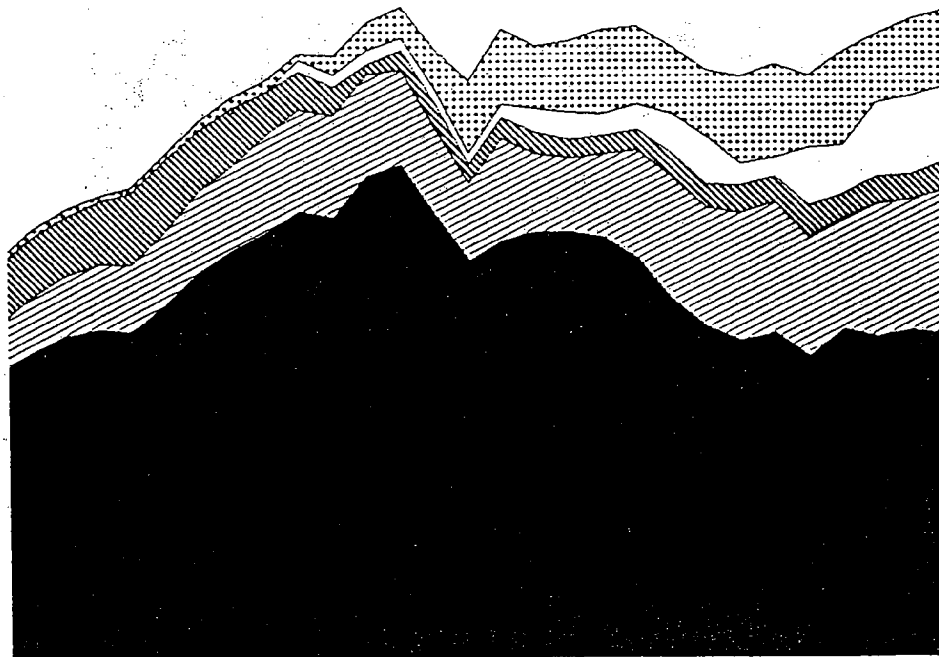


1991 New Jersey Energy Master Plan

November 1991



State of New Jersey
Board of Regulatory Commissioners
Department of Environmental Protection and Energy
Department of Community Affairs • Department of Human Services
Department of Transportation • Department of Health • Department of Treasury





State of New Jersey
Department of Environmental Protection and Energy
CN 402
Trenton, NJ 08625-0402

Scott A. Weiner
Commissioner

November 1991

Dear Citizen:

On behalf of the New Jersey Energy Master Plan Committee, I am pleased to present the 1991 Energy Master Plan. The committee, established by statute, is composed of the commissioners of Environmental Protection and Energy, Health, Human Services, Transportation, Community Affairs, the State Treasurer and the chairman of the Board of Regulatory Commissioners. The statute requires the committee to report on supply, price and use of energy in the state, and adopt a plan to meet the state's needs.

The committee presents this plan as a framework for action. Over the next months, with your input through the public hearing process and through interested organizations, the committee will prepare an implementation section. The process will include discussion among representatives of the public, electric and gas utilities, petroleum and other energy suppliers, alternate power producers, independent contractors and equipment suppliers, environmental groups and users. The committee will prepare a draft implementation section by early spring 1992, will hold public hearings, and expects final adoption by summer 1992.

The committee thanks the many citizens who have devoted considerable time to develop an effective plan, one that meets the economic development, environmental and energy needs of the state. We encourage your continued participation in choosing the most effective way to implement this plan.

Sincerely,

A handwritten signature in black ink that reads "Scott A. Weiner".

Scott A. Weiner
Chair

1991 New Jersey Energy Master Plan

November 1991

New Jersey Energy Master Plan Committee:

Commissioner Scott A. Weiner
Department of Environmental Protection and Energy

Commissioner Edward H. Salmon
Board of Regulatory Commissioners

Commissioner Melvin R. Primas, Jr.
Department of Community Affairs

Commissioner Frances J. Dunston, M.D.
Department of Health

Commissioner Alan J. Gibbs
Department of Human Services

Commissioner Thomas M. Downs
Department of Transportation

Treasurer Douglas C. Berman
Department of Treasury

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Executive Summary

The 1991 New Jersey Energy Master Plan

The *1991 Energy Master Plan* (Plan) provides information and a framework for discussion and decisionmaking that will shape New Jersey's energy future. The policies that result must support economic prosperity, protect public health and the environment, and safeguard the state from energy supply disruptions.

The apparent lesson of the energy crisis of the 1970s was that oil producers could raise prices or embargo supplies at will. The real lesson is that America discovered a *new* and very large source of energy: efficiency. Higher levels of building insulation and more efficient cars, trucks and industrial methods have allowed the United States' economy to expand by 40 percent while energy purchases stayed near 1970 levels. This response shows that we can influence our energy future. Today's challenge is to preserve and extend efficiency gains.

This Plan discusses New Jersey's energy goals, examines energy supply, use, and programs, and identifies tools for change and choices the state can make to meet its energy requirements through the year 2000. The Plan emphasizes conservation as a primary strategy to meet New Jersey's future energy needs because it strikes an effective balance among competing social, economic and environmental concerns. By investing in efficient equipment energy users can accomplish the same work with less energy—reducing both business costs and dependence on energy supply. During periods of energy price volatility, efficient users insulate themselves from the effects of price shock. The use of fossil and nuclear fuels carries an environmental cost; conservation can temper the need for fossil fuel combustion and nuclear generation. Each unit of energy saved can be used to accommodate growth and offset the need to increase supplies or build costly additional capacity. A renewed push for efficient automobiles, lighting, appliances and equipment and increased building weatherization will stimulate the economy by generating additional business opportunities and work for those who manufacture, sell, install and service energy-efficient products. Enabling homeowners, apartment dwellers, schools, hospitals and businesses to get more heating, cooling, light and power from each dollar spent on energy is, plainly and simply, sound economics. By using energy more efficiently, individuals and organizations can divert more of their resources to other important needs.

Developing the Plan: A Public Process

Public participation is crucial to the ultimate governmental tasks of balancing competing needs and determining appropriate public policy goals. From the beginning, one of the foremost goals of the Energy Master Plan Committee was to involve as many interested parties as possible in the master plan process. To develop the 1991 Plan, state planners and regulators, utilities, alternative power producers, energy equipment vendors and service providers, public interest groups, energy

users and others reviewed draft plans and a broad range of energy-related issues that affect New Jersey's environment, quality of life and economic competitiveness. Seven departments of state government set forth key information and proposals that would enable a broad-based public debate throughout the process. Public and private groups responded to requests for specific information during development of the Plan. Members of industry, professional association representatives and public interest groups attended informal roundtable discussions. Public hearings on a widely distributed October 1991 draft Plan served as a magnet to attract a diverse group of public interest and business community commentators, each with a stake in conservation activities. On December 4 and 6, 1990, more than 500 people attended at least part of two public hearings on the draft Plan. Almost 80 groups and/or individuals submitted formal testimony on the draft Plan.

Environmentalists supported the draft Plan's promotion of conservation as a means to temper the need for new capacity and asked for an even greater commitment to conservation in the transportation sector. Public interest groups asked for aggressive implementation of the draft Plan and confirmed their support for measures that would increase the penetration of conservation programs and aid ratepayers. Petroleum industry representatives testified concerning their industry's continuing desire to join in all state conservation program efforts. Builders asked that the state be aware that a more stringent energy subcode would increase housing stock efficiency but would entail some increase in the construction costs of residential housing. Plumbing, heating, cooling and ventilation contractors and equipment suppliers highlighted the need for cooperation and coordination in conservation program delivery between utilities and private-sector contractors and vendors that have historically played an integral role in responding to New Jerseyans' energy-equipment and service needs.

Utilities cautioned that the *best choice* scenario the Plan uses to illustrate how energy consumption statewide could actually be reduced over the next decade fails to emphasize the practical barriers to achieving the scenario's technical savings potential; however, utilities supported adoption of rules that would allow earnings on conservation investments and modification of rules that distinguish between utility and non-utility projects. Alternative power producers, i.e., non-utility electric generation facility developers, agreed that distinctions between utility and non-utility electric generation in state statute and rules should be eliminated and suggested that state regulators implement an all-source bidding system under which utilities would compete directly with non-utility generators and conservation or demand-side management (DSM) projects for the right to satisfy incremental capacity and energy needs.

The information provided by each group and individual participating in the Energy Master Plan process is invaluable to efforts of the Governor, his cabinet officers and legislative leaders to shape policies that will ensure a solid economic, energy and environmental future for New Jersey. The detailed and thoughtful testimony submitted has illuminated the complex challenges facing energy providers, government regulators and

consumers over the next 10 years. The 1991 Plan, as modified and adopted, responds to the many concerns expressed by the individuals and groups who got involved in the process of developing a viable and aggressive energy strategy for New Jersey.

Governor Florio issued Reorganization Plan #002-1991 on June 20, 1991 to recast the state's Board Public Utilities (BPU) into the Board of Regulatory Commissioners (BRC) *in but not of* a renamed Department of Environmental Protection and Energy (DEPE) in an effort to streamline and refine the state's energy planning, energy facility review and environmental permitting processes. The Reorganization Plan transferred statutory responsibilities originally assigned to the state Division of Energy Planning and Conservation (which merged with the BPU in 1989) to the DEPE. This action reflects the administration's belief that the disciplines of energy and environmental planning are inextricably bound. The reorganization will enable the state to more effectively promote Energy Master Plan policies to ensure that the state's resources are protected and used to the greatest benefit.

This 1991 Plan is presented pursuant to P.L. 1987, c. 365 (as it amends N.J.S.A. 52:27F-14) that establishes an Energy Master Plan Committee *responsible for the preparation, adoption and revision of master plans regarding the production, distribution, and conservation of energy in this State.*

This Plan is submitted to Governor Jim Florio, the members of the State Legislature and the citizens of New Jersey by the Energy Master Plan Committee composed of Board of Regulatory Commissioners Chairman Dr. Edward H. Salmon, Department of Community of Affairs Commissioner Melvin R. Primas, Jr.; Department of Environmental Protection and Energy Commissioner Scott A. Weiner; Department of Health Commissioner Dr. Frances Dunston; Department of Human Services Commissioner Alan J. Gibbs; Department of Transportation Commissioner Thomas M. Downs and State Treasurer Douglas C. Berman. The Energy Master Plan Committee formally adopted this Plan by unanimous consent on October 24, 1991.

To implement the policies proposed in the Plan, many departments of state government will need to take decisive action. Individual government agencies will invite public participation in the rulemaking processes that will translate policy into action. The Energy Master Plan Committee member-commissioners look forward to working on the implementation of the 1991 Plan with the many dynamic industry, professional association and public interest groups and individuals who contributed to the development of a Plan that will help New Jersey capture significant energy gains and environmental dividends and secure the state's economic vitality into the 21st century.

Today's Situation

Energy Sources

New Jersey uses over 2000 trillion Btu (TBtu) of fossil fuel and nuclear energy each year. Per capita consumption is low relative to other states. However, most of the money New Jersey spends on energy leaves the state and nation and constitutes a net drain on the local economy.

Petroleum has been New Jersey's predominant fuel source for several decades. Until the 1973 oil crisis it supplied over three quarters of the state's energy consumption but recently petroleum's share dropped to 50 percent. Fuel for electricity generation—primarily uranium and coal—accounts for 31 percent of consumption in 1989 and natural gas supplies the remaining 19 percent.

Utilities provide electricity and natural gas, one half of energy consumption. In 1987 and 1988 electricity prices went down and sales grew by about five percent each year. New Jersey electric utilities purchase and import electricity from utilities in other states to satisfy one-third of New Jerseyans' demand. These utilities face unprecedented economic and regulatory changes: increased marginal costs, generation competition, and opportunities to invest in efficient equipment for end-users where that would cost less than provision of new generation capacity. Gas utilities need more pipeline capacity to provide diversity of supply and meet peak winter needs and new gas uses such as cogeneration and air conditioning.

Supply Projections

Over the next decade long-term shortages are unlikely in the supply of primary fuels—petroleum, natural gas, coal, or uranium. However, the price at which they will be available is uncertain. Events during the summer of 1990 illustrated that when primary fuel supplies are controlled by foreign countries, access and ability to transport supplies for use in this country and in this state could be limited.

Domestic oil production continues a gradual decline. New Jersey and the Northeast rely heavily on imported petroleum. Until new gas pipelines are installed, New Jersey's winter consumption will continue to be limited by the present capacity of pipelines. Coal is readily available but challenging to use in environmentally acceptable ways. In addition to acid rain problems amenable to technical controls, coal combustion produces more CO₂ (a major greenhouse gas) than other fuels, so global warming considerations may limit expanded uses. Concerns remain about nuclear power.

Energy Prices

New Jersey wholesale coal and electricity prices are among the highest prices in the country. Retail gasoline prices, in contrast, are lower than in most states because the state tax is one of the lowest in the country. Natural gas prices are in the mid-range nationally. Coal prices, high throughout the eastern U.S., are somewhat higher in New Jersey because stringent air quality standards require use of more costly low-sulfur coal.

Energy Uses

Residential and commercial building energy use accounted for nearly half of energy purchases in New Jersey in 1989. The energy performance of buildings is much more expensive to improve through retrofit than during construction. Since buildings last for scores of years, building codes and construction practices lock-in energy use for a long time.

Transportation accounted for over one-quarter of energy purchases in the state. Transportation needs depend on vehicle efficiency, mode of travel (e.g., car versus train), and land use. The location of buildings, jobs, shopping, and residences relative to each other helps determine the transportation infrastructure and transportation energy requirements.

Industry accounted for the remaining quarter of the state's energy purchases. Its portion has declined with the loss of manufacturing operations in New Jersey; remaining manufacturers have increased their efficiency by using less energy for the amount of goods produced.

Needs

Improving Our Competitive Edge: In spite of great progress, the United States uses more energy per dollar of output than its major foreign trade competitors. Compared to such countries as Japan, West Germany and France, the U.S. consumes twice as much energy per dollar of gross national product (GNP).

Bolstering our Energy Security: New Jersey is entirely dependent on energy imports from foreign and domestic sources. In an energy emergency it lies distant from the Strategic Petroleum Reserve in Louisiana.

Improving Environmental Quality: The increasing use of fossil fuels affects environmental quality. Some environmental problems are inherent to fossil fuel combustion, and the primary means of mitigating them is to use less fuel to provide desired energy end-use services.

State Energy Policy Goals

GOAL #1

To provide secure energy supplies and services to energy users.

GOAL #2

To encourage economic growth by providing energy services at the least cost.

GOAL #3

To protect our environment through wise and efficient energy use.

GOAL #4

To balance energy needs and impacts through coordinated and integrated planning.

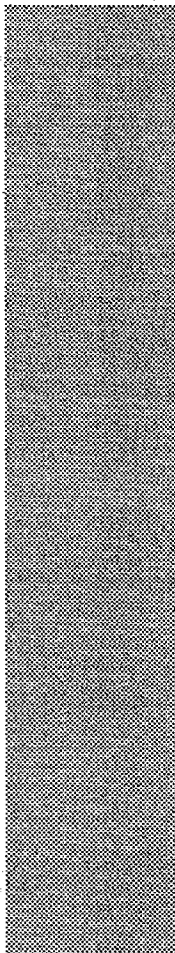
Scenarios for 2000

To meet these goals, New Jersey must select its optimum energy future. The Master Plan examines three plausible projections of future energy needs.

Energy purchases could increase by about 4 percent per year as occurred when energy prices were relatively low (1960-1973) or price could increase only slightly, about 0.2 percent per year, as occurred when energy prices were relatively high (1981-1986).

A third scenario would supply New Jersey's energy service needs (e.g., heating, lighting, cooling, transportation) with the most efficient appliances and equipment on the market today. This best choice scenario has the potential to decrease energy use over 2 percent each year. The scenario is technically achievable. If travelers had the most efficient cars, joined carpools or used mass transit; if building owners installed the most efficient lighting and weatherized all existing buildings and if they replaced existing appliances and equipment with the most efficient commercially available models, per capita energy consumption could drop by more than two percent each year. Those actions would reduce fossil fuel combustion, help clean the air and protect the environment.

Three Strategies to Increase Energy Efficiency



The best energy services or best choice scenario offers the greatest potential for progress toward environmental, economic and security goals. It could maintain the comfort and convenience energy provides but reduce the environmental damage, economic cost and insecurity brought by energy dependence. Achieving it requires change and leadership. The major opportunities to reduce energy consumption cost effectively without reduction of energy services are as follows:

1. **Transportation** - Transportation offers nearly half the potential efficiency gains. Improve the ability of all citizens to accomplish everyday tasks without dependence on petroleum-fueled single-passenger automobile transportation. Provide incentives to increase use of car pools, van pools and mass transit for trips to and from work, a major component of single passenger travel. Encourage progressive increases in the federal Corporate Average Fuel Economy (CAFE) standards and consider state incentives to raise the fuel efficiency of cars and light trucks, the major determinant of motor-fuel use.
2. **Lighting** - Building lighting offers nearly a quarter of efficiency opportunities. Improve the efficiency of building lighting, the largest component of commercial-sector electric use. Expand incentives to invest in high efficiency commercial lighting programs and to encourage increased use of daylighting in new or retrofitted buildings.
3. **Heating and Cooling** - Building space heating and cooling use offers over a quarter of efficiency opportunities. Improve the efficiency of high-use electrical appliances and equipment. Improve the efficiency of gas- and oil-fired space- and water-heating equipment. Provide incentives for the replacement of existing appliances with high-efficiency units. Consider more stringent building standards or expanded incentives to weatherize and insulate buildings.

Principal Findings, Policies and Implementation Actions:

Petroleum

Findings

Crude oil delivered to New Jersey and East Coast refineries comes almost exclusively (90 percent) from other countries. Both crude oil and product refined in other regions or other countries must come long distances via pipeline, tanker, barge or truck. Crude stored for national emergencies is in Louisiana and Texas, far from local refineries.

New Jersey ranks seventh highest nationally in petroleum consumed. In 1989, petroleum supplied more than half of all energy purchased. Transportation consumed 57 percent, industry 23 percent, buildings 14 percent, and in-state electricity generation by electric utilities 6 percent.

The state can mitigate its vulnerability to supply disruptions and cost escalation by reducing its high dependence on petroleum products. Effective measures include: improvement of auto and light truck motor fuel efficiency; expansion of alternatives to single-passenger auto travel to work—mass transit and carpools and vanpools; improvement of space-heating equipment efficiency; and increased insulation and weatherization of buildings.

Petroleum space-heating consumers have experienced sharp price increases for heating fuels during periods of exceptionally severe cold weather conditions. Consumers can eliminate their vulnerability to seasonal increases by taking steps to reduce use of and dependence on petroleum: improve heating equipment efficiency; insulate and weatherize buildings; install alternative heating capability; and maintain sufficient fuel storage capacity to carry a building through the coldest winter month.

Policy

The State should promote significantly increasing the fuel economy of cars and light trucks.

The State should promote expanded use of ridesharing, vanpooling, and mass transit to reduce single passenger auto use for frequent trips such as travel to work.

The State should encourage Congress to increase the fill rate of the Strategic Petroleum Reserve to provide increased protection against the possibility of an interruption in imported supplies.

The State should support and develop means to encourage increased storage of refined petroleum products in New Jersey and the Northeast, both at the wholesale and retail levels. The State should do so in a manner that would mitigate potential air quality impacts and the increased risk of oil spills from the movement of additional products in harbors and waterways.

Implementation

New Jersey, through its congressional delegation, should adopt a leadership role in urging the U.S. National Highway Traffic Safety Administration to raise Corporate Auto Fleet Efficiency (CAFE) standards.

The Department of Transportation should facilitate greater use of van-pooling and carpooling.

New Jersey should reduce petroleum dependence for motor vehicle use through programs outlined in Chapter 13, Transportation.

The Department of Environmental Protection and Energy should seek the support of the New Jersey Congressional delegation to fill the Strategic Petroleum Reserve to a level of 750 million barrels at an increased rate.

The Department of Environmental Protection and Energy is evaluating the economic feasibility of establishing minimum inventory levels for refined petroleum products both at wholesale and retail levels. This evaluation should consider: limitations imposed by the present transportation infrastructure that moves the product from the prime suppliers to the end users, and the feasibility of establishing a Northeast regional product reserve.

New Jersey's congressional delegation should promote the development of federal incentives to encourage suppliers at the wholesale level to maintain stocks of refined product adequate for seasonal demand. The federal government should encourage suppliers to institute summer fill programs at the wholesale level. The Department of Environmental Protection and Energy should encourage retailers to institute summer fill programs at the retail level.

New Jersey should enact legislation to require heating oil and propane dealers to provide consumers with appropriate price and quantity information at the time of delivery.

Natural Gas

Findings

Natural gas supplies, which are from domestic or Canadian sources, are secure compared to crude oil and petroleum product supplies of which more than 50 percent are imported.

The combustion of natural gas produces significantly smaller quantities of polluting gases compared to petroleum products, thereby helping to improve New Jersey's air quality, which currently is in violation of federal standards.

New Jersey and the other northeastern states need increasing supplies of natural gas.

Existing pipelines flowing gas to the region operate at capacity during portions of the winter peak season, presenting issues of deliverability.

Profound regulatory changes by the Federal Energy Regulatory Commission have restructured traditional functions and created uncertainties in natural gas planning among producers, pipelines, local distribution companies (LDCs), and end-users.

Current New Jersey local distribution company strategies need to more fully incorporate conservation into the planning process.

Prior regulations offered utilities no profit incentive to reduce demand through conservation programs. To encourage cost-effective utility-sponsored programs, the Board of Regulatory Commissioners adopted new regulations that will allow utilities to benefit from cost-effective conservation measures that result in measurable energy savings.

Opportunities exist for vehicle fleets fueled with natural gas. (See Chapter 13.)

Policy

New Jersey should encourage competition among natural gas suppliers and between natural gas and other fuels.

The Board of Regulatory Commissioners supports the completion of new pipeline projects to the northeast approved by Federal Energy Regulatory Commission.

The Board of Regulatory Commissioners will require each gas local distribution company to demonstrate that it provides least-cost gas service without jeopardizing a secure supply for firm customers.

Local distribution companies must employ a planning model that integrates supply-side and demand-side options.

The Board of Regulatory Commissioners shall implement the new regulations that reward utilities for promoting cost-effective conservation measures.

The Board of Regulatory Commissioners should set transportation tariffs that have the flexibility to meet the rapid changes in the gas market. They must be low enough to allow natural gas to compete with oil for industrial consumers, while enabling captive residential consumers to reap some of the benefits of increased competition. These tariffs should provide appropriate incentives to the local distribution companies. The advantages of price cuts, the spot market, and conservation alternatives shall be made available to as many consumers as possible.

Implementation

New Jersey will continue to promote conservation, including energy subcode improvements for new construction and weatherization programs in existing homes. Specifically, since almost three-quarters of all natural gas consumed in New Jersey is used for residential and commercial buildings heating applications, replacement of older gas furnaces with new energy-efficient units where cost-effective offers a significant savings opportunity. (See Chapters 11 and 12.)

The Board of Regulatory Commissioners will provide utilities with adequate profit incentives to aggressively pursue conservation. Further, the Board will work to develop partnerships with independent contractors, in recognition of the fact that New Jersey will achieve its energy conservation goals only with the active involvement of the private sector.

The Board of Regulatory Commissioners will continue to work with utilities to enhance the least-cost planning process and encourage a mix of supply and demand side options that best serves the utility and its ratepayers.

Coal

Findings

Coal is in abundant supply in this country and offers a long-term means to maintain the state's fuel diversity.

The cost of coal is competitive with other fuels and its use could increase at relatively low incremental cost if other fuels were unavailable.

Coal use in New Jersey is primarily—90 percent—for electric generation, the remainder is used in industrial plants.

New Jersey's coal-fired utility plants emit significant amounts of sulfur and nitrogen oxides that react in air to become components of acid deposition. New plants would have equipment to control emissions.

Coal combustion produces greater quantities of CO₂ and ash per unit of energy than petroleum or natural gas combustion.

Continued development of technology that reduces pollutant emissions from coal and will increase the state's ability to meet or exceed air quality standards.

Policy

Coal use in New Jersey should continue but in an environmentally acceptable manner.

New Jersey should support *clean coal technology* research and development.

Coal should compete unhandicapped with other fuels, including natural gas. Once the public health and environmental costs of each fuel are fully internalized, the market should decide the relative values of the attributes of coal and natural gas. Evaluation of external costs is complicated and difficult to accomplish but necessary to enable market prices to reflect the true cost of any given fuel's use.

The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners should explore means to internalize, and thereby allocate to users, the environmental cost of producing electricity from coal. They should consider treating out-of-state generation on the same environmental terms as New Jersey generation.

Implementation

The Department of Environmental Protection and Energy should develop an effective coal waste disposal program to enable continued coal use by the electric utilities.

Nuclear Power

Findings

Uranium-fueled nuclear reactors supply more than one-third of New Jersey's electricity. Four nuclear facilities generate electricity within state borders and New Jersey electric utilities have ownership interest in four other nuclear generating stations located in Pennsylvania.

Significant barriers stand in the way of any future nuclear generating additions in New Jersey. It is unlikely that nuclear technology could compete with conventional fossil fuel or renewable energy technologies on an overall cost basis. Siting this type of facility is also extremely difficult.

Cost, siting, and waste disposal technology barriers—as well as public concerns—need to be addressed before nuclear generation can again be considered a viable option for meeting new demands for power in New Jersey. However, if costs associated with this technology can be reduced and if health, safety and environmental concerns can be satisfied, use of nuclear power could provide an alternative to fossil fuel combustion and its negative environmental effects.

Many variables will affect State policy on nuclear power. For example, the impact that such legislation as the federal Clean Air Act or adoption of a carbon tax will have on the future selection of energy options remains unresolved.

Industry is investigating new reactor designs that may improve the viability of nuclear technology in the future.

Policy

The State should closely monitor the implications of federal Clean Air Act and other legislation on future state energy planning.

The State should support efforts to site low and high level radioactive waste disposal facilities in a manner that provides long-term disposal in an environmentally acceptable manner.

Implementation

Although no new nuclear facilities will be built in New Jersey in the near future, the State should continue to monitor the viability of nuclear power as a source of future electrical generation and examine new reactor designs as they become available.

The Board of Regulatory Commissioners should monitor new reactor design efforts to gauge their impact on the economic and developmental viability of future projects.

Cogeneration

Findings

Cogeneration can be a cost-effective and energy-efficient means of meeting New Jersey electricity capacity and thermal energy needs; the technology is available to both utility and non-utility generators.

Cogeneration improves generation and overall energy efficiency and reduces the state's reliance on imported fossil fuels.

To gain the maximum environmental advantages of cogeneration requires policies that allow full development of its potential. New cogeneration technology can meet reasonable air quality standards. New Jersey can benefit most from a strong environmental program that allows clean, economic cogeneration to come on line.

Cogeneration can provide a means for New Jersey businesses to reduce their operating costs, thereby enhancing the state's economic competitiveness and companion ability to retain and attract jobs.

Cogeneration can also help reduce the acid deposition that results from electricity generation in states that allow higher emission levels.

New gas pipeline capacity would facilitate the growth of gas turbine and reciprocating cogeneration facilities in New Jersey.

Policy

The State should continue to promote cost-effective cogeneration to meet New Jersey's power needs economically and to reduce environmental impacts.

The State should work to minimize regulatory impediments to rapid deployment of this technology that has so much potential to reduce environmental problems and enhance the economic competitiveness of New Jersey businesses.

The State should evaluate the elimination of grandfathered air emission permits that allow continuing pollution from sources that obtained permits before more stringent standards took effect. Under a revised policy, only companies able to prove that cogeneration would not be economic would be allowed to keep a grandfathered status.

Implementation

The Board of Regulatory Commissioners and the Department of Environmental Protection and Energy should cooperate to assure the installation of environmentally sound cogeneration that reduces air emissions and acid rain problems.

The Board of Regulatory Commissioners should continue to support fuel diversity in applications for new electric generation to guard against supply disruptions and price risk exposure.

Electricity

Findings

A trend of increased competition in the electric generation market emerged in the late 1980s with the development of alternative power production.

The Board of Regulatory Commissioners has instituted a competitive bidding system for electric utilities to procure alternative power capacity and large-scale conservation projects.

The current regulatory structure treats alternative power producers differently than electric utilities in the areas of siting, technology, project approval, earnings surveillance and project risk.

Current utility projections demonstrate the need for substantial increments of new generating capacity.

The siting and operation of electric generating facilities have the potential to negatively impact environmental quality in New Jersey.

The potential exists for conservation and demand-side management energy efficiency measures to mitigate the need for new electric generating facilities.

With appropriate price signals, financial incentives and marketing techniques, electric utilities can influence customer behavior in both the purchase and use of end-use equipment.

The Board of Regulatory Commissioners adopted a rule in September 1991 to address barriers to conservation and create incentives for utility investment in demand-side management.

Various taxation policies have been enacted or proposed that impact upon energy policy in the state.

More electric generating capacity in New Jersey would reduce loading on the west-to-east electric transmission system and costs to consumers.

Self-generation by many industrial and commercial electricity users can be installed without bidding under the 1988 Stipulation of Settlement and can be a powerful competitive force on utilities as well as a way to meet the state's capacity requirements.

The performance of New Jersey's nuclear plants has been substandard relative to the national average and also relative to the performance anticipated during the planning and construction stages of the plants.

The Board of Regulatory Commissioners has instituted nuclear performance standards to allocate the risks of poor performance and to encourage utilities to run nuclear units more effectively.

Nuclear plants have required significant additional capital investments on an ongoing basis to meet operating license requirements.

New Jersey utilities are relying significantly on power purchases from utilities outside New Jersey.

New Jersey has a transmission capacity limitation. There is at the same time a public concern regarding the potential health effects of electromagnetic fields.

Recent and planned additions to generating capacity rely primarily on natural gas as a fuel source.

Electric prices in New Jersey are significantly higher than the national average.

Policy

Utilities should deliver energy services at the lowest possible cost to consumers by appropriately considering conservation options or end-use technologies that conserve electricity on an equal basis with constructing new generation facilities.

The Board of Regulatory Commissioners should consider implementing mechanisms to eliminate the distinction between utility and non-utility generation. Expanded competition could be achieved through some form of deregulation of utility generation or some form of increased regulatory oversight of alternative power producers (APPs). Alterna-

tively, to mitigate the current differential treatment of utility and non-utility generators, the Board of Regulatory Commissioners could consider applying a uniform set of rules to all electric generators.

The State should consider modifying the Electric Facility Need Assessment Act to further integrate the regulatory treatment of utility and non-utility generation.

The siting, design and operation of electric generating facilities in the state must be consistent with the State's environmental quality standards.

In the context of utility planning, consideration should be given to allowing non-utility cogenerators to demonstrate that they can displace existing utility capacity and save money for both the utilities and their ratepayers.

The State should consider whether *N.J.S.A. 40:55 (d)* should be expanded to include alternative power producers in order to afford them the opportunity to appeal to the Board if they are aggrieved by a municipal agency's actions.

In order to maintain and enhance regional power markets and resulting economic efficiencies, the free interstate flow of electricity should not be discouraged through inappropriate taxation policies or other artificial barriers.

The State should support the efforts of the interstate pipelines to increase gas supplies to New Jersey to the extent necessary to provide natural gas to necessary electric generating facilities.

The Board of Regulatory Commissioners should study the impact of unbundling electric utility services to determine if self-wheeling or retail wheeling can be implemented.

Electric utilities should continue to diversify their supply options and not rely on one source of energy for the bulk of their requirements.

To meet projected capacity needs of New Jersey consumers at the least possible cost, utilities should aggressively pursue cost-effective programs that improve generation and transmission efficiency and that optimize peak load management. Such efforts would offset the need to invest in capacity expansion and generating facility life extension.

Performance standards for nuclear power plants should be continued.

Least-cost planning principles dictate that modifications to existing generating plant should be considered within the context of alternative supply options. In light of substantial ongoing capital additions to existing nuclear facilities, other cost-effective supply alternatives must continue to be explored.

Prior to adopting new legislation affecting energy supply facilities, the State should consider its impact on integrated energy supply planning.

Electric utilities should aggressively employ cost-effective peak shaving load management techniques.

Utilities should continue to cost-effectively reinforce existing and/or construct new transmission facilities where appropriate, subject to health and other siting concerns.

The Department of Environmental Protection and Energy Commission on Radiation Protection is working to establish limits on electromagnetic fields that would apply to all electric transmission lines.

Utilities should provide incentives for builders to construct energy-efficient structures that enable the control or channeling of ventilation to prevent air pollution.

Implementation

Least-cost planning should be continued and refined by utilities and regulators as the fundamental strategy for meeting New Jersey's needs for the services provided by electricity. The Board of Regulatory Commissioners and the Department of Environmental Protection and Energy will develop guidelines for incorporating environmental costs within the least-cost planning framework.

The Board will implement regulatory mechanisms set forth in rules adopted in September 1991 to provide long-range utility incentives for conservation via the ongoing rulemaking proceeding.

The Board of Regulatory Commissioners should consider whether the current ratemaking structure provides the appropriate incentives for utilities to fully consider the least-cost means of meeting electric generating projects, whether from utility plant, purchases from non-utility generators or inter-utility purchases.

Renewable/Recoverable Energy Sources

Findings

Building design is an ideal way to use the sun's energy when combined with other energy efficient building techniques.

Nearly all regulatory barriers to the use of renewable energy sources have been eliminated.

Photovoltaic production of electricity, if equipment and installation costs decline, or if electric rates rise, could become a cost-effective option to help reduce peak electric load in New Jersey.

At mid-1990 prices, the cost-effectiveness of active solar water heating is marginal.

Successful recycling and source reduction efforts can reduce the need to expend energy in the manufacture of new goods; New Jersey has adopted an aggressive recycling and source reduction policy that supports such energy savings.

Policies

The State should encourage the use of cost-effective passive solar energy.

The State should work aggressively to develop methane recovery systems because of their potential to produce energy and reduce methane releases.

The State should encourage private sector development of photovoltaic projects.

The Department of Community Affairs should consider the promulgation of technical specifications for the installation of solar domestic hot water systems.

Implementation

The State should encourage broad use of building orientation and design elements that take advantage of natural heating, cooling and lighting to improve the efficiency of housing stock. Passive and active solar energy systems can reduce dependence on purchased energy in efficient buildings.

State government should continue to help break down any nonmarket barriers to use of renewables and to render whatever assistance it can on a case-by-case basis to individuals, municipal agencies and institutions who wish to utilize solar, wind, or any other renewable resources.

State government should encourage continued private sector development of renewable energy applications.

Energy Facility Siting

The Electric Facility Need Assessment Act (*N.J.S.A. 48:7-16 et seq.*) sets forth specific criteria that the State must apply in its evaluation of any application for a certificate of need which is required before construction of public utility electric generating facilities. New electric generating facilities of 100 MW or more, and existing electric facilities expanded by 25 percent or by more than 100 MW, whichever is smaller, must comply with the certificate of need requirements of the Electric Facility Need Assessment Act (*N.J.S.A. 48:7-16 et seq.*) and the regulations thereunder (*N.J.A.C. 14A:14-1.1 et seq.*).

Non-utility projects are not subject to the siting requirements of the Electric Facility Need Assessment Act. However, they are subject to the individual permit requirements of the Department of Environmental Protection and Energy and are subject to coextensive jurisdiction pursuant to *N.J.S.A. 52:27F-15(c)*.

The current differential siting treatment of utility and non-utility generation facilities should be reviewed. In view of the expanding role that alternative power producers are projected to play in meeting New Jersey's future energy needs, the concept of imposing a single set of rules on the siting and construction of utility and non-utility generation facilities deserves consideration.

In light of the State's recognition of the potential benefits of cogeneration technology, including reduced air emissions, economic development and business competitiveness, and decreased reliance on fossil fuels, the State should consider implementing a requirement that electric utilities evaluate the feasibility of cogeneration applications when assessing potential sites for new generating capacity.

In siting any future electrical transmission lines, existing rights-of-way (ROWs) should be used to the maximum extent practicable to avoid human population concentrations. The Department of Environmental Protection and Energy, the Board of Regulatory Commissioners and the Department of Transportation should develop a comprehensive mechanism to solve competing interests in the use of existing rights-of-way (ROWs).

Residential Sector Energy Use

Findings

Fuel input for electricity accounted for 43 percent, natural gas for 38 percent and petroleum for 19 percent of residential fuel purchases in 1989.

Natural gas for home heating has increased substantially as petroleum use has declined. Electricity for home heating has increased to approximately 8 percent of the total.

The electric appliances that accounted for the greatest percentage of electric consumption were refrigerators plus freezers (approximately 30 percent) and air conditioners (approximately 15 percent).

Replacement of refrigerators and freezers with the most efficient models commercially available today could substantially reduce electricity use for refrigeration if the old models were removed from service.

Weatherization and insulation of homes has a large potential for saving energy at low cost.

Replacement of inefficient water and space heating equipment with the most efficient types commercially available today has a large potential for saving energy both in natural gas and oil heated homes.

State mandated utility home energy evaluation for existing homes and state building code requirements for new development can stimulate energy savings.

Improvement in building shell performance and the use of higher efficiency appliances can be stimulated by utility incentive/penalty programs and modification of rate schedules and/or terms and conditions of service to ban inefficient technologies.

The Board of Regulatory Commissioners adopted a rule in September 1991 that encourages utilities to invest in high efficiency appliances and equipment rather than in construction of additional generation capacity. The rule enables utilities to earn income on Board-approved investments in conservation that yield measurable savings.

Policy

New Jersey should strive to achieve cost-effective residential appliance, equipment and building efficiency over the next decade equal to the highest efficiencies available today to heat, cool, light and power homes.

New Jersey should continue to promote use of more efficient appliances in homes and apartments to avoid the economic impacts and environmental effects of increased energy consumption.

New Jersey should promote weatherization of existing structures and superinsulation of new structures, accompanied by proper ventilation techniques to control potential dangers of increased indoor air pollution.

Implementation

The State should promote cost-effective conservation in the residential sector by educating consumers on life-cycle costing for energy equipment and appliance purchases.

Utility programs should be continually evaluated to ensure that the program design used is the one that most effectively achieves replacement of old, inefficient appliances with more efficient new ones.

Regulations that enable utilities to earn income on investments in conservation can lead to significant energy efficiency gains statewide. The Board of Regulatory Commissioners should review Demand Side Management Resource Plans submitted by the utilities pursuant to the Board's September 1991 conservation incentives rulemaking in a timely manner to ensure prompt implementation of cost-effective conservation programs.

The Board of Regulatory Commissioners should review federal regulations on appliance efficiency and determine if they encourage the development and sale of efficient equipment.

The Board of Regulatory Commissioners and the utilities should increase consumer education. For example, life cycle cost labels for light bulbs (like unit prices for groceries) would allow consumers to compare total costs of screw-in fluorescents versus incandescent bulbs.

The Department of Community Affairs and the Department of Environmental Protection and Energy should evaluate measures to achieve greater building shell efficiency in new construction. These measures can include future changes of building code and utility incentive programs or tariff design.

Energy Use in Nonresidential Sectors

Findings

In the commercial sector, electricity accounted for approximately 63 percent, petroleum for 12 percent, and natural gas for 25 percent of fuel use in 1990.

In the industrial sector, petroleum accounted for 49 percent, electricity accounted for 33 percent, and natural gas for 17 percent of energy use in 1990.

Electric peak demand has been rising 5 to 6 percent annually in New Jersey over recent several years.

In the commercial sector, the primary uses for electricity are for lighting and air conditioning. The primary uses for natural gas and petroleum are space and hot water heating.

In the industrial sector, the primary use of electricity is to power electric motors. The primary use for natural gas and petroleum is for process boiler fuel.

On a Btu per square foot basis, thermal energy use in the State buildings sector has declined 21 percent while electric use has remained approximately the same since 1973.

The Board of Regulatory Commissioners adopted a rule in September 1991 that encourages utilities to invest in high efficiency appliances and equipment rather than in construction of additional generation capacity. The rule enables utilities to earn income on Board-approved investments in conservation that yield measurable savings.

Policy

The State should continue to promote use of more efficient cooling and lighting technologies to reduce electric consumption in the commercial sector.

The State should promote use of thermal storage and natural gas air conditioning to reduce peak demand in the commercial sector.

The State should promote use of more efficient motor drive technologies to reduce electric consumption in the industrial sector.

The State should continue to identify and pursue energy savings opportunities in the State buildings sector and place strong emphasis on adhering to operating and maintenance procedures that ensure peak energy system performance.

The State should promote cost-effective conservation in the commercial and industrial sectors by educating companies on life-cycle costing for energy-consuming equipment, system and appliance purchases.

Implementation

Utility rebate programs should be continually evaluated to stimulate replacement of old, inefficient lighting and cooling appliances with the most efficient commercially available technology.

Incentives should be provided to encourage use of off-peak cooling technologies as well as more efficient motor drives.

Regulations that enable utilities to earn income on investments in conservation can lead to significant energy efficiency gains statewide. The Board of Regulatory Commissioners should review Demand Side Management Resource Plans submitted by the utilities pursuant to the Board's September 1991 conservation incentives rulemaking in a timely manner to ensure prompt implementation of cost-effective conservation programs.

Energy Use In Transportation

Findings

Motor fuel accounts for three-quarters of the state's transport energy use.

As a result of economic growth, population density, and its position in the densely populated Boston-Washington corridor, New Jersey has the most crowded roads in the country.

Mass transit can play an important role in meeting mobility needs.

Mass transit modes, rail and bus, are more efficient and cause less pollution than cars.

Increased traffic congestion on New Jersey's roads is wasting greater amounts of energy.

New Jersey has not attained federal air quality standards for ozone and auto emissions are a major contributor to the state's air pollution.

Motor fuel use has increased and reached new highs.

Higher vehicle occupancy is the most cost-effective and most quickly implemented means of reducing peak period congestion and reducing fuel use per person.

Avoided cost calculations can compare investments in road improvements with those (such as vanpool subsidies) that would alleviate congestion without new construction. Alternatives may be less expensive in many situations.

Vanpooling and ridesharing will reduce congestion. Additional support measures, such as parking restrictions; express lanes for high occupancy vehicles (HOVs), and lower bridge, tunnel, and turnpike tolls for high occupancy vehicles are needed to increase vanpooling and ridesharing.

Substantial improvement in motor vehicle fuel efficiency is possible.

Fleet energy assessment programs can save large amounts of energy. Both state and municipal fleets could benefit.

Natural gas fueled vehicles could reduce dependence on oil imports as well as improve air quality.

Opportunities exist to employ vehicle fleets fueled by alternative fuels.

Traffic signal management programs can reduce energy use and reduce congestion.

Policy

The State should pursue the goal of moving more people and goods on its systems, not more vehicles. The State should encourage the use of high occupancy vehicles which minimize congestion, discourage energy consumption and improve air quality.

The State should address metropolitan congestion in ways that will not encourage growth in single occupancy auto travel or inappropriate land development.

The State should integrate its efforts to protect the environment and enhance mobility. While it facilitates the movement of people and goods, the State must bring itself into compliance with clean air standards.

The State should make better use of its roadway system to improve mobility within the state and reduce congestion and concomitant air pollution. Reversible lanes and computerized signal timing should be instituted to handle surge loads of traffic.

The State should evaluate all costs and benefits, including avoided costs, of alternative means to achieve transportation goals and choose those that best coincide with economic, public health and environmental goals.

The State should encourage the use of alternative fuels, such as compressed natural gas, in government and commercial fleets.

The State should encourage vehicle efficiency. It should continue, expand, or adopt programs to save energy and reduce air pollution in the operation of its own fleet, and other publicly-owned fleets.

Implementation

The State should implement demand reduction strategies that discourage the use of single occupancy vehicles and encourage alternative means of transportation through the following measures:

- Increase transit investments.

- Improve support for mass transit use to make it competitive with automobile transportation.

- Support increased tax credits for transit users.

- Continue support for transportation management associations (TMAs).

- Promote ridesharing and provide incentives.

- Establish additional high-occupancy-vehicle priority lanes where feasible.

- Develop more park'n ride lots.

- Coordinate land use and transportation investments.

- Develop experimental transit routes.

- Encourage enactment of appropriate traffic reduction ordinances.

- Encourage bicycle and pedestrian usage.

The State should implement traffic management strategies and measures that discourage peak hour road use. To do so, the State should:

- Implement employer trip reduction requirements consistent with the Clean Air Act Amendments of 1990.

- Promote flex-time, four-day work weeks, telecommuting and staggered work hours.

- Test and implement electronic toll systems where feasible to alleviate stopping at toll facilities.

- Develop *smart* highways and streets that employ the most efficient available technologies to improve traffic flow on key congested corridors statewide.

Promote the testing of variable rates on toll roads and at river crossings to discourage peak hour solo driving and increased vehicle occupancy.

Improve incident management capabilities to reduce traffic disruptions caused by accidents, spills or other emergency situations on state highways operating at or near capacity.

Implement surveillance and advisory information measures to advise drivers of downstream route information.

Implement surveillance and diversion information measures to identify less congested alternate routes.

Make greater use of reversible lanes.

Prioritize intersection and interchange improvements in non-attainment areas for air quality. Make air quality improvements one of the major criteria in project prioritization.

The State should evaluate the potential of market-based measures (such as revenue-neutral differential sales taxes and registration fees based on fuel efficiency ratings) to encourage the purchase of energy efficient autos and, if appropriate, propose mechanisms to implement these measures.

The State should adopt or expand improved fleet operation and evaluate purchases based on life cycle costing. To do so, the State should:

Institute programs based on the school bus energy assessment program in all school districts and investigate the potential for similar savings by applying the program to New Jersey's transit bus operators.

Purchase vehicles based on life cycle costs (including fuel costs) rather than on initial purchase price.

Monitor the performance of natural gas-fueled vehicles being introduced by the gas utility companies and New Jersey Transit, and consider the use of alternative-fueled vehicles in the State fleet on a pilot program basis.

State Energy Efficiency Initiatives

State Buildings

Findings

The State can achieve significant energy and dollar savings through energy retrofits to state building stock and through the use of energy management systems.

The process of collecting energy consumption information from all departments for the Department of Environmental Protection and Energy data base needs to be improved to enhance the state's ability to identify opportunities to reduce energy consumption.

The role of the departmental energy coordinator has not been emphasized in the past few years, thereby diminishing the energy conservation awareness throughout the State.

Some state facilities can reduce energy costs through the use of cogeneration.

The State may avoid large capital outlays to reap cogeneration savings by employing third-party vendors to construct and operate cogeneration systems.

The State realized savings of approximately 20 percent through the Trenton Capitol Complex district heating tie-in and may identify similar opportunities in other cities where district heating and cooling (DHC) is under study.

The majority of all State Energy Conservation Bond funds are currently dedicated to projects; new sources of funding must be identified for the program to continue.

Policy

Timely and accurate state building energy consumption and cost figures should be collected by each department and entered into the Department of Environmental Protection and Energy data base.

All State Energy Conservation Bond projects should include sufficient metering in their design to ensure the integrity of energy data collected and to enhance the State's ability to review retrofits for cost-effectiveness.

The State should pursue cogeneration opportunities where they would reduce costs at facilities.

The State should consider district heating and cooling participation where state buildings' location and thermal load indicate energy rate relief through a district heating and cooling tie-in.

The State should formulate new State Energy Conservation Bond legislation to fund projects once current monies are exhausted and should explore using shared savings agreements to finance future energy improvements to state buildings stock.

Implementation

Department heads should assign an energy coordinator to act as a liaison for all energy matters and provide the central coordination crucial to the success of state energy monitoring and conservation retrofit efforts.

The State should either amend State Energy Conservation Bond regulations or earmark a separate pool of funds to pay for the installation of meters wherever appropriate in state buildings to ensure that the departments will have the tools necessary to evaluate energy systems and conservation dollars spent.

As departmental reporting procedures improve, the Department of Environmental Protection and Energy should provide the Legislature with an analysis of past performance and developing trends in state energy use to evaluate the extension of the State Energy Conservation Bond program.

The State should continue to pursue the use of cogeneration in state facilities and consider tie-ins to future district heating and cooling projects when such projects can reduce costs.

The State should pursue shared savings opportunities where studies indicate the feasibility of such agreements for state facilities. Departments and agencies should draw on the Department of Environmental Protection and Energy's shared savings experience in the commercial and institutional sectors to develop cost- and energy-efficient public-private partnerships.

Institutional Sector Efficiency

Findings

The primary source of funding for the Institutional Conservation Program program is Petroleum Overcharge Reimbursement Fund money, which is rapidly being depleted.

The Institutional Conservation Program uses U.S. Department of Energy and oil overcharge dollars to enable nonprofit schools and hospitals to implement cost-effective improvements that can pay for themselves in energy savings and help stabilize institutional operating costs.

From 1979 through 1991, the state's Institutional Conservation Program has awarded New Jersey schools, hospitals, and colleges more than \$54 million in grants to fund projects with an average 3.5 year payback yielding aggregate savings of more than \$12 million each year statewide.

Few other programs offer as ideal an opportunity to reap large quantity energy and cost savings as the Institutional Conservation Program. The high energy consumption in schools and hospitals maximizes savings possible through the installation of program-funded measures.

Potential savings are still available through upgrades to the balance of New Jersey's institutional sector building stock.

Policy

To harness projected savings of approximately 16 TBtu/year in schools and hospitals, the State should strengthen and continue the Institutional Conservation Program.

Implementation

The State should develop a future Institutional Conservation Program funding mechanism to succeed Institutional Conservation Program oil overcharge funding. The legislature should consider drafting legislation allowing for a special bond issue similar to the State Energy Conservation Bond bill.

Commercial/Industrial Programs

Findings

State conservation initiatives in the commercial/industrial sector address energy efficiency assessment through audits and the need for financial assistance to implement energy improvements.

The oil overcharge-funded family-owned farm matching grant program received almost \$13 million worth of requests and provided \$4.15 million in grants, exhausting program funds. The high subscription rate reflected strong program interest.

Of all programs initiated in 1988 under the new Business Energy Improvement Program regulations, grant and no-interest loan programs offered the greatest degree of assistance, attracted the largest number of participants, and resulted in the most immediate implementation of cost-effective energy improvements.

The Business Energy Improvement Program estimates that the \$1.365 million in grants distributed to family farms and Urban Enterprise Zone businesses in 1988 will yield annual energy savings of more than \$500,000, demonstrating a 2.7 year payback on oil overcharge monies.

The Business Energy Improvement Program estimates annual savings of \$430,000 via the implementation of \$2.5 million in no-interest loan projects tentatively approved by year-end 1988.

As New Jersey depletes its share of oil overcharge funds, the commercial/industrial sector may need to turn to alternative financing agreements with private energy service companies to reduce consumption and capture savings.

New Jersey businesses have evidenced a desire to participate in state-sponsored energy conservation programs.

Policy

The State should seek to further reduce energy consumption in its commercial/industrial sector that accounts for 46 percent of the state's annual energy use.

Financial incentive programs to help commercial/industrial energy users become more energy efficient should be continued.

Implementation

The Department of Environmental Protection and Energy should work with utilities to increase and improve audit delivery to the commercial/industrial sector.

The Department of Environmental Protection and Energy should track and analyze response to the Business Energy Improvement Program programs introduced in 1988 to identify the most effective means of achieving retrofits in the commercial/industrial sector.

The State should develop legislation to enlarge the pool of revolving loan monies and to expand this program's eligible client base.

The State should investigate the development and financing of new business energy conservation programs.

The Department of Environmental Protection and Energy should continue to monitor all economic and legislative factors that affect the viability of alternative financing agreements and shall continue to provide agreement guidelines to potential users.

Weatherization Assistance Program

Findings

The Department of Community Affairs uses oil overcharge funds to provide up to \$2,000 per household of weatherization materials and services to the state's low-income residents.

The Department of Community Affairs weatherized approximately 70,000 homes between 1977 and 1989, and estimates that more than 340,000 additional homes are program-eligible.

Oil overcharge monies that fund a significant portion of the Weatherization Assistance Program will be depleted in 1993.

Local community action program (CAP) agencies that coordinate most state- and utility-sponsored weatherization efforts may benefit from increased staff support to fully track and strengthen low-income weatherization program delivery.

Policy

The State should continue its efforts to weatherize low-income building stock throughout New Jersey and should coordinate more closely with utility programs that aid the same low-income population to streamline program delivery and ensure effective spending.

Implementation

The State should identify new funding sources to continue low-income weatherization efforts in the future.

The State and utilities should conduct a comprehensive review of their separate low-income programs to identify ways to maximize energy efficiency gains in this sector.

Utility Energy Efficiency Programs

Findings

By year-end 1990, more than 460,000 households had obtained basement-to-attic home energy surveys through the statewide Home Energy Savings Program cosponsored by the state and its seven public utilities.

Approximately 2.4 million eligible households in the state have not yet obtained a Home Energy Savings Program audit.

The utilities currently lack uniform methods of calculating and reporting conservation program savings, preventing validated cost/benefit analyses.

More than 204,000 low-income households obtained free weatherization services through utility direct investment programs between 1984 and 1990.

More than 7,700 residents obtained no-interest or low-interest loans through utility programs to implement Home Energy Savings Program-approved home energy improvements between 1983 and 1990.

More than 460,000 residents obtained utility rebates for the purchase of high efficiency air conditioners between 1983 and 1990. Appliance rebate programs reduce residential energy costs and shave utility peaks.

Approximately 17,000 commercial/industrial/nonprofit entities have received comprehensive CACS energy audits through 1990.

Current conservation initiatives may be ineffective in reaching the small buildings portion of the commercial sector where utility costs are either fixed or hidden in rental charges.

Policy

Using least cost planning principles, the state and utilities should tap potential savings in the state's residential and commercial sectors to ensure the utilities' ability to meet customer demand in the most cost-effective way possible. The Board of Regulatory Commissioners is developing a mechanism to allow utilities to profit on their investments in conservation.

The Board of Regulatory Commissioners should review and direct implementation of programs pursuant to the new conservation incentive rules it adopted in September 1991. Conservation initiatives that stem from the rulemaking will commit utility capital and other resources to energy efficiency through a partnership with private enterprises involved in equipment design, financing, marketing, sales and installation to accelerate efficiency gains in New Jersey. This partnership will result in energy savings for the state and its energy users; enhanced business opportunities for private supply houses, independent contractors and energy service companies (ESCOs); and attractive investment opportunities for utilities.

The Board of Regulatory Commissioners and electric and natural gas utilities must regularly examine the costs and benefits of conservation programs.

Utilities must carefully weigh the cost of saved energy capturable through conservation programs against the cost of capital expansion and fuel/power importation, and must promote efficiencies when such a policy benefits ratepayers.

Implementation

To provide Home Energy Savings Program (HESP) audit participants with reliable information, all auditors must have access to and use utility billing data.

The Board of Regulatory Commissioners and electric and natural gas utilities will use the New Jersey Conservation Analysis Team (NJCAT) study as a tool to develop the next generation of conservation programs. All conservation programs must be reviewed periodically to determine the need for change, expansion or elimination; however, modifications to utility conservation plans must also consider the overall economic, environmental and social goals of the state.

The State and utilities should integrate program delivery mechanisms to deliver cost-effective services.

Building Codes

Findings

Houses are the largest investment made by most consumers, they are used for scores of years and are part of the state's economic infrastructure. The state's economy benefits from adequate construction and performance.

The energy subcode currently in force comprises the National Energy Conservation Code/1990 of the Building Officials and Code Administrators International, Inc., (BOCA) and the LEM-1-1982 lighting standards of the Illuminating Engineering Society.

The the owner's cost burden in housing is not the mortgage payment alone, but the sum of mortgage and energy costs.

All current model energy codes lag behind the marketplace in terms of thermal performance and mechanical equipment requirements. Specified efficiencies for furnaces, boilers, water heaters, and air conditioners are lower than the efficiencies of commonly available equipment on the market.

Increased building stock efficiency adds to the initial cost of a home but reduces long-term fuel/utility costs—a significant portion of monthly carrying costs. Increased building efficiency helps to moderate winter natural gas peaks, summer electricity peaks and reduce New Jersey's strong dependence on petroleum. (See Chapters 3, 4, 8 and 11.) Further, any efficiency measures that reduce the need to burn fossil fuels serve the state's goal of preserving New Jersey's environment.

Policy

The New Jersey Energy Subcode requirements should prescribe the maximum cost-effective levels of efficient construction (calculated at current energy prices) in order to reduce life-cycle costs to a minimum.

The State should evaluate state-of-the-art air infiltration/ventilation standards for occupied buildings, analyze the costs and benefits of their adoption, and consider the need for procedures to measure compliance.

In keeping with the State's policy of expanding affordable housing opportunities throughout New Jersey, the state needs a mechanism that will: (1) overcome the barriers of higher initial cost for an energy efficient home; (2) recognize the savings potential and long term benefit—to the homeowner and the state—of investments in more energy efficient housing; and (3) factor avoided fuel/utility costs associated with an efficient home into a lending ratio.

Implementation

The Department of Community Affairs and the Department of Environmental Protection and Energy should evaluate measures to achieve greater energy efficiency in new construction. These measures can include future changes in building code and utility incentive programs or tariff design.

A joint Department of Community Affairs-Department of Environmental Protection and Energy-Department of Health task force should study the issue of air infiltration/ventilation control in occupied buildings. The task force should evaluate and recommend appropriate standards and procedures.

The State should work with representatives of the building, utility, real estate, banking and home financing industries to develop an innovative mechanism that will consider the impact of reduced fuel/utility bills on a mortgage applicant's ability to finance a high efficiency home. Factoring energy savings in the lending ratio could alleviate public, government and industry concerns over the affordability of high efficiency homes and would help remove barriers to the adoption of a strengthened energy subcode that simultaneously serves the economic, environmental and energy goals of the state.

Home Energy Rating System

Findings

Home energy rating systems (HERS) can be based on engineering analyses of existing houses, calculations from blueprints for proposed units, or analysis of energy consumption (billing data).

Ratings can be qualitative (bronze star/gold star), relative (0 through 9), energy estimates (Btu/yr), or economic (\$/yr). The selection depends on marketing goals of the program.

All systems proposed have systematic or random errors, but many systems provide consumers and bankers with useful information and offer builders data that they use for marketing the energy efficiency of their products.

Market-driven programs backed by the credibility of the utilities have advantages over attempts to impose mandatory programs.

Policies

The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners should establish a home energy rating system for New Jersey. Such a system would provide the right incentives to buyers and sellers, by providing unbiased information to all parties.

A home energy rating system for New Jersey should be based on voluntary participation by builders.

The home energy rating system adopted should be consistent in the state and administered by the state's utilities. The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners, in developing a home energy rating system, should consider using billing analysis as back-up to the prescriptive or calculation methods.

Implementation

To implement a home energy rating system: (1) the Department of Environmental Protection and Energy could initiate a proceeding pursuant to the requirements of the Administrative Procedure Act, or (2) the Department of Community Affairs, as the lead agency with responsibility for the Uniform Construction Code, could propose a home energy rating system by administrative rulemaking.

Land Development Patterns for Energy Efficiency

Findings

Population shifts to the suburbs and formerly rural areas have increased reliance on the automobile.

The subsequent movement out of urban centers by employers who rely on a regional labor market, while reducing travel distances for some commuters, increases travel distances for others and diminishes options for the use of mass transportation.

A concentrated development pattern is essential to establish and maintain an efficient mass transportation system that provides an alternative to the automobile. Dispersed development does not have the population density required to support traditional mass transit.

A concentrated development pattern brings residences and destination points closer together to reduce travel distances and enhance opportunities for nonmotorized transportation modes.

The State has established many programs and policies that serve to promote residential, commercial, and industrial investment in urban areas that will help to establish an efficient land use pattern.

Policies

The State should encourage redevelopment and revitalization of urban areas to create and maintain densities necessary to support the use of mass transportation and to provide for reduced travel distances between housing, employment, and services.

The State should encourage an appropriate mix of land uses to shorten travel distances and to maximize access to destination points by nonmotorized transportation modes.

The State should encourage compact clustered development to improve options for the use of mass transportation and to shorten travel distances.

Implementation

The State should stimulate urban redevelopment and encourage public and private investment in areas where mass transit systems exist and people rely less on automobile travel to meet their daily needs.

The State should encourage economic development and redevelopment in higher density mixed-use centers that accommodate the use of alternative modes of transportation and reduce the need to travel.

Energy Efficiency and the Environment

Findings

Energy efficiency, in addition to its other advantages, is the single most effective means of reducing combustion-related emissions.

CO₂ released by fossil fuel combustion is building up in the earth's atmosphere. The implications of this build up are critically important in the mid- to long-term. While New Jersey alone cannot control the build up, it can prepare to meet scientific and public concerns that are now surfacing.

Nitrogen oxides and sulfur dioxide emissions cause acid precipitation. Acid precipitation contributes to the acidity of lakes and streams, and the resulting adverse effects on living organisms. Acid precipitation may harm plant life. It may affect soil acidity that controls the movement of toxic heavy metals through soils and into aquifers.

Ozone, formed in the atmosphere from nitrogen oxides and organic substances, results, at least in part, from fossil fuel emissions. Exceedances of the ozone standard are increasing, possibly as a result of hot summer weather. The number of days with poor air quality has increased because of high ozone levels.

Volatile organic substances, petroleum, petrochemicals, solvents, and other organic compounds are released into the air in part from fuel use. Gasoline vapor released at gas pumps is a major source. These compounds are precursors of ozone. Many are suspected of causing cancer.

Particulate matter resulting from incomplete combustion of fossil fuel, particularly diesel fuel, contains particulates with the carcinogen benzo(a)pyrene.

The Department of Environmental Protection and Energy has already instituted the most cost-effective technically available controls for the controllable pollutants. Ozone formation remains a problem.

Carbon dioxide release from fossil fuel combustion is not now controllable by technical solutions such as emissions controls. The alternatives are increased use of nuclear electric generation, alternative energy sources, or greater end use efficiency.

Policy

The State should encourage energy efficiency to the greatest extent consistent with cost-effective investment.

The State should review its own investments in transportation, water supply and water treatment infrastructure, its policy affecting land use, and its own operations to find opportunities for fuel efficiency.

The State should encourage use of renewable energy, landfill gas, and photovoltaics to the maximum extent technically feasible by assessing their potential in all decisions that affect energy supply, price or use.

The State should encourage research on energy storage, photovoltaics, and other promising technologies that might reduce dependence on fossil fuels, particularly imported petroleum. The New Jersey congressional delegation should work to reallocate research funds from non-renewable fuel research to renewable research.

The State should require inclusion and refinement of environmental costs and benefits in energy planning cost/benefit analyses. It shall foster the development of appropriate methodology and design of means to internalize environmental costs.

The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners should continue to work with regional air management agencies and neighboring state regulatory agencies whose electric utilities comprise the Pennsylvania-New Jersey-

Maryland (PJM) Interconnection to develop, to the extent practicable, planning methods and energy efficiency programs for regional air management.

Implementation

The State should target motor vehicle emission for more stringent enforcement.

The State should require new residential construction using combustion heating equipment to install high-efficiency sealed combustion units or to ensure adequate ventilation of indoor spaces not sealed from the combustion unit.

The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners should confer to develop an integrated response to the Clean Air Act amendments. As part of this effort, the Board of Regulatory Commissioners should: (1) require the electric utilities to study the economic and environmental impacts to New Jersey consumers of the continuation of purchases of large quantities of power from out-of-state utilities where SO₂ emission requirements are less stringent than those in New Jersey, and (2) require electric utilities to internalize environmental costs in least cost planning process.

The Department of Environmental Protection and Energy and the Board of Regulatory Commissioners should establish a regulatory framework that provides guidelines to assess utility Clean Air Act compliance plans.

The proposed Clean Air Act requires utilities to offset SO_x and NO_x emissions from new facilities by retiring, plant, switching to cleaner fuels, improving emissions control at other plants, or purchasing offsets from other utilities in their region. Offsets by other means such as planting trees, or investing in energy efficiency should be considered by the Department of Environmental Protection and Energy.

The State should employ life-cycle costing for all government-purchased energy-consuming equipment to guarantee consideration of energy savings benefits.

The State should encourage implementation of energy conservation measures to the maximum extent practical to reduce air pollution emissions.

The State should develop methodologies to fully reflect environmental costs so that all electric users would pay their share of emissions reduction costs based on their share of use. This process is known as internalization of environmental externalities.

The State should continue to support energy efficiency and conservation as a means to meet environmental goals.

Emergency Plans

Findings

In the event of an emergency that results in a major energy supply dislocation or interruption, an emergency plan of restoration must be available.

The energy emergency plan objective should be to mitigate the effects of any supply disruption.

In addition, an emergency plan should provide for the protection and safety of the public and potential environmental degradation.

The availability of timely, accurate and reliable information and data at the time of the emergency and all during the various phases of restoration must be in place and properly functioning and administered by the Department of Environmental Protection and Energy.

Periodic drills and tests must be held to test the reporting and response mechanisms that would be activated in the event of an actual incident.

The Department of Environmental Protection and Energy, in conjunction with the Office of Emergency Management and the Governor's Office, play an important and integral role in the gathering and dissemination of energy data during an emergency.

Policy

Greater emphasis should be placed on maintaining, updating and drilling in the various emergency response plans.

The Department of Environmental Protection and Energy should evaluate the effectiveness of the Energy Emergency Information Center. In an emergency, the Center receives, evaluates and disseminates energy information to the Office of Emergency Management and the Governor's Office.

Implementation

In addition to Radiological Emergency Response Plan drills and under the auspices of the Department of Environmental Protection and Energy and the Office of Emergency Management, a variety of exercises should be held to test the responsiveness of the various emergency units and their effectiveness.

The State should conduct other simulated exercises involving regional dislocations that occur on an interstate level, such as loss of the electric grid system among New York, New Jersey and Pennsylvania.

Developing an Energy-literate Society

Findings

Energy-related issues will impact all areas of life for New Jersey citizens.

Sound energy decisions require informed citizens; energy education efforts should be heightened during times of energy supply and price stability when energy efficiency issues attract little attention on their own.

Policy

The Department of Environmental Protection and Energy should continue efforts to provide New Jersey residents and business owners with information on how they may cost-effectively increase energy efficiency.

Implementation

The Department of Environmental Protection and Energy will work to continue to secure federal energy monies to fund the toll-free energy information line and the printing and dissemination of literature on energy efficiency for New Jersey homes and businesses.

The Department of Environmental Protection and Energy and the Department of Education should examine possibilities for the incorporation of energy-awareness programs in New Jersey schools.

The State should explore the use of community access cable television programs and public service announcements to provide information to the general public about energy efficiency.

Energy Research and Development

Findings

Federal government, utilities and energy industries support data accumulation, energy supply, utility operations and industry specific research and development.

Relatively little support goes to research and development of appliance and equipment efficiency automobile efficiency or other means to maintain energy services with less fuel input.

Only one organization, the National Renewable Energy Laboratory, exclusively studies opportunities to utilize renewable energy.

Policy

New Jersey, which has no non-renewable energy sources, should support research and development of renewable energy and encourage development and demonstration of appliance equipment and auto fuel efficiency.

New Jersey should encourage any means to provide energy services—warmth, cool, light and motor power—with less dependence on non-renewable energy.

Implementation

The Board of Regulatory Commissioners should encourage utilities to develop and demonstrate methods to use electricity and gas efficiency, a part of their least cost plan.

The Board of Regulatory Commissioners should study the equity, security, environmental, revenue and economic aspects of differing taxes on competing fuels.

The State should encourage NJ Transit to develop new methods of providing transportation services that might better serve to reduce fuel use.

The Department of Transportation should develop and demonstrate ways to encourage ridesharing and vanpooling for trips to work.