discount to undertake an independent and comprehensive energy audit program before granting a rate adjustment.

▲Structure energy bidding processes to reward projects which minimize the long-term costs to New Jersey's economy and environment, rather than focusing solely on short-term prices.

▲Base competitive procurement on principles that are fair and open to renewable resources.

▲Consider the development of incentives and exploration of alternative environmental approaches to encourage large energy generators and users to set pollution reduction targets above and beyond current minimum standards.

▲Incorporate environmental policies into energy goals that are designed to efficiently and effectively meet existing clean air and water standards.

▲Consider aligning tax policy with energy policy and environmental policy and eliminating tax disadvantages for clean fuels.

▲Incorporate the objectives of the New Jersey Environmental Master Plan, currently under development, the State Implementation Plan for air quality, and the environmental and land use goals of the State Development and Redevelopment Plan into energy policy.

▲Assess the decommissioning of older, inefficient higher-emitting power plants in favor of more efficient energy generation facilities during integrated resource planning.

▲Support regional efforts to improve air quality through coordinated solutions, particularly the efforts of the Ozone Transport Commission. As the bulk power market develops into a regional and even national commodity-type exchange, it is important that environmental standards imposed on power plants throughout the region exhibit commonality in order to avoid market distortions.

▲Pursue a regional emissions reduction strategy, in accordance with the September 27, 1994 Memorandum of Understanding of the Ozone Transport Commission, to decrease the amount of air pollution transported into New Jersey. A regional strategy could reduce the State's compliance costs related to the implementation of the Clean Air Act Amendments of 1990 and the Energy Policy Act of 1992.

▲Endorse the efforts of the Ozone Transport Commission to produce post-RACT reductions in ozone precursors through a cost-effective market-based trading system.

▲Persue a regional emissions reduction strategy that, by the year 2003, establishes a common region-wide emission limit so that all power plants in the PJM pool are subject to the same environmental standard.

▲Encourage emissions trading to act as a tool to support DSM. Allow participants in DSM programs to gain credit for verifiable and quantifiable emission reductions.

▲Work with the Department of Environmental Protection in refining the methodology that the Board of Public Utilities has developed to measure the costs and benefits of energy savings, particularly with regard to environmental benefits.

▲Work with the Department of Environmental Protection to quantify emissions reduction from conservation measures. Conservation efforts could reduce the projected emissions growth rate, thus becoming an important strategy in the State Implementation Plan for air quality.

▲Continue to explore with the Department of Environmental Protection, the Ozone Transport Commission, and other State and regional entities, the possibility of expanding the NOx emissions trading program to other pollutants.

▲Explore with the Department of Environmental Protection the possibility of allowing credit trading between stationary and mobile sources.

Alternative Transportation Fuels

The use of clean and alternative fuels in New Jersey's motor vehicles is required by two Federal statutes: the Energy Policy Act of 1992 (EPAct) and the Clean Air Act as amended in 1990 (CAAA). Clean and alternative transportation fuels can play an important role in addressing New Jersey's energy and environmental concerns. The use of these fuels will be driven by Federal requirements, fuel availability, cost of fuel and vehicles, and energy and environmental policies.

Energy Policy Act

Section 502 of the Energy Policy Act (EPAct) requires the Federal Department of Energy (DOE) to establish a mandatory program that, to the maximum extent practicable, promotes the replacement of petroleum fuels in light-duty motor vehicles with domestic alternative fuels. The goal of this section is to ensure the availability of those alternative fuels that will have the greatest impact in reducing oil imports, improving the health of the nation's economy and reducing greenhouse gas emissions.

EPAct requires the use of alternative fuels by Federal and state government fleets and alternative fuel provider fleets, beginning with model year 1996. The EPAct definition of "alternative fuels" includes natural gas, propane, electricity, alcohols and other fuels that are substantially nonpetroleum and yield substantial energy security and environmental benefits.

Under EPAct, in model year 1996, 10 percent of all new light-duty vehicles acquired by state government fleets must be alternatively fueled; this percentage increases to 75 percent by model year 2000. For Federal government fleets and alternative fuel provider fleets, the percentages of alternative fuel vehicles required are even higher. The DOE may elect to institute similar fleet requirements for additional fleet operators, beginning with model year 1999, if it determines that EPAct's fuel replacement goals cannot be met through its mandates for Federal and state government and alternative fuel provider fleets, and additional voluntary measures.

Clean Air Act

Under the Clean Air Act, New Jersey must submit a State Implementation Plan (SIP) that identifies actions and programs that will be undertaken to control emissions in "nonattainment areas," that is, areas that fail to meet the health-based National Ambient Air Quality Standards (NAAQS) set by the Federal Environmental Protection Agency for specified pollutants such as ozone, carbon monoxide, and particulates.

All 21 of New Jersey's counties are out of compliance with the Federal NAAQS for ozone. In addition, 14 municipalities fail to comply with the NAAQS for carbon monoxide. Continued noncompliance with these standards could result in the Federal government's withholding of hundreds of millions of dollars in Federal highway funds, and will pose a threat to public health, the environment and the economic vitality of the State. Motor vehicles are significant contributors to the air pollution in these nonattainment areas.

The CAAA definition of "clean alternative fuels" is broader than the EPAct definition, and includes reformulated gasoline and diesel, when used in a "clean fuel vehicle" that meets the CAAA's emissions standards. Section 246 of the Clean Air Act requires states containing nonattainment areas to develop a clean fuel vehicle program for public and private fleets consisting of 10 or more vehicles that are capable of being centrally fueled, unless equivalent emission reductions can be obtained through alternative strategies. New Jersey is currently developing a Clean Fuel Fleets program as part of the State Implementation Plan.

Findings:

- In 1992 there were approximately 6 million motor vehicles registered in New Jersey. These vehicles account for approximately 33 percent of the State's volatile organic hydrocarbon emissions, and 34 percent of the nitrogen oxide emissions which contribute to urban ground level ozone (smog) formation during the peak ozone producing season each year (June, July and August). They also emit 81 percent of the carbon monoxide released into New Jersey's air during the winter months.
- New Jersey's transportation sector is heavily dependent on gasoline and diesel

fuel, much of which is imported, making the State's economy vulnerable to any disruptions in the supply of these fuels.

- The Federal Clean Air Act Amendments and Energy Policy Act require the use of clean and alternative fuels in certain centrally fueled fleets. While there is some overlap between the two statutes, the requirements, effective dates, affected fleets and definitions of clean and alternative fuels differ somewhat.
- A State Implementation Plan, detailing the steps New Jersey will take to reduce air pollution in nonattainment areas, is required by the Clean Air Act. A portion of the SIP must indicate the actions New Jersey will take to reduce emissions from motor vehicles.
- The use of clean and alternative fuels can be integrated into many of the programs required by the CAAA, including the Low Emission Vehicle (LEV), Employer Trip Reduction (ETR), and Enhanced Inspection and Maintenance (I/M) programs, as well as optional programs such as emissions trading, that the State may elect to implement.
- The New Jersey Board of Public Utilities, in conjunction with the Department of Environmental Protection and the Department of Transportation, is currently conducting an Alternative Fuels Demonstrations Project that will eventually involve up to 200 State-owned vehicles.
- The State has converted 41 passenger vehicles from the Department of Environmental Protection and the Department of Transportation to bi-fuel, compressed natural gas and gasoline vehicles. A total of 100 vehicles will be converted to operate using compressed natural gas. The State has also agreed to convert 20 vehicles to operate using propane, as part of the Demonstration Project.
- There are currently over 400 natural gas powered motor vehicles in operation in New Jersey, as well as approximately 650 propane powered motor vehicles.
- If alternative fuels are to gain widespread acceptance, a refueling infrastructure must be developed, a wider range of alternative fuel vehicles (AFVs) must be made available, and the cost of purchasing AFVs must become competitive with the cost of purchasing comparable gasoline or diesel vehicles.
- There are health and safety issues associated with the use of all motor vehicle fuels, including gasoline and diesel, as well as reformulated gasoline, propane, natural gas and other clean or alternative fuels.

Recommendations:

The following recommendations apply to the role that New Jersey's State government should play with regard to clean and alternative fuels:

- ▲ The Board of Public Utilities should work closely with the Department of Environmental Protection, the Department of Transportation and the Division of Motor Vehicles to ensure that the requirements of the Federal Clean Air Act Amendments and Energy Policy Act are carried out in a coordinated manner, and within the Federally mandated timeframes.
- ▲ The State should not endorse a particular clean or alternative fuel, but should encourage the use of those fuels that will best enable New Jersey to meet the requirements of the Clean Air Act Amendments and Energy Policy Act, and achieve the goals of cleaner air and energy security.
- ▲ The Energy Master Plan and the State Implementation Plan should be consistent for the purpose of coordinating the State's air quality and energy policies.

▲The State should continue with the expansion of the Alternative Fuels Demonstration Project.

▲The Board of Public Utilities, in conjunction with the Department of Environmental Protection, should establish a mechanism to assess and compare the various clean and alternative fuels in the areas of price, safety, performance, emissions benefits, refueling infrastructure and supply reliability. Accurate information should be made available to the public, so that fleet operators may make decisions regarding clean and alternative fuel use based on which fuel or fuels best suit their individual needs.

▲The State should rely on market-based initiatives, to the greatest extent practicable, rather than on additional mandates to increase the use of clean and alternative fuels in New Jersey, thereby enabling the State to comply with existing Clean Air Act Amendments and Energy Policy Act requirements.

▲The Board of Public Utilities should work together with clean and alternative fuel providers to determine whether "niche markets" exist for different fuels in various sectors of the State's economy. The objective should be to determine the applications for each fuel type that are most practical from a transportation standpoint, and that will aid the State in attaining its air quality and energy security goals.

▲The Department of Environmental Protection and Board of Public Utilities should continue to investigate the possibility of establishing an emissions trading program that would allow the intersector trading of credits between mobile sources (motor vehicles) and stationary sources as a means of accelerating the use of clean and alternative fuel vehicles.

▲The Department of Environmental Protection and the Division of Motor Vehicles should investigate whether the inspection and maintenance requirements proposed for gasoline-powered vehicles are appropriate for use on the various alternative fuel vehicles, or whether separate procedures should be established.

▲The Board of Public Utilities should work with the Departments of Treasury, Transportation, and Environmental Protection to assess the costs and benefits of various legislative and regulatory measures, including tax credits and rebates, as incentives toward increasing the number of clean and alternative fuel vehicles in New Jersey.

▲The Board of Public Utilities should conduct a public education campaign, directed at fleet operators and the public in general, to disseminate information on the short and long-term benefits of using clean and alternative fuels. The economic, public health, environmental and energy security costs to New Jersey of not complying with the Federal mandates should also be made clear.

▲The State should continue to evaluate the health and safety issues associated with various clean and alternative fuels.

▲The Board of Public Utilities should encourage New Jersey's cities to participate in the U.S. Department of Energy's Clean Cities Program, a Federal initiative designed to promote coordinated efforts among different levels of government, private sector fleet operators and alternative fuel providers in furtherance of the Energy Policy Act's goals.

▲In anticipation of an increase in the number and types of vehicular fuels in use, the Board of Public Utilities should work with the Division of Motor Vehicles to develop a vehicle identification system for alternative fuel vehicles, to assist first responders in identifying the fuel type in the event of an accident.

▲The Board of Public Utilities should further develop recommendations regarding clean

and alternative fuels during Phase II of the Energy Master Plan process. Input from workshops, such as the Clean Fuel Fleets Workshop to be held in conjunction with the Department of Environmental Protection, should be incorporated into future proposals.

▲ The State should investigate the possibility of initiating a "fast track" permitting process for alternative fuel refueling facilities.

Transportation and Energy Use

Transportation usage represents approximately one-third of New Jersey's energy consumption. This sector of our economy, which is driven by our reliance on the automobile, remains almost entirely dependent on one energy source: petroleum. The New Jersey Energy Master Plan recognizes that an efficient and reliable transportation network is necessary to support a strong regional economy, secure our place in the global economy, and offer our citizens opportunities for social and economic mobility. Moreover, transportation planning must be closely allied to energy, environmental and land use planning to maintain the quality of life for all New Jerseyans.

Our current transportation usage contributes approximately 81 percent of carbon monoxide (CO) to our air during the winter season, and approximately 33 percent of volatile organic compounds (VOCs) and 34 percent of oxides of nitrogen (NOx) during the summer ozone season[19]. In response to these environmental indicators, as well as other impacts, our State transportation planning is being guided by the Federal Clean Air Act Amendments of 1990 (CAAA), the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Energy Policy Act (EPAct), and the New Jersey State Development and Redevelopment Plan.

The Federal legislation calls for transportation control measures that decrease solo commuting, peak road use and traffic congestion, and promote the use of more efficient, cleaner-burning fuels and alternatives to single-occupancy vehicles. The State growth management plan advocates more compact and mixed-use patterns of development that support alternative transportation modes and directs growth to areas where infrastructure or development already exists.

The New Jersey Department of Transportation (DOT) is currently leading a two-year open process in which interested members of the public are helping to plan for New Jersey's transportation needs for the next 25 years. The DOT reached out to a broad section of the State's population through telephone surveys, interactive focus groups and open houses. The DOT staff traveled to shopping malls, senior citizen centers and other areas where citizens congregate to gather recommendations; and to more structured issue groups where statewide concerns, such as goods movement and urban and suburban mobility, land use, quality of life and economic development issues, were discussed.

Participants in the DOT's public process have identified a number of broad goals and objectives. These include the need to encourage economic development in New Jersey by upgrading transportation services and improving access to more job opportunities; improving the quality of life; shaping development patterns consistent with the State Development and Redevelopment Plan; improving the effectiveness, efficiency, attractiveness, comfort and safety of public transportation; and implementing new processes of transportation service development and deployment.

Participants in the development process of the New Jersey Energy Master Plan also raised a number of transportation-related issues. These include the need to:

- provide access to transportation alternatives;
- restore and promote communities with a sense of place as advocated by the State Development and Redevelopment Plan;
- protect the public health and safety, including improvement in air quality, ambient vehicular noise level, commuter stress, and accident occurrences;
- conserve land and open space;
- improve energy efficiency;
- reduce vehicle miles traveled;
- review the State tax policy on vehicular fuels and road usage;
- develop an alternative form of toll collection to raise revenue and reduce the collection process during peak hours;
- promote more freight and passenger rail use;
- develop energy policies designed to effectively and efficiently meet the requirements of the CAAA;
- site park-and-ride facilities at train and bus stations to facilitate transit use;
- create public/private partnerships to reduce trips and support employers who implement employer trip reduction programs;

- support bicycle usage by providing bicycle lanes, bicycle lockers, and bicycle access to public transit;
- include pedestrian pathways in transportation planning;
- support urban projects such as the Circle of Mobility/ Urban Core Projects and other transit projects, multimodal projects and goods movement strategies;
- continue financial support of the State's transportation management associations (TMAs);
- identify experimental transportation modes, both traditional and nontraditional, such as station cars at train stations and shuttle vehicles, in the less populated areas of the State where public transit is lacking; and
- re-authorize the Transportation Trust Fund and distribute the monies in a strategic plan that reduces congestion, air pollution and sprawl-type development, using market-based pricing approaches.

These issues should be considered by the Department of Transportation in its development of plans for meeting New Jersey's transportation needs.

Findings:

- New Jersey's existing transportation system is overwhelmingly dependent on our supply of petroleum and remains a major contributor to ambient air pollution and greenhouse gases.
- Our current pattern of land use development intensifies our reliance on the automobile and reduces the opportunity for transportation services and options in significant sections of the State.
- The Federal CAAA requires New Jersey to include effective transportation control measures in its State Implementation Plan that offset the increase in emissions resulting from the growth of vehicle miles traveled.
- Transportation planning should be coordinated with energy, land use and environmental planning, as well as public and private sector investment decision-making.

Recommendations:

▲The State should encourage energy conservation in the transportation sector through support of efficient land development patterns as recommended in the State Development and Redevelopment Plan and through the provision of travel options across all modes, with emphasis on traditional as well as nontraditional public transit alternatives.

▲New Jersey should plan to move more people and goods, not vehicles, through a transportation network that offers a range of choices and connections for those who walk, bicycle, ride buses, trains, light rail, and carpool or vanpool.

▲Transportation planning should be coordinated among State agencies, local government agencies, metropolitan planning organizations and other regional and bi-state authorities, with the public as active participants in the process.

▲The State should evaluate existing transportation subsidies and energy taxes within its overall tax policies.

▲The DOT should consider the conceptual direction as outlined in the public discussion on "Transportation Choices 2020", including:

- Encouragement of economic development by providing improved access to more job opportunities through transportation alternatives, providing more cost-efficient movement of goods, and upgrading intermodal passenger and freight facilities;
- Improvement in New Jersey's quality of life by reducing accidents on the transportation system, meeting or exceeding environmental standards, providing mobility for all segments of the population, developing additional transportation choices, and reducing the need for travel through efficient land use patterns.

- Encouragement of development patterns and land uses that can support a greater range of transportation services; investment decision-making that encourages the development of the State Development and Redevelopment Plan's Communities of Place; and public/private partnerships in transportation investments.
- Improvement in transportation services by reducing travel delays, increasing reliability, and providing affordable, convenient, comfortable, safe, energy-efficient, and cost-effective travel alternatives.
- Improvement in the transportation planning and implementation process by providing quality customer service; coordinating regional and local planning and land-use development decision-making; encouraging intergovernmental and interagency cooperation for integrated and intermodal transportation projects; assisting the formation of partnerships within the transportation sector and with other industries to support economic development and job opportunities; exploring new technologies; and providing a stable, dedicated and adequate source of funds for transportation.
- An increase in the range of options and rate of deployment of new technologies for transportation information, operations, energy consumption, and travel mode development and integration, thereby supporting research and development in New Jersey as well as new business growth.

Energy Efficiency In Building Codes

New residential and commercial buildings, as well as those undergoing significant renovations, must comply with or exceed the standards set in the energy subcode of the State Uniform Construction Code (UCC). New Jersey's energy subcode consists of the 1993 Building Officials and Code Administrators International Incorporated (BOCA) National Energy Conservation Code and the Illuminating Engineering Society LEM-1, 1982 Standard, as amended.

The Federal Energy Policy Act (EPAct) of 1992 requires the State to compare the existing UCC energy subcode for residential development with the 1992 Council of American Building Officials Model Energy Code (CABO MEC). The State need not revise the provisions of its residential building code regarding energy efficiency, but it must review the subcode to determine whether it is appropriate to do so at the current time[20].

The EPAct does, however, require the State to review and update its energy efficiency provisions for commercial building codes to meet or exceed ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) 90.1-1989 standards by October 1994[21]. New Jersey is in the process of complying with this Federal mandate through an adoption proceeding for the ASHRAE standard for commercial buildings.

The Federally mandated comparison between the State's current residential energy subcode provisions and CABO MEC is not solely a building code issue, but also raises considerations that cross-cut economic, environmental and energy planning. Energy-efficient housing and appliances can provide significant long-term energy cost savings to the consumer, increase property values, reduce demand for energy-generation and offer air quality benefits. From a consumer, energy, and environmental perspective, energy conservation through cost-effective, energy-efficiency measures are strongly encouraged.

However, a comparison of the State's adopted 1993 BOCA National Energy Conservation Code and the 1992 CABO MEC does not confirm clear-cut energy and cost savings. During the past year, the Department of Community Affairs (DCA), with the assistance of a consultant group and input from the public, has been evaluating the 1993 BOCA National Energy Conservation Code and the 1992 CABO Model Energy Code to determine energy, as well as cost savings. The study reviewed fuel use for appliances as well as heating systems.

The study identified a number of economic and energy efficiency trade-offs[22]. Although the 1992 CABO MEC requires a higher energy-efficient building envelope, the current BOCA National Energy Conservation Code adopted in 1993 mandates improved equipment performance. The adoption of the 1992 CABO MEC in New Jersey would al-

low the installation of lower-efficiency appliances than are currently allowed.

In addition, it is unclear that the cost/benefit payback is significant enough to warrant a subcode change to the 1992 CABO MEC. According to the study, the fuel savings for an average detached home built according to the requirements of 1992 CABO MEC is approximately 15 percent, while there are no fuel savings for attached houses.

The data from the comparison study conducted by the DCA consultants indicate that building envelopes that comply with the 1992 CABO MEC add between $1,076 and $2,262 to the cost of a single-family detached house with a basement, over the cost of complying with the 1993 BOCA National Energy Conservation Code. The data also shows that simple payback in energy cost savings for single-family detached houses would range from 8 to 24 years, with an average of 10 to 12 years. For attached housing, no payback can be calculated because the heating costs are higher for 1992 CABO MEC than for 1993 BOCA.

Subsequent to the passage of EPAct, the U.S. Department of Energy (DOE) determined that the 1993 CABO Model Energy Code offered greater energy efficiency in residential buildings than the 1992 Model Energy Code. Consequently, the State must now compare its existing energy subcode with the 1993 CABO Model Energy Code[23]. This evaluation must be completed by July 1996, two years after the Federal directive.

This recent Federal mandate means that New Jersey must again compare its energy subcode, this time with the 1993 CABO MEC. An analysis and determination of the model energy codes will be initiated within the next 18 months, and public input will be encouraged during the process.

Considering the lack of confirmation of significant energy and cost savings in a reasonable payback time from the 1992 CAB MEC and the need to re-evaluate the State's energy subcode again within the next two years, the State has decided not to take action on its residential energy subcode at the present time. The DCA will re-evaluate the State's existing residential energy subcode provisions with the 1993 CABO MEC standards within the next two years.

In the meantime, the State-adopted 1993 BOCA National Energy Conservation Code sets a minimum requirement for energy efficiency in new construction. The State, however, should continue to promote the installation of cost-effective energy efficiency measures which exceed the minimum standards established in the energy subcodes.

For example, the Board of Public Utilities demand-side management (DSM) incentive regulations provide an opportunity for utilities to earn incentives on the implementation of cost-effective DSM measures in new construction. Utilities assist in the promotion of energy-efficient homes and offer financial incentives to builders and homeowners to install appliances which exceed minimum Federal and State energy efficiency standards.

Another example of a way to promote energy efficiency in new construction is a home energy rating system (HERS) program. A HERS program would provide prospective buyers of new and existing homes with information about the present energy efficiency level of a home, including estimated energy costs. A HERS program can also identify potential opportunities to use energy more efficiently. A key incentive of a HERS program is that it allows more purchasers to qualify for mortgages for energy-efficient homes because energy costs are lower, leaving more funds available to satisfy mortgage payments.

Findings:

- A comparison of the State's adopted 1993 BOCA National Energy Conservation Code and the 1992 CABO MEC does not confirm clear cut energy and cost savings.
- Opportunities exist for promoting the installation of cost-effective energy conservation measures in new buildings which exceed the minimum standards established in the State's adopted energy subcodes.

Recommendations:

- The DCA should continue to evaluate updated versions of nationally recognized Model Energy Codes to determine if they should be adopted to improve energy efficiency in new and renovated residential structures.
- A Home Energy Rating System should be