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SAFEGUARDING OUR ENERGY FUTURE

- Investing Oil Overcharge Funds in Energy Efficiency

Oil is a significant part of our energy supply. When oil prices rise, the cost of energy goes up. That's why it's important to invest in energy efficiency. It can help us save money and reduce our dependence on oil.

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Throughout the past several years, States have been receiving settlement monies distributed from escrow accounts maintained by the Department of Energy and various courts. These monies are paid by oil companies for alleged violations of the petroleum pricing regulations of the 1970's. These funds, commonly referred to as Petroleum Violation Escrow (PVE) or Oil Overcharge funds, have been an important tool in supporting energy efficiency programs and technologies at the State level. PVE funds have been used to provide restitution to overcharged customers through programs that demonstrate and promote energy efficiency and renewable energy technologies. As of March 1, 1993 approximately \$4.7 billion of Petroleum Violation Escrow monies have been distributed to the States for energy-related projects, and additional funds are likely to be available over the next several years. Allocation of these monies is left to the discretion of each State, but proposed uses are reviewed by the Department of Energy to ensure consistency with the terms of the various court settlements.

The aim of this publication is to highlight some of the many interesting, replicable projects funded with PVE monies and to serve as a resource for successful, energy efficiency programs in planning, technology application and education. By capturing a number of these innovative State-level programs, this document will expand the information network on renewable energy and energy efficiency and serve as a point of departure for others pursuing similar goals. Projects referenced throughout this publication reflect some of the program areas in which the Department of Energy takes an active interest, and fall into the following categories:

- 1) Alternative fuels
- 2) Industrial efficiency and waste minimization
- 3) Electric power production from renewable resources
- 4) Building efficiency
- 5) Integrated resource planning
- 6) Energy education

State energy offices are the primary source of information concerning projects in this document and continue to be the point of contact for persons interested in exploring the possibility of PVE project funding. A listing of each State energy office and its contact person is provided in the appendices.

Petroleum Violation Escrow (PVE) funds derive from settlements between oil producers and the U.S. Department of Energy for violations of oil price regulations that were in effect from 1973 to January 1981.

In response to the oil embargo of 1973, Congress passed the Emergency Petroleum Allocation Act to minimize the repercussions caused by oil price increases. The complex regulations gave rise to pricing disputes between the Department of Energy, tasked with enforcing the provisions, and individual oil companies. The ensuing litigation finally concluded with court-ordered settlements directing oil companies to make restitution to all overcharged consumers. Settlement monies paid by oil companies are distributed to the States for use in energy efficiency programs.

The purpose of providing PVE funds to the States is to implement energy-related programs that benefit the general public. While there are some restrictions on the use and allocation of PVE funds as set forth by the Exxon and Stripper Well agreements, each State has the authority to choose energy projects that reflect the needs of its citizenry. A listing of some of the programs eligible to receive oil overcharge funding is provided in Appendix I.

As of March 1, 1993 more than \$4.67 billion has been distributed. States have funded more than 4,000 energy-related projects and programs. The Office of the Assistant Secretary for Energy Efficiency and Renewable Energy (EE) within the Department of Energy supports these State initiatives by providing information and technical guidance on renewable energy and energy efficiency technologies. EE follows the State projects with a great deal of interest and coordinates these projects with efforts by the Department of Energy whenever possible. EE also gathers and disseminates information about State projects through its State and local networks. Although the categories highlighted in this publication reflect several program areas in which the Department of Energy takes an active interest, they represent only a small fraction of the activities the States have been involved in with PVE funding. Since all PVE projects must be initiated by the States, persons wishing to receive additional information on the status and use of PVE funds for energy efficiency or renewable energy technology programs should contact their local State energy office listed in the appendices. It should be kept in mind that availability of funds and existing commitments vary widely from State to State.

The transportation sector is responsible for approximately 27 percent of total U.S. energy consumption and 66 percent of all U.S. petroleum use. Transportation fuel use is also considered the most significant factor contributing to dependence on foreign oil and poor air quality in our major cities. The widespread adoption of alternative fuels will not only increase our national energy security by reducing dependence on foreign oil supplies, but also improve our air quality and reduce our Nation's overall energy bill. The following program summaries illustrate some State efforts to promote alternative fuel use throughout the country.

FLORIDA'S ALTERNATIVE FUELS PUBLIC TRANSIT DEMONSTRATION

Recognizing that diesel engines used in urban transit buses are unlikely to meet new EPA clean air standards, Florida's Metro Dade Transit Authority (MDTA) has undertaken a comprehensive 4-year demonstration project using alternatively fueled public transportation buses.

Florida's Metro Dade Transit Authority is using 40 public transportation buses to conduct a test of fuel alternatives. The reliability, fuel efficiency, reduction in harmful emissions, availability of fuel supplies and parts, and operating costs for each of the alternative fuels will be assessed.

MDTA, in conjunction with Florida's Urban Mass Transit Administration and the Florida Energy Office, will dedicate 40 buses to this program. The buses will be divided into 4 groups of 10 each. In each group, 5 buses will be powered by an alternative fuel, and 5 will operate on standard diesel gasoline to serve as a control set. All 10 buses in each group will operate on the same route so that performance comparisons of the different fuels can be drawn under identical operating conditions. The four buses will test the following fuel alternatives: methanol, compressed natural gas, diesel with particulate traps, and a diesel-natural gas mix. Each vehicle will provide approximately 450,000 passenger miles of service per year.

The Metro Dade Transit Authority will evaluate the reliability, fuel efficiency, reduction in harmful emissions, availability of fuel supplies and parts, and operating costs for each of the fuels tested and will report the public's perception of the vehicles.

LOUISIANA'S STATE VEHICLE CNG CONVERSION PROGRAM

Louisiana has undertaken a 2-year compressed natural gas (CNG) demonstration project to determine the cost effectiveness, energy efficiency and environmental benefits of using CNG as a fleet fuel. The program will demonstrate to fleet owners and managers the importance of incorporating energy efficiency planning into their maintenance and operations strategies.

The demonstration project utilizes four types of public fleets—automobiles, pick-up trucks, medium-sized trucks, and school buses—and is conducted in two stages. The first stage encompasses the installation of natural gas compressor stations and the retrofitting of fleet vehicles to use CNG. The second stage consists of project evaluation and public outreach to disseminate the program's results.

Louisiana officials feel educating the residential, commercial and industrial energy consumers about CNG technology will yield many benefits, including reduced operating costs for public and private fleets, reduced air pollution levels throughout the State, lessened reliance on foreign oil and refined petroleum imports, and an enhanced natural gas industry within the State.

OKLAHOMA'S ALTERNATIVE FUELS CONVERSION FUND

In an effort to encourage and facilitate the use of alternative fuels in public fleets, Oklahoma has developed a revolving, interest-free loan program to assist government agencies in converting gasoline-powered engines to those that can operate on alternative fuels [CNG, liquefied natural gas, liquefied petroleum gas, and ethanol]. Loans of up to \$3,500 will be used to cover the initial costs of vehicle conversions, and loan repayments will be financed from the ensuing fuel savings. Eligible vehicles include those owned and operated by State, county, or municipal governments as well as vehicles owned by school districts.

Based on Oklahoma's experience with the Tulsa Public Schools CNG demonstration program, fleet fuel-efficiency improvements of more than 20 percent have been documented by converting to natural gas. Studies by the

Science and Public Policy Division of the University of Oklahoma indicate that participation in this program by eligible school districts alone would displace between 45,000 and 250,000 gallons of gasoline per district annually. The studies further estimate that a school fleet using 45,000 gallons of gasoline per year could potentially save \$10,000 in annual operating costs.

Oklahoma proposes to convert a minimum of 800 State trucks, vans, and passenger vehicles over the next 4 years to CNG and to assist in installing 11 natural gas fueling facilities statewide.

The State officials feel that the Alternative Fuels Conversion Fund has the capacity to enhance fleet transportation, reduce emissions from fleet vehicles, and to reduce the cost of the State's energy inputs, thus benefitting residents statewide.

NEW YORK'S HYDROGEN STORAGE RESEARCH PROJECT

Developments in hydrogen storage technology by New York's Energy Research and Development Authority at Syracuse University have shown encouraging results with potentially far-reaching alternative fuel applications. Proton-exchange-membrane (PEM) fuel cells in conjunction with lightweight electric motors could feasibly replace conventional gasoline combustion engines once an efficient means to store hydrogen has been developed. The research in New York focuses on this storage issue by experimenting with carbon adsorbents as a way to carry useful amounts of hydrogen fuel on board.

Hydrogen offers many advantages as a fuel: it reduces dependence on petroleum, virtually eliminates toxic emissions from vehicle exhausts, and utilizes energy resources more efficiently. Hydrogen-powered vehicles also will meet the new Zero Emission Vehicle (ZEV) standards being adopted throughout the country and will provide greater range, speed, and load-carrying capacity than battery-electric ZEV vehicles. New York's Energy Authority believes that resolving the hydrogen storage issue will represent a key technological advance in fuel-cell applications.

COLORADO'S LARGE CAPACITY CHASSIS DYNAMOMETER

A large capacity chassis dynamometer capable of exacting measurements of fuel economy and efficiencies will be purchased for the Colorado Institute for Fuels and High Altitude Engine Research, located at the Colorado School of Mines. The Institute, formally designated by the EPA as the National Heavy Duty High Altitude Research and Technology Assessment Center, will focus its efforts on measuring the energy efficiency, economic efficiency, and environmental impact of novel engine and fuel technology. The chassis dynamometer, capable of both static and transient loading, will be an important source for efficiency information on large capacity vehicles and enable purchasers to select the most cost-effective technologies.

The primary targets of this research are the operators of large capacity vehicles and the manufacturers of engine efficiency technology. The Regional Transportation District (RTD) in Denver will also benefit from the Center's work. RTD is responsible for the public transportation services in the Denver metropolitan area and is interested in upgrading its vehicle fleet to incorporate fuel-efficient, cleaner buses. In both cases, the Center will provide an accurate test bench for products and will produce verifiable data on which to base efficiency improvement or purchase decisions.

Industry consumes more than a third of the nation's primary energy, and produces over 12 billion tons of waste each year. Through process innovations and equipment improvements, however, industries now are able to make new products with less energy input and fewer raw materials, and reduce or reuse their solid wastes. These industrial efficiency and waste minimization technologies significantly improve energy usage, have beneficial impacts on the environment, and improve the economics of waste disposal. Examples of various State programs focusing on waste minimization and industrial efficiency are represented in the following summaries.

MISSOURI'S RECYCLING/ENERGY-EFFICIENT LANDSCAPING PROGRAM

A program combining newspaper recycling with energy-efficient landscaping techniques was undertaken by the Missouri Department of Natural Resources' Division of Energy. "Trees Renew Energy and Environment" (TREE) marketed the benefits of using trees to reduce solar heat gain in buildings and of using old newsprint to produce cellulose insulation. Participants who provided a 3-foot-high bundle of newspapers in January, 1991 received a coupon for a 3- to 6-foot-high tree to be picked up in April for spring planting. Information on energy-efficient landscaping accompanied the trees as well as instructions on plant care and maintenance. The collected newsprint was sent to a cellulose insulation manufacturer in the State.

In Missouri's Tree Renew Energy and Environment (TREE) program, participants provided a 3-foot high bundle of newspaper and received a 3 to 6-foot high tree in return. The program, combining newspaper recycling with energy efficient landscaping techniques, resulted in the collection of more the 850 tons of newsprint and the distribution of more than 16,500 trees.

Missouri's TREE program collected more than 850 tons of newsprint and distributed more than 16,500 trees. Because a 3-foot stack of newsprint is roughly equivalent to the fiber of

one 100-pound tree, this project brought Missouri citizens full circle in understanding the interrelationships of recycling, reforestation and energy conservation. Direct benefits from project TREE accrued to residents of the State through reduced home energy costs, reduced landfill requirements, and reduced energy inputs in the manufacture of insulation.

WASHINGTON'S EFFICIENT MOTORS DATA BASE

As part of a research project on energy-efficient electric motors performed under contract with the Bonneville Power Administration, the Washington State Energy Office (WSEO) has developed a comprehensive database that includes performance and price information for more than 2,700 National Electrical Manufacturers Association Design B electric motors. Because motors vary significantly in efficiency, the database can be used to identify a more efficient and cost-effective motor than might otherwise be purchased. The data base contains the manufacturer's name, motor model, catalog number, full load speed (RPM), service factor, frame size, and list price for motors in the 5- to 300-horsepower range. Information also is given on each motor's full-and part-load nominal efficiency and power factor values.

To facilitate the use of this data base, WSEO also has developed a software package for motor energy saving analysis. Energy, demand, dollar savings, and simple paybacks are readily displayed by this software for three high-efficiency motor purchase scenarios: (1) initial or new purchase of an energy-efficient motor versus a standard motor; (2) rewinding of a failed or burned-out motor; and (3) replacement of an operable oversized and underloaded standard motor with a high efficiency unit. WSEO officials see the data base and analysis package as significant tools for program planners, industrial plant managers, building operators, and utilities offering high-efficiency motor rebate programs; they hope that the availability of this information will motivate the motor manufacturing industry to emphasize efficiency in its research, design, and marketing efforts.

NEW HAMPSHIRE'S COMMERCIAL WASTE REDUCTION INITIATIVE

Joining initiatives implemented by both Vermont and Maine, New Hampshire has undertaken a proven self-help program in the area of industrial waste management. WasteCap, a non-regulatory, self-help industry initiative, provides companies with site-specific waste reduction

recommendations. Free, on-site technical assessments assist businesses in identifying changes that can be made in their production and material handling procedures to reduce their solid waste generation.

The Business and Industry Association of New Hampshire (BIA) selects an appropriate WasteCap Team from a pool of knowledgeable volunteers to perform each on-site assessment. Immediately following each visit, the team meets with company representatives to discuss the team's observations and suggestions. They then develop a report for the company that outlines their observations and suggests alternatives to the company's current waste handling practices. The report also includes pertinent information on recycling. BIA follows up with the company 6 to 12 months after the visit to evaluate the success of the program.

Information from selected WasteCap visits is developed into case studies and is used to train the program's volunteers. These cases also serve as vehicles to exchange existing waste management experience in the tri-state area and to expand the information data bases of both the regional WasteCap program and the national Pollution Prevention Information Exchange System.

WISCONSIN'S WOOD WASTE ENERGY INCENTIVE PROGRAM

Wisconsin's Energy Bureau is conducting a Wood Waste Energy Incentive Program designed to install, repair, or modify commercial and industrial wood energy systems. The program was initiated after two statewide surveys indicated that 250 to 300 businesses were generating significant amounts of fuel-quality wood waste. Respondents to the survey expressed difficulty in eliminating their waste economically and noted concern about rising landfill costs and reduced landfill availability. Since its inception in 1988, the program has awarded grants to 24 businesses for 26 separate wood energy projects.

The wood waste incentive grants are awarded on system energy performance rather than on system cost. Thus, the program encourages applicants to "shop around" for systems that offer the best energy output and eliminates subjective judgments on cost components. Incentives generally fall within 10 to 20 percent of total project cost and increase as system efficiency increases. Grant amounts also increase as the utilization of the system's energy output increases. The success of this program has led to the use of more than 40,000 tons of wood waste annually, enough wood to cover a

200-acre area to the depth of one foot or fuel a 6 megawatt electric power plant. At current commercial prices, this translates into a savings of over \$1 million per year in Wisconsin's out-of-state energy expenditures.

The Wood Waste Energy Incentive Program conducted by the Wisconsin Energy Bureau is designed to install, repair, or modify commercial and industrial wood energy systems. The success of this program has led to the use of more than 40,000 tons of wood waste annually and has resulted in a savings of over \$1 million per year in Wisconsin's out-of-state energy expenses.

NEW YORK'S MARKET EXPANSION PROGRAM FOR SECONDARY MATERIALS

New York's Secondary Materials Energy Conservation (SMEC) program is intended to stimulate and expand the activities of local enterprises that use waste materials in their manufacturing processes. The goal of the program is to modify current production methods to include secondary materials, thus reducing energy consumption and creating new markets for waste products. The program offers financial assistance to help industrial firms, businesses, and not-for-profit organizations conduct solid waste feasibility studies, and provides direct loans for plant process modifications that will incorporate secondary materials technologies.

Various studies have already been initiated with New York's SMEC funding that examine the uses of household batteries, tin-lined steel cans, plastic, used wire, paper sludge, and old newsprint. Listings of businesses that use recyclable materials in their manufacturing process, specifications required by various recycling firms, and advice on materials source separation also are provided by the program. Future SMEC efforts will be directed toward developing cooperative marketing ventures that establish secure market linkages for secondary materials recovered by municipalities.

The generation, transmission, and use of electricity sustains our economic productivity, elicits technological and scientific innovation, and profoundly impacts the quality of our environment. Renewable energy (RE) technologies offer clean and nonexhaustible alternatives to traditional power production methods. Some RE technologies are becoming increasingly cost competitive with conventional energy sources. However, they must receive equitable consideration from industrial, regulatory, and financial managers to foster widespread market acceptance. Following are descriptions of State programs designed to encourage electric power production from renewable resources.

LOUISIANA'S LANDFILL GAS RECOVERY PROJECT

An innovative landfill gas recovery project is underway in the city of Lafayette, Louisiana. The project has two objectives: (1) to recover the city's landfill gas and use it to augment existing fuel supplies of the Lafayette Utilities System power generation facility; and (2) to develop an accurate data base that predicts the quantity and quality of landfill gas.

The 5-year Landfill Gas Recovery and Database Development Project is intended to be a cooperative and innovative approach to the management of municipal solid waste. The funding covers all phases of the project's implementation from preliminary site investigations to design, construction, operation and maintenance of the system. When the project is operational, the landfill is expected to yield 260 million cubic feet of gas annually containing an estimated 500 Btus per cubic foot. The recovered gas will be treated to remove moisture and pressurized to fire a 1,000-kW electric generator. The electricity produced from this gas will be used to offset the City of Lafayette's electrical consumption.

The project will serve as a demonstration to public and private owners of sanitary landfills, landfill regulators, power utilities, technical engineering societies, municipal associations, and environmental advocacy groups to prove that useful quantities of landfill gas can be collected and utilized for electric power production. Publicity efforts in the form of press releases, seminars, videotapes, and brochures will help to disseminate information concerning the project, and tours will make the facility accessible to the general public.

ARIZONA'S SOLAR OASIS FOR DESERT TECHNOLOGIES

The Arizona Solar Oasis is a living demonstration of new energy technologies available to desert communities. The world-class exhibition provides specific solutions to the problems of energy production and energy and water efficiency and serves as an interactive learning center where workshops, symposiums, hands-on demonstrations and audio/visual programs offer diverse formats for educating the public on desert-living innovations.

Scientific investigation performed at the Solar Oasis include published studies on air pollution reduction, climate control in outdoor spaces, cool-tower modeling and cool-tower performance. Technology demonstrations encompass water harvesting concepts, photovoltaic and solar thermal applications, passive solar building design, and solar cooling tower phenomenon. The program also incorporates a public outreach effort to help communities discover their individual resource efficiency potential and to disseminate information on practical, innovative ways to address the issues of energy, water, and air quality.

COLORADO'S PLATTE RIVER POWER AUTHORITY PHOTOVOLTAIC DEMONSTRATION

The Platte River Power Authority constructed a 10kW photovoltaic demonstration power plant in Fort Collins, Colorado, to test the performance of full-scale photovoltaic modules. The plant consists of three parallel and independent systems, each rated at 3.3 kW, and is being used to determine what combination of module (flat plate or concentrating) and tracking mode (south facing adjustable tilt, or two-axis tracking) is best suited for the climate in northern Colorado. All three systems convert direct current power from the photovoltaic cells into alternating current power for use at the facility. A Hewlett-Packard data acquisition system was designed to monitor the alternating current-generated readings from each photovoltaic system and to generate quarterly graphs on the plant's monthly readings, system availability, 24-hour capacity, and peak capacity.

Energy savings from the demonstration plant are estimated to be between 15,000 to 20,000 kWh per year. Some conclusions drawn from the project include: (1) the single-axis tracking system produced 11 percent more energy per unit of rating than the south-facing adjustable tilt system and 49 percent more than the two-axis tracking concentrator; (2) haziness caused by the 1988 fires in

The Platte River Power Authority in Ft. Collins, Colorado constructed a 10 kW photovoltaic demonstration power plant to test the performance of full-scale photovoltaic modules. All three systems at the plant convert direct current power from the photovoltaic cells into alternating current power for use at the facility.

Yellowstone had a more pronounced adverse effect on the concentrator systems than on the flat plate systems; and (3) rating guidelines for photovoltaic concentrating systems need to be more realistic. Although photovoltaics are not expected to replace conventional sources of electricity in Colorado, photovoltaic feasibly could supplement existing power supply sources to meet peak-load demand.

HAWAII'S WIND-DIESEL ELECTRIC HYBRID SYSTEM

Wind is one of Hawaii's most abundant renewable energy resources and has the potential to provide a significant portion of the State's electric energy requirements. Wind alone, however, is an intermittent energy source, and short-term wind speed fluctuation adversely affects the quality of power generated. Because of this, utilities have limited the amount of wind-generated electricity to 5 to 10 percent of their total installed capacity. A demonstration project on the island of Molokai coupling a wind energy conversion system with a diesel engine-powered generator will show that the two systems can work together to provide residents with a relatively firm power source (compared to diesel-only systems) and significantly reduce the use of imported fossil fuels to generate electricity.

A major wind energy project developer will design, construct, and operate the wind/diesel hybrid system on Molokai. The island was chosen for this demonstration because it has a significant amount of wind energy and has the highest electricity costs in the State. The system will

utilize three 100 kW wind turbines in conjunction with a 100 kW diesel engine-powered electricity generator to provide the island with its electric power. Molokai is the first island in Hawaii designated to achieve electrical power self-sufficiency and State officials view this project as a significant step in achieving this goal.

ALABAMA'S BIOMASS TRUST FUND

More than 10 million tons of bark, sawdust, and woodshavings are produced each year by Alabama industry. Harnessing the productive use of these waste products has been the goal of the State's Biomass Trust Fund. To date, over 20 area businesses have utilized the fund to install biomass energy equipment that burns wood waste as an alternative to fossil fuels. The program, run by the Science, Technology and Energy Division of Alabama's Department of Economic and Community Affairs, helps reduce business energy costs by substituting cheaper biomass fuel in steam-boiler and direct-fired heating furnaces for more expensive fossil fuels normally used in plant operations. Converting to biomass energy systems also alleviates industry disposal costs associated with the wood residue.

Biomass Trust Fund applicants must provide a detailed description of their project along with operational data in order to be eligible for a loan interest subsidy. Qualifying participants then may receive up to \$75,000 per project in interest reimbursements during the first 3 years of their loan. Program participants also are eligible to receive technical assistance and have been a source of firsthand information to the Alabama forest products industry on new and possibly more profitable methods of operation.

The Alabama Biomass Trust Fund was established to harness the productive use of more than 10 million tons of waste produced annually in the forms of bark, sawdust, and woodshavings. To date, over 20 area businesses have utilized the fund to install biomass energy equipment that burns wood waste as an alternative to fossil fuels.

Residential and commercial energy use account for nearly 37 percent of total U.S. energy consumption. Building energy costs for heating, ventilation, and air-conditioning comprise a significant portion of this consumption. Recent technology advances address both the issues of energy efficiency in our Nation's structures and the environmental impacts related to their use. Cost-effective improvements in building design, construction, materials, and equipment will make significant progress toward saving energy in our homes and workplaces. The programs detailed below are examples of building efficiency efforts at the State level.

WISCONSIN'S BUSINESS ENERGY FUND

Rebates and interest buydowns for commercial and industrial weatherization and process efficiency projects are the focus of Wisconsin's Business Energy Fund. Administered by the Wisconsin Housing and Economic Development Authority, the fund has provided low-cost financing and cash rebates to over 900 area businesses for energy conservation measures. Most of the program's

The Wisconsin Business Energy Fund has provided low cost financing and cash rebates to over 900 area businesses for energy conservation measures. The fund provides valuable energy efficiency incentives to Wisconsin businesses without using State tax dollars.

participants are businesses that have less than \$5 million in gross annual sales or employ fewer than 25 full-time employees. Additionally, 25 percent of the businesses are owned by either women or minorities, and an equal percentage are new ventures in their first 3 years of operation. Only those projects identified through an energy audit performed by either a utility company or a professional engineer are eligible for consideration.

The Business Energy Fund assists enterprises either through interest subsidies that reduce loan interest rates between 3 to 5 percent or through cash rebates equal to 25

percent of the energy efficiency improvement costs. The fund has maintained a 5:1 leverage factor with the most popular energy improvement projects being furnace replacements, lighting retrofits, and insulation upgrades. The fund provides valuable energy efficiency incentive to Wisconsin businesses without using State tax dollars.

NEW YORK'S CONSUMER REBATE PROGRAM

By offering consumer rebates, New York is promoting the purchase of energy efficient home appliances. The rebate program was designed to complement New York's appliance efficiency standards and to stimulate the manufacture and availability of highly efficient refrigerators, freezers and room air conditioners. More than 70,000 consumers participated in the State's initial program and received rebates valued at 8 to 15 percent of the appliance purchase price. This success has spawned continuing initiatives geared primarily toward purchasers of energy-efficient refrigerators.

The use of energy-efficient appliances will reduce electrical consumption and place less demand on New York's electric generation capacity. Estimates indicate that the decreased electrical generation resulting from the appliance rebate program will reduce the State's emission of pollutants by 1,400 tons and reduce carbon dioxide emissions by 172,000 tons.

WASHINGTON'S ENERGY CODE SUPPORT

In order to impart a comprehensive and uniform understanding of the Washington State Energy Code, the State is funding an Energy Code Support program. The goal is to train code officials, builders, and others in energy code matters and to provide staff that can perform analyses and serve other functions for the Washington State Building Code Council Energy Committee.

The Energy Code Support measure provides for on-site training in basic code inspection as well as specialized training in glazing and ventilation/moisture barrier requirements, heat load/loss calculations, building plan review, and mechanical systems. It also funds the activities of the Council's support staff, which provides objective technical analyses on energy code issues, studies and amendments; represents the Council's policies to the building and energy industries; and executes rulemaking steps necessary for energy code updates. Washington estimates that 4.3 billion Btus are saved annually as a result of its Energy Code Support program.

ARIZONA'S AND MINNESOTA'S ENERGY-EFFICIENT HOME DESIGN

Both Arizona and Minnesota have funded programs that will give home builders and buyers the opportunity to explore new concepts in energy-efficient building design. The purpose of each program is to disseminate viable building technologies appropriate to the region. In Arizona, the Desert Homes Demonstration Project will illustrate the

Arizona's Desert Homes Demonstration Project will illustrate the energy savings potential in desert housing by building a model home that requires half the amount of energy needed in homes of standard design.

energy savings potential in desert housing by building an affordable, appropriately-sized model home that integrates the best combination of materials and technologies. The model will require 50 percent less energy than homes of standard design and will be open to the building industry and general public. Architectural plans for the model home will become public documents in order to encourage the transfer of desert building efficiency technology.

In a similar vein, Minnesota is evaluating the viability of an energy-efficient manufactured housing industry that would integrate Swedish technology and design with local resources and capabilities. Studies will explore the efficiency of housing currently being manufactured; identify design, materials, and production characteristics of energy-efficient homes; and investigate public policy issues such as building codes and standards that need to be met in order to qualify housing for government financing programs. The project also will assess the State's available natural resources and their potential for manufacturing associated building industry products.

OREGON'S YOUTH SUMMER WEATHERIZATION PROGRAM

Oregon's Youth Summer Weatherization Program combines Community Action goals with home energy efficiency improvements. As many as 200 youths have been employed each summer to weatherize the State's low-income homes. They are educated in energy conservation and house needs assessments, and receive training in weatherization techniques and minor home repair. The crews also are educated in home energy efficiency tips which they pass along to their clients.

The benefits of the program are twofold: youth participants gain valuable job skills while low-income residents receive home energy improvements they otherwise could not afford.

Participants of Oregon's Youth Summer Weatherization Program truly learn to serve. Members first learn energy efficiency measures, weatherization techniques, and minor home repair and then apply their knowledge and training to the weatherization of low-income homes in the State. These summer youth services have helped to weatherize more than 10,000 homes in Oregon.

High school-and college-age minorities are given priority hiring status for the program and work in crews caulking and weather-stripping windows, insulating roofs, wrapping hot water heaters, and installing outlet gaskets and door sweeps. Low-income senior citizens and handicapped individuals are the targeted recipients of these summer youth services, which have helped to weatherize more than 10,000 homes in Oregon.

VERMONT'S VOCATIONAL EDUCATION BUILDING TRADES CURRICULUM DEVELOPMENT

The purpose of Vermont's Building Trades Curriculum Development initiative is to incorporate sound energy practices and technologies into the State's vocational education programs. The intent of the program is to update the training that students receive in energy conservation and building and retrofit practices. Experience in Vermont's

Home Energy Loan Program has shown that many contractors are not familiar with the latest available energy conservation technologies, resulting in inconsistencies in building and retrofit methods. Vermont hopes that by

The Vermont Building Trades Curriculum Development initiative strives to provide up-to-date training to students in energy conservation and building and retrofit practices, with the intention of securing long-term energy savings through improved building practices.

improving the knowledge and skills of the State's vocational instructors, it will significantly influence the practices of their future builders and contractors.

The Curriculum Development program has several objectives: to examine the current curriculum and determine needed additions; to adapt selected curriculum additions to be Vermont-specific; and to train building trades instructors in the use of the new materials and equipment. By revising the State's building trades curriculum and training the program's vocational instructors, Vermont aims to leverage long-term energy savings through improved building practices.

TEXAS' LOANSTAR PROGRAM

A low-interest loan program to fund energy-efficient retrofits in public sector institutions is being administered by the Governor's Energy Office in Texas. The program is designed to demonstrate commercially available energy-efficient technologies and techniques. All units of local government such as counties, cities, towns, and independent school districts are eligible for up to \$1.6 million for retrofits through the LoanSTAR program. Other eligible organizations include all State agencies and institutions of higher education that are appropriated general revenue funds for utility expenditures and which occupy State-owned buildings.

A wide range of projects is supported by the program, including indoor and outdoor lighting projects, heating, ventilation and air-conditioning equipment, building shell improvements, energy management systems, boiler efficiency and central plant improvement, alternate and renewable energy systems, water and waste water projects, and other cost effective, demand-or rate-based retrofits.

Criteria used to evaluate loan program applications focus on an estimated payback period and ability to repay loans through energy savings, an engineering assessment of the viability of the technology, and a demonstrated ability of the applicant to implement and maintain the retrofits.

As of May, 1992, the LoanSTAR program has funded up to \$47 million in projects. Both Refugio and Dallas counties, for example, have received \$16,402 and \$1,050,080 respectively. These counties have used LoanSTAR monies to fund projects ranging from relamping and upgrading chillers to modifying exterior lighting and replacing faulty steamtraps.

Integrated Resource Planning (IRP) is a process in which energy planners—principally utilities—consider all options for providing electric power service to customers, including reductions in energy demand as well as increases in energy supplies. Also termed least-cost planning, IRP processes examine electricity-saving and electricity-producing options such as demand-side management (DSM), purchases from small power producers, and utility rate structure changes; they weigh environmental, social, and economic costs in utility service decisions. The following summaries describe IRP implementation strategies and practices developed throughout the country.

IRP REGULATORY ADVOCACY AND POLICY IMPLEMENTATION INITIATIVES

Reduced energy demands, lower utility rates, and a more environmentally sound energy supply are the goals of both Massachusetts' and Colorado's DSM programs.

In Massachusetts, the heart of their Energy Efficiency Policy Implementation program is to advance demand side management policies beyond theory and into implementation and common practice. The focus is on integrated resource planning and DSM activities of electric and gas utilities which comprise the largest single source of direct energy efficiency investment. Other policy efforts highlight appliance efficiency standards enforcement and education, implementation of mandated energy efficiency measures in State facilities, and oil conservation investments by fuel companies.

Similarly, the goal of Colorado's Regulatory Advocacy Program (RAP) is to design incentive structures that help regulated utilities implement DSM programs as an alternative to constructing additional power capacity. A RAP representative advocates energy efficiency issues during formal proceedings before the Colorado Public Utilities Commission by offering specific information and suggesting alternative courses of action. By providing evidence and expert testimony to the Commission for use in its rulemaking, Colorado hopes to change the State's utility incentive structure from one that penalizes utilities for energy efficiency efforts to one that rewards them for delivering end-use efficiency services.

ILLINOIS' ENERGY BROKERING STUDIES

Illinois is investigating energy brokering as a component of the State's least-cost energy plan. Brokering would match willing buyers and sellers of electricity both inside and outside the State, and thereby provide cost-effective opportunities for energy-saving transactions.

The Illinois Department of Energy and Natural Resources believes that brokering would reduce the State's energy costs directly by replacing expensive, low-efficiency power generation with bulk power purchases from other areas. Because baseload plants operate efficiently only at high levels of use, any mismatch of supply and demand creates a situation in which plants must be cycled or shut down, which dramatically reduces power plant efficiency, increases the use of imported fuels, and reduces overall plant life. Brokering transactions therefore would allow a wider sharing of capacity reserves and reduce the State's need to build new baseload plants to meet peak and reserve requirements.

The 2-year energy brokering study will investigate six issues concerning regional wholesale power transactions. These issues include: potential for wholesale power transactions in the region; technical impediments to regional power transfers; legal and regulatory implications of energy brokering; and the effects of brokering on local energy consumption. The study results will be incorporated into the State's least-cost energy plan and will form the basis for future decisions concerning the establishment of an energy brokerage.

NEW ENGLAND'S REGIONAL POWER PLANNING STUDY

Maine, New Hampshire, Massachusetts and Connecticut will use oil overcharge funds to participate in a 3-year regional power planning study conducted by the New England Governor's Conference (NEGC). The study will analyze ways to meet the region's electric power needs in the most efficient and least-cost manner. Strategies developed by the NEGC will focus on the following:

- 1) Designing and implementing least cost planning strategies for each of the regional States;
- 2) Developing short- and long-term plans for regional transmission facilities that would enhance system reliability and reduce overall generation costs; and
- 3) Promoting the integration of supply and demand

planning activities with specific emphasis on conservation, land management, cogeneration, and small power production options.

The Power Planning Committee, comprised of the chairs of the Public Utility Commissions and the directors of the six New England energy offices, will provide guidance and oversight for the study.

OKLAHOMA'S REVOLVING LOAN PROGRAM FOR MUNICIPAL ENERGY EFFICIENCY IMPROVEMENTS

A large municipal utility in Oklahoma is offering 1 year, interest-free loans to Oklahoma cities and municipalities for energy efficiency improvements and conservation efforts. The 5-year program, administered by Municipal Electric Systems of Oklahoma, invites cities to submit loan applications for community energy conservation projects. Applications are judged on the basis of energy reduction, demand reduction, and economic development improvements provided through the investment. Projects promising the greatest economic gain per dollar of loan are given priority. A \$0.02 per kWh (\$50 per kilowatt) gauge is used to measure each project's economic gain.

The loans are granted for a 1-year period, except for programs that focus on customer-related energy reductions, which are eligible for 2-year loans. Types of projects to be funded include voltage control, air-conditioning control, system voltage upgrades, and street lighting conversion. Cities also are encouraged to develop natural gas, water, and sewer proposals that reduce energy consumption. One successful project in the city of Lavern used the loan program to replace municipal street lights, reducing the city's kilowatt hour usage by 36 percent and directly benefitting its 1,200 residents.

PENNSYLVANIA'S DEMAND-SIDE MANAGEMENT (DSM) PROGRAM FOR ELECTRIC CONSUMERS

The Pennsylvania Energy Office recognizes that everyone wins with effective demand side management; customers receive lower utility bills while still obtaining the same level of energy service, and utility companies avoid costly plant expansions to meet growing power requirements.

Research and experience in other States have shown that DSM measures frequently are the least-cost option for a utility to meet its customers' energy needs. With this in mind, the Pennsylvania Energy Office is working closely

with the State's Public Utility Commission to develop and implement fair and effective DSM programs. To overcome the barriers that have traditionally impeded widespread implementation of these programs, Pennsylvania has developed a plan that will focus on three major components. The first component is the provision of technical assistance to electric utility companies and to the Public Utility Commission in the design, implementation, and evaluation of DSM programs and rate proposals. The second component is the allocation of funds for the installation of new and innovative DSM measures and technologies, and the sharing of a portion of their implementation costs. The third component consists of educating electricity consumers about the options available to reduce their electricity bills through the use of DSM measures and an understanding of the structure of electricity rates.

Pennsylvania's DSM initiative aims to overcome the disincentives that currently exist in utility rate structures and to help local utility companies implement quality DSM programs for their customers.

WASHINGTON'S NATURAL GAS EFFICIENCY PROGRAM

Recent declines in the retail cost of natural gas are expected to spur greater reliance on this fuel source in both Washington's residential and commercial end-use sectors and as an input for cogenerated electricity. For this reason, the Washington State Energy Office is funding a Natural Gas Efficiency, Resources and Least-Cost Planning Program. The program is geared toward developing policy and planning criteria for the natural gas service sector along the lines of those already established for electric utilities.

Washington's natural gas efficiency program will lay the groundwork for making least-cost planning decisions and energy efficiency program plans in the natural gas sector. Decision criteria will take into account consumer, societal, and environmental concerns as well as the need for financially viable natural gas distribution companies in the State. The objectives of the program include documenting the performance and cost characteristics of natural gas end-use equipment, exploring the extent of natural gas efficiency programs already in place, and researching the marketplace and resource economics of the natural gas energy services sector in the State.

Educating our nation's children in energy conservation is an important tool in securing our energy future. Through development of an effective energy curriculum and participatory learning activities such as projects, contests, camps, and debates, our children strengthen their knowledge and understanding of energy issues and gain a greater appreciation for the role of energy conservation and renewable energy technologies. The following summaries describe examples of State efforts to promote both energy management within schools and effective energy curricula for our nation's youth.

CALIFORNIA'S REGIONAL ENERGY EXTENSION CENTERS

Schools throughout California have learned that they spend more per student on energy than they do on books, materials, and instructional supplies and have thus begun taking an active interest in ways to control their energy costs. The California Energy Extension Service (CEES)

Students actively participate in energy conservation through the establishment of eleven regional energy extension centers in schools throughout California. The centers provide training and support in developing energy management programs on both the administrative and classroom levels.

responded to this interest by establishing for schools a network of 11 regional energy extension centers that provide training and support in developing energy management programs. The regional centers provide comprehensive plans, maintenance training, and equipment surveys or audits as well as energy accounting and financing assistance projects.

CEES and the centers are also partners with the Department of Education in developing a student curriculum that highlights effective energy lessons for the

classroom. Students take an active role in their own education by teaching energy concepts to their peers and younger children. Through pep rallies with energy cheers, original plays, carnival games, recycling contests, hot dogs cooked with solar collectors, model dinosaurs that move with solar energy, and models of nuclear plants, students demonstrate their creativity in getting the energy message across. The centers also sponsor student energy projects and have a statewide awards ceremony to honor outstanding energy-saving efforts.

UTAH'S STUDENT ENERGY DEBATES

Thousands of Utah students participated in the State's 1991 interdistrict debate competition to deliver arguments and rebuttals on the direction of Utah's energy future. The debate proposition was to convert Utah's energy use from predominantly nonrenewable resources to predominantly renewable energy resources. The students chose whether to debate in favor of or against the resolution and developed

Students participating in Utah's 1991 interdistrict debate competition argued whether or not to convert the State's energy use from predominantly nonrenewable resources to predominantly renewable energy resources. Energy was chosen as the annual debate topic amidst widespread concern over the Persian Gulf crisis and its effect on oil supply and prices.

arguments to defend their positions. Energy was chosen as this year's debate topic due to the widespread concern over the Persian Gulf crisis and its effect on oil supply and prices.

To help teachers and students prepare for the debate, workshops were held to explain renewable and

nonrenewable energy resources and to give instruction and curricula containing in-depth teaching and learning aids. Debate teams were judged on organization, analysis, evidence, reasoning, refutation, and delivery. First-, second-, and third-place awards were presented to winning debate teams in the affirmative and negative categories, and best speaker awards were given for individual performances. The students received an excellent education on energy issues as a result of the program, and many teachers have urged competition organizers to choose energy as the topic of debate again next year.

MONTANA'S ELEMENTARY SCHOOL ENERGY VIDEO PROJECT

The Energy Division of Montana's Department of Natural Resources and Conservation awarded an education minigrant to the West Glacier School so that students could film three energy-related public service announcements. The project was an extension of the school's Energy Week activities in which all West Glacier students, grades kindergarten through sixth, participated.

The public service announcements were created by the students and focused on the theme of energy conservation. Producing the two 30-second and one 60-second announcements helped students internalize the energy conservation concepts by allowing them to participate in all aspects of message development, filming, acting, and editing. The announcements were aired an average of 40 times per week for 3 weeks on 15 television stations throughout the State.

Students at West Glacier Elementary School participated in the message development, filming, acting, and editing of three public service announcements promoting energy conservation. The announcements were broadcast throughout the State.

TRI-STATE ENERGY EDUCATION PROJECT

The Energy Offices of Arizona and Nevada, in conjunction with the California Governor's Office of Planning and Research, are working together to conduct a regional, coordinated energy education program for the three States. The program will evaluate existing energy education materials, disseminate current energy information to educators, and conduct a summer camp for students that promotes energy awareness and environmental issues.

The States will form a 32-member evaluation group to study existing energy education materials and to make a critical review of the States' energy education curricula.

Representatives, students, and teachers from Nevada, Arizona, and California attended a summer camp in Galena, Nevada where they studied and learned about energy and environmental issues. The camp was part of a regional, coordinated energy education program developed for the three States.

The evaluations will highlight strengths and uncover weaknesses in existing materials and will make recommendations for those grades that lack an energy educational program. The States will disseminate this information via an interdisciplinary newsletter, which provides information on teacher workshops, training, and upcoming events. Further complementing these activities was the environmental-energy camp held in Galena, Nevada during the summer of 1991, where representatives, teachers, and students from each State came to learn more about energy and environmental issues and to focus on food chain, pollution, solid waste disposal, and endangered species problems.

The following lists some of the various funding expenditures allowable under the Stripper Well Settlement Agreement. PVE monies may also be used in any of the Department's State grant programs.

I. TRANSPORTATION

A. General Driving Public

- 1) Fuel efficient traffic signal programs
- 2) Highway traffic management programs
- 3) Motor fuel and recycling programs
- 4) Highway and bridge maintenance and repair
- 5) Public transportation projects

B. Consumers

- 1) Car care clinics
- 2) Energy educations for drivers training
- 3) Ridesharing programs
- 4) Marketing of state-supported passenger rail and mass transit
- 5) Bicycle promotion program

C. Commercial, Industrial, Government

- 1) Vehicle fleet-maintenance programs
- 2) Transportation systems management assistance
- 3) Remanufacturing/refitting transit buses
- 4) Computerized school bus routing
- 5) Alternative transportation fuel programs
- 6) Transit system refitting loan program

II. RESIDENTIAL

A. Heating

- 1) Weatherization
- 2) Retrofitting
- 3) Tune-ups
- 4) Energy audits
- 5) Energy assistance
- 6) Demonstration Projects
- 7) Data collection and dissemination
- 8) Energy management services
- 9) Conservation promotion programs
- 10) Solar energy demonstration programs
- 11) Solar energy lending programs

B. Electricity

- 1) Weatherization
- 2) Energy audits
- 3) Energy assistance
- 4) Demonstration projects

III. COMMERCIAL

A. Industrial/Agricultural

- 1) Energy loans
- 2) Energy assistance
- 3) Conservation
- 4) Bio-mass conservation

B. Small Business/Government/Education

- 1) Energy accounting incentives
- 2) Loans and technical assistance
- 3) Energy audits
- 4) Energy efficiency
- 5) Cogeneration

STATE ENERGY OFFICES

ALABAMA

K. David Shropshire, Director
Alabama Department of Economic
and Community Affairs
P.O. Box 5690
Montgomery, AL 36103-5690
(205)242-5292

ALASKA

Robert Breen, Director
Alaska Housing Finance Corp.
520 E. 34th Ave.
Anchorage, AK 99503
(907)561-1900

ARIZONA

Jack Haenischen, Director
Arizona Department of Commerce
Arizona Energy Office
3800 North Central Avenue
Suite 1200
Phoenix, AZ 85012
(602)280-1402

ARKANSAS

Jim Blakley, Director
Arkansas Energy Office
One State Capitol Mall
Suite 4B/215
Little Rock, AR 72201
(501)682-7315

CALIFORNIA

Charles Imbrecht, Chairman
California Energy Commission
1516 9th Street, MS-31
Sacramento, CA 95814
(916)654-5000

Richard Sybert, Director
Governor's Office of Planning
and Research
1400 10th Street
Sacramento, CA 95814
(916)322-2318

COLORADO

Nancy Tipton, Director
Colorado Office of Energy Conservation
1675 Broadway, Suite 1300
Denver, CO 80202
(303)620-4292

CONNECTICUT

Susan Shimelman, Director
Policy Development and Planning
Office of Policy and Management
80 Washington Street
Hartford, CT 06016
(203)566-4298

DELAWARE

Charlie T. Smisson, Jr.,
Director
Division of Facilities Management
Energy Office
P.O. Box 1401
Dover, DE 19901
(302)739-5644

DISTRICT OF COLUMBIA

Charles Clinton, Director
District of Columbia Energy
Office
613 G Street, N.W.
5th Floor
Washington, DC 20001
(202)727-1800

FLORIDA

Jim Tait, Director
Florida Energy Office
Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100
(904)488-2475

GEORGIA

Paul Burks, Director
Office of Energy Resources
254 Washington Street, S.W.
Room 401
Atlanta, GA 30334
(404)656-5176

HAWAII

Maurice H. Kaya, Director
Department of Planning and
Economic Development
Energy Division
335 Merchant Street
Room 110
Honolulu, HI 96813
(808)587-3812

IDAHO

Robert Hoppie, Director
Department of Water Resources
Energy Division
1301 North Orchard Street
Boise, ID 83706
(208)327-7900

ILLINIOS

John S. Moore, Director
Department of Energy
and Natural Resources
325 West Adams Street
Room 300
Springfield, IL 62704-1892
(217)785-2002

INDIANA

Amy Stewart, Director
Department of Commerce
Office of Energy Policy
One North Capitol
Suite 700
Indianapolis, IN 46204-2248
(317)232-8940

IOWA

Larry Bean, Director
Iowa Energy Bureau
Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319
(515)281-8681

KANSAS

Jim Robinson, Director
Kansas Corporation Commission
Energy Programs Section
1500 S.W. Arrowhead Road
Topeka, KS 66604
(913)271-3100

KENTUCKY

John Stapleton, Director
Division of Energy
691 Teton Trail
Frankfort, KY 40601
(502)564-7192

LOUISIANA

Diane D. Smith, Director
Louisiana Department of Natural
Resources
Energy Division
P.O. Box 44156
Baton Rouge, LA 70804
(504)342-2133

MAINE

Leonard A. Dow, Director
Department of Economic and
Community Development
State House, Station #59
Augusta, ME 04333
(207)289-6800

MARYLAND

Gerald L. Thorpe, Director
Maryland Energy Administration
45 Calvert Street, 4th Floor
Annapolis, MD 21401
(301)974-3755

MASSACHUSETTS

Stephen J. Remen
Massachusetts Division of
Energy Resources
Leverett Saltonstall Building
100 Cambridge Street, Room 1500
Boston, MA 02202
(617)727-4732

MICHIGAN

Steven M. Fetter, Director
Michigan Public Service
Commission
6545 Mercantile Way
Lansing, MI 48909
(517)334-6270

MINNESOTA

Krista L. Sanda, Director
Minnesota Department of Public
Service
900 American Center Building
150 East Kellogg Boulevard
St. Paul, MN 55101
(612)296-6025

MISSISSIPPI

Chester B. Smith, Director
Mississippi Department of
Economic and Community
Development
Energy Division
510 George Street, Suite 101
Jackson, MS 39202-3096
(601)359-6600

MISSOURI

Director
Missouri Department of Natural
Resources
Division of Energy
P.O. Box 176
Jefferson City, MO 65102
(314)751-4000

MONTANA

Van Jamison, Director
Department of Natural Resources
and Conservation
Energy Division
1520 East Sixth Avenue
Helena, MT 59620-2301
(406)444-6697

NEBRASKA

Robert Harris, Director
Nebraska Energy Office
P.O. Box 95085
110 The Atrium
Lincoln, NE 68509
(402)471-2867

NEVADA

James Hawke, Director
Nevada Office of Community Services
Capitol Complex
Carson City, NV 89701
(702)687-4990

NEW HAMPSHIRE

Jonathan S. Osgood, Director
Governor's Office of Energy
and Community Services
57 Regional Drive
Concord, NH 03301-8506
(603)271-2611

NEW JERSEY

Nancy Wittenberg, Director
Department of Environmental
Protection and Energy
401 E. State Street
Trenton, NJ 08625
(609)292-2885

NEW MEXICO

Dianne Caron, Director
Department of Energy, Minerals,
and Natural Resources
Energy Conservation and
Management Division
2040 South Pacheco
Santa Fe, NM 87505
(505)827-5917

NEW YORK

Francis J. Murray
Commissioner
New York State Energy Office
Two Rockefeller Plaza
Albany, NY 12223
(518)473-4376

NORTH CAROLINA

Carson D. Culbreth, Jr., - Director
North Carolina Department of
Commerce
Energy Division
430 North Salisbury Street
Raleigh, NC 27611
(919)733-2230

NORTH DAKOTA

Shirley R. Dykshoorn, Director
Office of Intergovernmental
Assistance
State Capitol Building
Bismarck, ND 58505
(701)224-2094

OHIO

Roberta Garber, Director
Ohio Department of Development
Community Development Division
Office of Energy Efficiency
77 S. High Street, 25th Floor
Columbus, OH 43266-0413
(614)466-3465

OKLAHOMA

Sherwood Washington, Director
Department of Commerce
Division of Community Affairs
and Development
P.O. Box 26980
Oklahoma City, OK 73126-0980
(405)843-9770

OREGON

Christine Ervin, Director
Oregon Department of Energy
Conservation Division
625 Marion Street, NE
Salem, OR 97310-0831
(503)378-6063

PENNSYLVANIA

Brian T. Castelli, Director
Pennsylvania Energy Office
116 Pine Street
Harrisburg, PA 17101-1227
(717)783-9981

RHODE ISLAND

J. Scott Wolf, Director
Governor's Office of Housing,
Energy & Intergovernmental
Relations
State House, Room 111
Providence, RI 02903-5872
(401)277-2850

SOUTH CAROLINA

Nancy B. Wrenn, Director
Office of the Governor
Division of Finance and
Administration
Office of Energy Programs
1205 Pendleton Street
Third Floor
Columbia, SC 29201
(803)734-0310

SOUTH DAKOTA

Director
Governor's Office of Energy
Policy
217 1/2 West Missouri
Pierre, SD 57501
(605)773-3603

TENNESSEE

Cynthia Oliphant, Director
Tennessee Department of
Economic and Community
Development
Energy Division
320 6th Avenue North, 6th Floor
Nashville, TN 37219-5308
(615)741-6671

TEXAS

Harris E. Worcester
Governor's Energy Office
Capitol Station
P.O. Box 12428
Austin, TX 78711
(512)463-1931

UTAH

Richard M. Anderson, Director
Utah Energy Office
355 West North Temple
3 Triad Center, Suite 450
Salt Lake City, UT 84180-1204
(801)538-5428

VERMONT

Richard Sedano, Director
Department of Public Services
Energy Efficiency Division
120 State Street
Montpelier, VT 05620
(802)828-2811

VIRGINIA

Jim Smith, Director
Department of Mines, Minerals
and Energy
2201 West Broad Street
Richmond, VA 23220
(804)367-0979

WASHINGTON

Katherine Freidt, Director
Washington State Energy Office
P.O. Box 43165
Olympia, WA 98504-3165
(206)956-2001

WEST VIRGINIA

John F. Herholdt, Jr., Director
West Virginia Development
Office
Fuel and Energy Office
State Capitol Complex
Building 6, Room 553
Charleston, WV 25305
(304)558-4010

WISCONSIN

Nathaniel E. Robinson, Director
Wisconsin Division of Energy and
Intergovernmental Relations
101 East Wilson Street
P.O. Box 7868
Madison, WI 53707-7868
(608)266-8234

WYOMING

John F. Nunley, III, Director
Division of Economic and
Community Development
Energy Division
Barrett Building
Cheyenne, WY 82002
(307)777-7284

TERRITORIES:

AMERICAN SAMOA

Reiysena S. T. Tagaloa,
Director
Territorial Energy Office
American Samoa Government
Pago Pago, AS 96799
(684)699-1101

EASTERN CAROLINE ISLAND

Marcelino Actouki, Director
Federated States of Micronesia
Department of Resources and Development
Energy Division of Micronesia
P.O. Box 190
Kolonias, Pohnpei, EC 96941

Energy Planner
State of Truk
State Planning Office
P.O. Box 189
Moen, Truk, EC 96942

FEDERATED STATES OF MICRONESIA

Timothy P. Timothy, Director
P.O. Box AD
Kosray State, FS 96944

GUAM

Mike B. Brown, Director
Guam Energy Office
P.O. Box 2950
Agana, GUAM 96910
(671)477-0538/0563

NORTHERN MARIANA ISLANDS

Jocelyn Guerrero, Director
Commonwealth Energy Office
P.O. Box 340
Saipan, CM 96950
(670)322-9229

PUERTO RICO

Department of Consumer Affairs
P.O. Box 41059
Minillas Station
San Juan, PR 00902-1059
(809)721-0809

REPUBLIC OF PALAU

Greg Decherong, Director
Republic of Palau
Ministry, National Resources
Palau Energy Office
P.O. Box 100
Koror, Palau, RP 96940
(608) 488-2431/2508

VIRGIN ISLANDS

Claudette Young-Hinds, Director
Virgin Islands Energy Office
81 Castle Coakley
Christiansted
St. Croix, VI 00823
(809)772-2616

WESTERN CAROLINE ISLAND

Godfrey E. Chochol, Director
State of YAP
Office of Planning and Budget
P.O. Box 471
Kolonias, YAP, WC 96943

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