Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, academia, and the private sector who present views and technical information on subjects as varied as utility deregulation, passive solar design, and laboratory design, construction, and operation issues. Informal sessions enable attendees to highlight current issues and projects and exchange views and experiences with their peers.

Buildings and Facilities Conference

Also conducted on a yearly basis is a 3-day Buildings and Facilities conference, which all EPA facility managers must attend. Conference attendees include facility managers from EPA-operated laboratories and GSA-operated regional offices and headquarters. One day will be spent on issues related to energy-efficient design and management, including renewable energy purchases, ESPCs, and energy-efficient retrofits.

Credit Card Purchasing Guidelines

EPA plans to continue assisting its employees when making purchasing decisions. Credit card purchasing guidelines on EPA's Environmentally Preferable Purchasing Program's Web site provide easy access for credit card holders to ensure their purchases comply with environmental laws and EPA policies. The guidelines identify specific environmental attributes to look for when selecting products, including the ENERGY STAR® label or other energy-efficiency designations. They also recommend the purchase of products with recycled content, reduced packaging, and those containing minimal hazardous materials or toxic chemicals. In addition, the guidelines provide information on the procurement process, including specific EPA requirements, sources for obtaining the products (e.g., through GSA's Environmental Products Guide or office supply catalogs), and other information and guidance.

Greening EPA Newsletter

EPA will keep its employees up-to-date on resource conservation technologies, energy-efficiency accomplishments at EPA facilities, and other issues concerning the environmental improvement of EPA's facilities, through *Greening EPA*. The newsletter is distributed to all EPA facility managers and others interested in renewable energy and energy- and water-efficiency activities in EPA facilities. Topics of recent *Greening EPA* articles include: the use of ESPCs to increase energy efficiency, protect the environment, and save money; renewable energy projects at EPA facilities, including photovoltaic and geothermal heat pump technologies; EPA green power purchases; and updates on EPA's Laboratories for the 21st Century initiative.

Earth Day House Exhibit

For Earth Day 2000, EPA created a 50-foot by 8-foot model of a “green” home and an accompanying 50-foot time line tracing the 30-year history of environmental improvements since EPA’s founding. Every feature in the house from the construction materials to the furnishings was selected to highlight specific environmental benefits that were explained with more than 100 interpretive signs. EPA plans to display the “green” home at several future events. This display highlights EPA’s commitment to energy efficiency and its role in educating the public about the important relationship between energy efficiency and environmental performance.

Office of Administration Web Site

EPA’s Office of Administration’s new Web site has been reorganized to provide more information more efficiently. Additions to the Web site in FY 2001 will update energy and water performance at each facility, highlight new energy-efficiency projects, as well as provide access to all issues of *Greening EPA*. EPA also hopes to establish an on-line reporting system enabling facilities to submit their energy and water consumption data.

Showcase Facilities

EPA will complete construction of its Region 1 laboratory in Chelmsford, Massachusetts, in FY 2001, and also will finish improvements and upgrades at a number of its facilities. EPA hopes to designate its improved laboratories as showcase facilities.

SECTION II

IMPLEMENTATION STRATEGIES

With Executive Order 13123, the federal government is poised to become a leader in sustainable energy management. EPA is committed to continuing to use a variety of strategies to reduce energy consumption and improve energy efficiency in its facilities, including lifecycle cost analysis, energy audits, third party financing through ESPCs, use of energy-efficient products, sustainable building design, green lease riders, green power purchases, renewable energy technologies, and water conservation measures.

LIFE-CYCLE COST ANALYSIS

When designing, constructing, and maintaining its facilities, EPA will use natural resources conservatively and seek to incorporate innovative technologies that are cost-effective and environmentally sound throughout their life cycles.

EPA will continue to focus on ESPCs to achieve its energy- and water-reduction goals. ESPCs are effective avenues for addressing life-cycle cost analysis (LCCA) decisions, because energy-efficiency projects can be clustered and bundled together. This clustering method allows the Agency to benefit from overall lifecycle cost savings. EPA also will consider expanding the time frame it uses to examine lifecycle cost savings. While many LCCA models only examine savings over a 5- to 10-year time frame, EPA is investigating project savings over a 15- or 20-year time frame.

FACILITY ENERGY AUDITS

In accordance with EPACT and EO 13123, and to help identify opportunities for energy system improvements, EPA's facilities will continue to be audited regularly for energy and water efficiency. Facilities participate either through a contracted audit process, or as part of the ESPC evaluation process. In FY 2001, EPA anticipates the ESPC process to begin in Ada, Oklahoma, and plans to enter into lease-amended ESPC contracts at its facilities in Las Vegas, Nevada, and Richmond, California. EPA facilities in Research Triangle Park, North Carolina, and Athens, Georgia (Ecosystem Support Division), have been considered for energy audits, but the process is on hold until major building construction and demolition projects are completed.

FINANCING MECHANISMS

EPA will continue pursuing ESPCs to finance the initial cost of comprehensive energy upgrades. ESPCs are a form of third party financing that fund energy-saving upgrades using future utility cost savings. ESPCs enable agencies to obtain energy-efficient technologies, reducing energy use and costs, through private investments.

In FY 2001, EPA's laboratory in Ada, Oklahoma, will begin its ESPC projects, worth more than \$4 million. In FY 2002, EPA plans to award an ESPC at its facility in Gulf Breeze, Florida, worth an estimated \$4 million. EPA expects to achieve a greater than 50 percent reduction from current energy consumption levels for each facility undergoing a comprehensive upgrade paid through an ESPC.

In FY 2001, EPA will amend its leases at its Las Vegas, Nevada, and Richmond, California, facilities. Using different financing techniques, the lessor will finance the energy-efficiency project. The Agency will amend the lease by transferring the utility expenses into lease payments.

ENERGY STAR[®] AND OTHER ENERGY-EFFICIENT PRODUCTS

EPA will continue promoting the purchase of energy-efficient products that carry the ENERGY STAR[®] label, including photocopier equipment. The Agency plans to review and update its purchasing specifications as necessary.

EPA will keep encouraging its employees to become involved and responsible participants in the Agency's energy management activities. The Environmentally Preferable Purchasing program will help train government purchase card users on buying energy-efficient and sustainable products. The Agency also will distribute product guides that explain in greater detail the environmental attributes of available products.

Several EPA newsletters promote the use of energy-efficient products and provide resources to EPA purchasers. The Environmentally Preferable Purchasing (EPP) Program's *EPP Update* and the Office of Administration and Resources Management's *Greening EPA* will include articles on specific product categories and purchasing procedures to help EPA spread the word about energy efficiency.

ENERGY STAR® BUILDINGS

EPA will continue to approach facility upgrades from a systemic perspective and incorporate holistic design principles in its construction projects. Currently, the ENERGY STAR® Buildings program does not encompass energy-intensive facilities such as laboratories, therefore EPA cannot designate its 20 laboratory facilities as ENERGY STAR® buildings. The Agency will work with GSA, however, to achieve the ENERGY STAR® Buildings label in its leased office facilities.

SUSTAINABLE BUILDING DESIGN

To promote a healthy, efficient, and productive working environment, EPA will incorporate sustainable design principles into the siting, design, and construction of new facilities, as well as the renovation and maintenance of existing facilities. The Agency will continue to implement the principles outlined in its Green Buildings Vision and Policy Statement, which serves as a guide for a holistic, systems approach to building design.

Not yet completed, EPA's new Region 1 laboratory in Chelmsford, Massachusetts, is actively applying the green building principles outlined in the policy statement. The new laboratory's features will cover energy efficiency, indoor air quality, water efficiency, site and building planning, and recycling and use of recycled-content materials. The lab also will purchase 100 percent green power to meet its electricity needs.

ENERGY EFFICIENCY IN LEASE PROVISIONS

EPA does not own most of the buildings it uses. They are leased by the Agency directly from the building owners or are owned by GSA. As part of its mission to protect and improve the environment, however, EPA will continue requiring "green riders" as part of its leases for newly constructed leased buildings. The green rider, which includes environmentally preferable criteria such as energy- and water-efficiency measures, is an amendment to the Agency's solicitation for offers (SFO) for constructing or retrofitting EPA facilities. When potential contractors submit bids to build a new facility for EPA's use, they are required to address the green rider as part of the proposal process.

INDUSTRIAL FACILITY EFFICIENCY IMPROVEMENTS

EPA will continue to maximize the energy and water efficiency and environmental performance of its facilities through a variety of innovative projects and commonsense initiatives. The following efficiency improvement opportunities are being considered for EPA facilities.

- # *Ada, Oklahoma.* As part of the recently awarded ESPC, an HVAC system renovation/upgrade will install a ground source heat pump, variable air volume fume hoods and air supply, new and upgraded fan motors, and integrated direct digital control system for HVAC, energy, fire, and security management. The facility also is pursuing a 40-kW photovoltaic system to power the ground source heat pump.
- # *Ann Arbor, Michigan.* As part of the ESPC renovations, the first under the Labs21 program, the laboratory will continue to realize energy-, water-, and cost-savings. New chiller/heaters will recover up to 25 percent of the input energy from the condenser water stream. The natural gas fuel cell will be installed to provide both base load power and emergency backup for the facility.
- # *Athens, Georgia (ORD).* The facility will examine the feasibility of using bioenergy.
- # *Cincinnati, Ohio.* EPA is investigating the purchase of green power for this facility.
- # *Duluth, Minnesota.* EPA will replace two large boilers with ten smaller boilers to improve the heating system's efficiency.
- # *Edison, New Jersey.* EPA issued a green power RFP in early April 2000. The poor response to the RFP resulted in no contract award. EPA will continue to pursue 100 percent green power for this facility.
- # *Fort Meade, Maryland.* The facility is working DOE and others to demonstrate the world's first megawatt-class solid oxide fuel cell power generation system.
- # *Golden, Colorado.* EPA will install a solar panel for the south wall of the facility to augment the heating and cooling system. The lab also will purchase 100 percent green power, through the Colorado Public Service Company, which is supplying the facility with wind power through Windsource.
- # *Gulf Breeze, Florida.* EPA plans to award an ESPC at this facility in FY 2002.
- # *Houston, Texas.* EPA is evaluating technology and operational options to reduce the levels of cooling and reheating required to reach temperature set-points.
- # *Las Vegas, Nevada.* This leased laboratory facility is being reviewed for an energy-efficiency upgrade through a third party financing agreement with the owner, University of Nevada of Las Vegas, to replace constant volume HVAC and fume hoods with variable air volume systems.
- # *Manchester, Washington.* The Manchester laboratory will purchase 100 percent "green" power generated from wind farms, a renewable source of energy.

- # *Narragansett, Rhode Island.* EPA is investigating the purchase of green power for this facility.
- # *Research Triangle Park, North Carolina.* A 100-kilowatt, integrated roof power system is being installed and will be operational by July, 2001.
- # *Richmond, California.* The facility will continue purchasing 100 percent green power from the Sacramento Municipal Utility District (SMUD), which is generating power from landfill gas.

EPA also is evaluating its newest laboratories (Ft. Meade, Golden, and Athens [ESD], GA) to improve their environmental performance and reduce their energy consumption. In addition, the following activities are being proposed to help ensure EPA's reduction in energy consumption.

- # *Review New VAV Labs.* Determine why the three new VAV labs are using much more energy than expected. Questions to be asked are: how are these new labs being operated? Are the control systems adequate and functioning properly? Are the facility occupants closing their fume hoods when appropriate? Are there heavier plug loads than originally planned? The review is underway for Fort Meade, and the work order is being placed for Golden and Athens.
- # *Better Transition from Construction to Operation.* The control systems in new laboratory facilities are increasingly complex. FMSD can strengthen the program to transition facilities from the HQ to the region or program operators. This could include:
 - More thorough commissioning of the facilities, reviewing installation, operating control systems, checking facility operations a few months after occupancy.
 - Specific training for one or more facility operators at each new location regarding energy conservation, systems operations, systems controls. Production of a basic facility operating manual. This would apply to both EPA owned facilities and the GSA leased facilities where the building owner runs the building but EPA pays utility bills.
 - General facilities training nationwide to insure a pool of competent facility managers.
- # *Better Controls in New and Existing Labs.* Our specifications for lab control systems in our new labs may not be adequate to manage and report on these complex systems. The control systems should be able to run HVAC systems in an energy-efficient manner and correlate with actual facility operating needs (i.e. the ability to set back at night.) Additionally, FMSD may need to develop a "best practice" guide for the newly installed Direct Digital Control (DDC) systems.
- # *Nationwide Reporting of Energy Results.* Walt Disney World e-mails quarterly energy use information, rankings, and increases and decreases in consumption to each major facility operator and each operations chief with profit responsibility over the facility. In addition the information is posted on a web page available to all Disney personnel. This identifies to each operating area whether their peers are outperforming them and the profit impact of poor operations. If appropriate responsible managers can be identified at EPA, this information delivery and availability may help achieve energy savings.

- # *Move Utility Bills to Regions.* Regions currently have no incentive to cut energy use because they do not pay the bill. Moving utility bills to the regions could increase pressure from all regions to operate efficiently. Our understanding is that utility money comes out first in the Regional Support Account budgeting process and then the remainder is divided among the regions. Currently Manchester utility bills are paid via the Regional Support Account. The New Kansas City lab will be handled in this manner in FY 2002, when it is completed. This assumes the regions know how utilities are funded via the Regional Support Account.

- # *Exempt Central Utility Plant (CUP) from New RTP Laboratory Annual Energy Reporting.* The agency's energy consumption estimates for 2002 noted above include energy consumption by the new facilities at rate similar to that of existing facilities. FMSD and RTP will work with DOE to develop an appropriate justification to exempt the RTP CUP from future EPA energy consumption reports using authority provided in Executive Order 13123. FMSD conservatively estimates that exempting the energy consumption by the CUP facility will reduce RTP rate of consumption by 20 percent and that this, with other efficiency gains and renewable energy purchases, will reduce EPA's 2002 energy consumption rate by about 13 percent.

HIGHLY EFFICIENT SYSTEMS

EPA will continue using the ESPC process to further its installation of combined cooling, heating, and power systems and locally available renewable energy sources.

Ada, Oklahoma. The Ada, Oklahoma, laboratory will install a geothermal heat pump (GHP) as part of an ESPC upgrade.

Ann Arbor, Michigan. A natural gas fuel cell will be installed to provide both base load power and emergency backup power for the facility. The fuel cell will generate 200 kW of power and will provide heating water for the reheat water loop serving the air handling units. By integrating the heating and cooling plant, EPA will recover a significant amounts of energy that would have otherwise been wasted in cooling towers or radiators.

Athens, Georgia (ORD). Results of a bioenergy feasibility study sponsored by EPA for the EPA and U.S. Department of Agriculture (USDA) co-located laboratories in Athens indicated that large quantities of biofuels are available locally. Though biofuel technology was not incorporated into the design of the EPA facilities, consideration of biomass technologies will be included in the USDA laboratory renovation and new construction programs. A strong partnership between EPA, DOE, USDA, and state agencies will provide the foundation for making biomass an energy technology option.

OFF-GRID GENERATION

To promote environmentally-sensitive energy generation, EPA facilities will use renewable energy technologies to supplement or replace a large portion of their energy requirements. EPA recognizes that incorporating renewable energy sources and technologies combined with increased energy efficiency is the most environmentally beneficial method to reduce greenhouse gas emissions. In all ESPCs, EPA requires the installation of renewable technologies as part of the overall upgrade. The following facilities will incorporate new renewable energy technologies:

Ada, Oklahoma. The Ada, Oklahoma, laboratory, will install a geothermal heat pump (GHP) as part of an ESPC upgrade.

Ann Arbor, Michigan. A 200 kW natural gas fuel cell will be installed as part of an ESPC upgrade.

Fort Meade, Maryland. EPA will continue working with DOE, Siemens-Westinghouse Power Corporation, and Cinergy Corporation to demonstrate the world's first megawatt-class solid oxide fuel cell (SOFC) power generation system. Never before has a fuel cell been built of this size, scale, or capacity. The hybrid power system will demonstrate the highest electrical efficiency (60 percent) and lowest emissions of any power plant fueled by natural gas. SOFC technology has the potential to virtually eliminate NO_x and SO_x emissions and drastically reduce greenhouse gases.

Golden, Colorado. EPA plans to build a transpired solar collector panel for the south wall of the facility's hazardous materials building. The solar panel will save energy by preheating ventilated air when heating is required.

Manchester, Washington. EPA's wet laboratory in Manchester, Washington, one of the facilities multiple laboratory buildings, may become the first commercial solar powered "net metering" project in the Northwest.

Research Triangle Park, North Carolina. A 100-kilowatt, integrated roof power system will be installed and operational by July, 2001.

WATER CONSERVATION

EPA will continue to require its facilities to monitor and report water consumption and costs and energy consumption data on a quarterly basis. Since 1994, EPA has required the use of water conserving equipment in all newly leased and built facilities. Assessments of water efficiency opportunities are part of EPA's facility site visit program and have led to operational and management measures that have reduced water consumption. EPA plans to significantly reduce water consumption at the following facilities.

Ada, Oklahoma. As part of the recently awarded ESPC, EPA expects water consumption at the Ada facility to decrease by 80 percent when the upgrade is complete.

Ann Arbor, Michigan. As a result of the improvements made under the ESPC, EPA expects the Ann Arbor facility's water consumption to decrease by 80 percent.