UPDATE

NEW YORK STATE

Energy Master Plan

& Long-range Electric & Gas Report

VOLUME 1

FINAL REPORT
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N.Y. STATE ENERGY OFFICE Hugh L. Carey, Governor. James L. Larocca, Commissioner

New York State

Energy Master Plan

and long-range electric and gas report

VOLUME ONE

James L. Larocca
Commissioner
State Energy Office

Hugh L. Carey
Governor

NEW YORK STATE ENERGY MASTER PLAN AND LONG-RANGE ELECTRIC & GAS REPORT VOLUME I

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INTRODUCTION

A. Scope and Impact of the Energy Planning Process

It is the policy of the State to conduct energy planning in an integrated and comprehensive manner through development of a long-range State Energy Master Plan, which shall provide the framework for energy-related decisions made throughout the State (Energy Law, Sections 3-101 and 5-110).

Consistent with this State policy, the State Energy Office was required to prepare the first Draft State Energy Master Plan (Plan) and Draft Long-Range Electric and Gas Report (Report) and submit these documents to the Energy Planning Board* for review and approval (Energy Law, Sections 5-110 and 5-112). On March 20, 1980, the Energy Planning Board adopted the first State Energy Master Plan and Long-Range Electric and Gas Report (SEMP I), thus completing the State's initial effort at comprehensive and integrated State energy planning.

The Energy Office is required to review and update as necessary the State Energy Master Plan and update the Long-Range Electric and Gas Report, at least every two years. In August, 1981 the first draft biennial update (Draft SEMP II) was published by the State Energy Office and submitted to the Energy Planning Board for review and approval. As with the first State Energy Master Plan, the State Energy Office has combined the 1981 Plan and Report into a single document, consistent with the objective of conducting energy planning in a comprehensive and integrated manner.

In developing the Draft SEMP II, the State Energy Office considered, among other factors: energy prices; demand and supply; economic growth and development trends; the potential contribution of energy conservation, renewable and indigenous energy resources, conventional fuels, and new energy technologies; State and Federal energy policies; and the effects of all the above on the State's economy, public health, safety and welfare, and the State's environment.

This Plan contains, among other matters:

- a forecast of State energy requirements for five, ten, and fifteen year forecast periods, together with the bases for such forecasts;
- a forecast of electric and gas demands in the State for five, ten, and fifteen year forecast periods, supply requirements, and an estimate of the cost of electricity and gas to consumers;
- an identification and analysis of emerging trends related to energy price, demand and supply;
- a summary of the plans of the State's major energy suppliers for meeting forecasted energy requirements, including descriptions of new energy sources; and
- a statement of specific energy policies, together with the reasons therefor, and recommendations for administrative and legislative actions to implement State energy policy.

Upon approval by the Energy Planning Board, and adoption by the State Energy Office, the updated SEMP findings serve a variety of purposes, principally:

- Public and Private Sector Planning. The Plan will "provide the framework for energy-related decisions made throughout the State" (Energy Law, Section 5-110). In addition, the Plan "shall control all energy-related decisions made by the State and will be the guide for energy-related decisions in the private sector." (Governor's Memorandum of Approval, McKinney's 1978 Session Laws, p. 1838).
- Public Service Law Article VIII and Article VII Decisions. The specific findings with respect to projected electric demand in the Report are binding on the State Board on Electric Generation Siting and the Environment (Siting Board) with respect to any determination of need for future steam electric generating facilities under Article VIII of the New York Public Service Law (Energy Law, Section 5-112(3)(c)). In addition, the Siting Board must find that a proposed facility is consistent with the "long-range planning objectives for electric power supply in the state" established by the Plan before it may grant an application for a certificate under Article VIII (Public Service Law, Section 146(2)(e)). Moreover, the specific findings with respect to projected electric and gas demand are binding on the Public Service Commission with respect to any determination of need for major electric and gas transmission facilities under Article VII of the Public Service Law (Energy Law, Section 5-112(3)(c)).

This Plan will also serve to help coordinate State administrative and legislative actions, and State recommendations regarding Federal energy policy.

B. Planning Process

The 1981 State energy master planning process began on December 30, 1980, with issuance by SEO of a Notice of Commencement of the Planning Process, in accordance with the planning regulations. The State's major energy suppliers submitted their plans in April. Public hearings were conducted in May, 1981 to receive public input on the development of SEMP II and public response to the submittals of the major energy suppliers. The public hearings were held in Buffalo on May 5th, New York City on May 7th, and Albany on May 11, 1981, with written comments received by the Energy Office through June 11, 1981.

The Energy Planning Board held two sets of public hearings on the 1981 Draft Plan and Report. Interested persons and public officials had the opportunity to present statements on September 18 in New York City, September 25 in Syracuse, October 1 in Buffalo, and October 5 in Mineola.

Evidentiary hearings were held in Albany before Judge Aloysius J. Melia from November 9 to 19. Direct and reply testimony was received prior to these latter hearings. Parties to the proceeding sponsored witnesses and questioned witnesses sponsored by others, including the staff of the State Energy Office during the hearings. Initial and reply briefs were received by the Energy Planning Board following the close of the hearings.

After reviewing the record developed in the hearings and considering the final environmental impact statement, the

*The members of the Energy Planning Board are: The Commissioner of Energy, appointed by the Governor to serve as Chairman, the Chairman of the Public Service Commission, the Commissioner of Environmental Conservation, the Temporary President of the Senate or his designee and the Speaker of the Assembly or his designee. Ronald Pederson served on the Board as the designee of the Temporary President of the Senate and Ira Millstein served on the Board as the designee of the Speaker of the Assembly, in connection with the updating of the Plan and Report.

Energy Planning Board issued an Opinion and Order in connection with the updated Plan and Report on March 25, 1982. The Opinion and Order is contained in Section V. The text of this volume of the Plan and Report (Volume I) reflects the modifications to the Draft Plan and Report made by the Energy Planning Board.

C. Development, Structure, and Organization of the Master Plan

The updated SEMP was developed with input from many sources. Figure I-1 illustrates the scope and diversity of activities and organizations that helped shape this document.

This Plan is organized as follows:

- Volume I presents the State energy policies, forecasts, supply plans and actions approved by the Energy Planning Board.
- Volume II—Background and Supporting Analyses—presents more detailed information regarding the State's energy profile, development of the forecasts, and each energy supply plan.

Volume I is structured as follows:

- Section I—Introduction
- Section II—The specific State energy policies adopted by the Energy Planning Board are presented and discussed.
- Section III—The forecasts of future energy consumption by fuel type and end-use and future electric and gas demands adopted by the Planning Board are presented and discussed.
- Section IV—An overview of the current status and activities and future strategy concerning energy conservation, renewable resources, transportation, and each conventional fuel type is presented. This Section also includes subsections on the impacts of energy costs on low income and elderly citizens; contingency planning; and research and development. Specific proposed actions, which further the State energy policies set forth in Section II, are included in each subsection in Section IV.
- Section V—Energy Planning Board's Opinion and Order approving the updated State Energy Master Plan.
- Section VI—Energy Planning Board's Opinion and Order regarding the New York Gas Group's request for reconsideration.

D. Summary of the Impact of the updated SEMP on the State's Fuel Mix, Energy Costs, Economy and Environment

The programs and policies set forth in this Plan would, if fully implemented, significantly reduce the State's dependence on imported petroleum; substantially diversify the State's fuel mix; significantly increase the efficient use of energy, and the use of renewable resources and coal in the State; moderate the expected increases in energy costs; contribute to the State's economy; and provide for a more secure and an environmentally sensitive energy future.

Full implementation of these programs and policies would result in the following changes to the State's fuel mix (See Figure I-2);

Fig. I-1 ***New York State Energy planning process inputs***

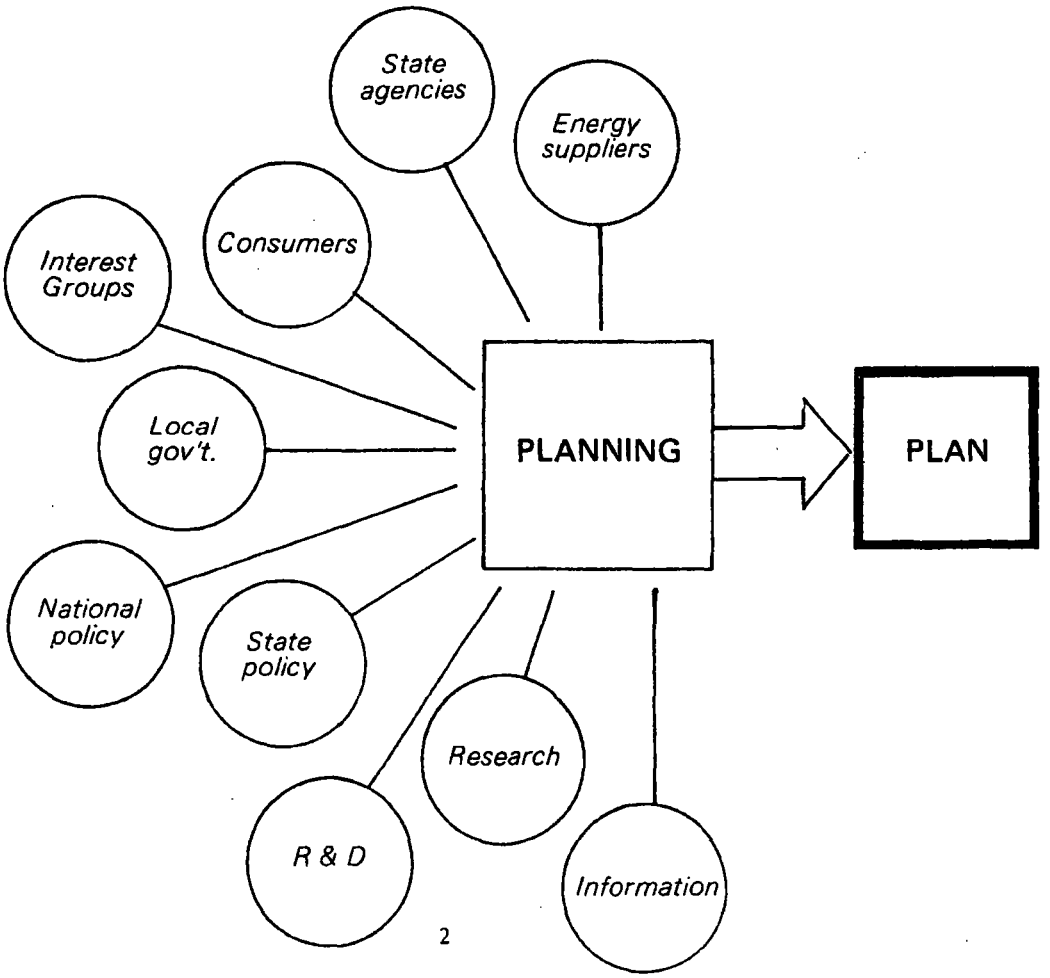
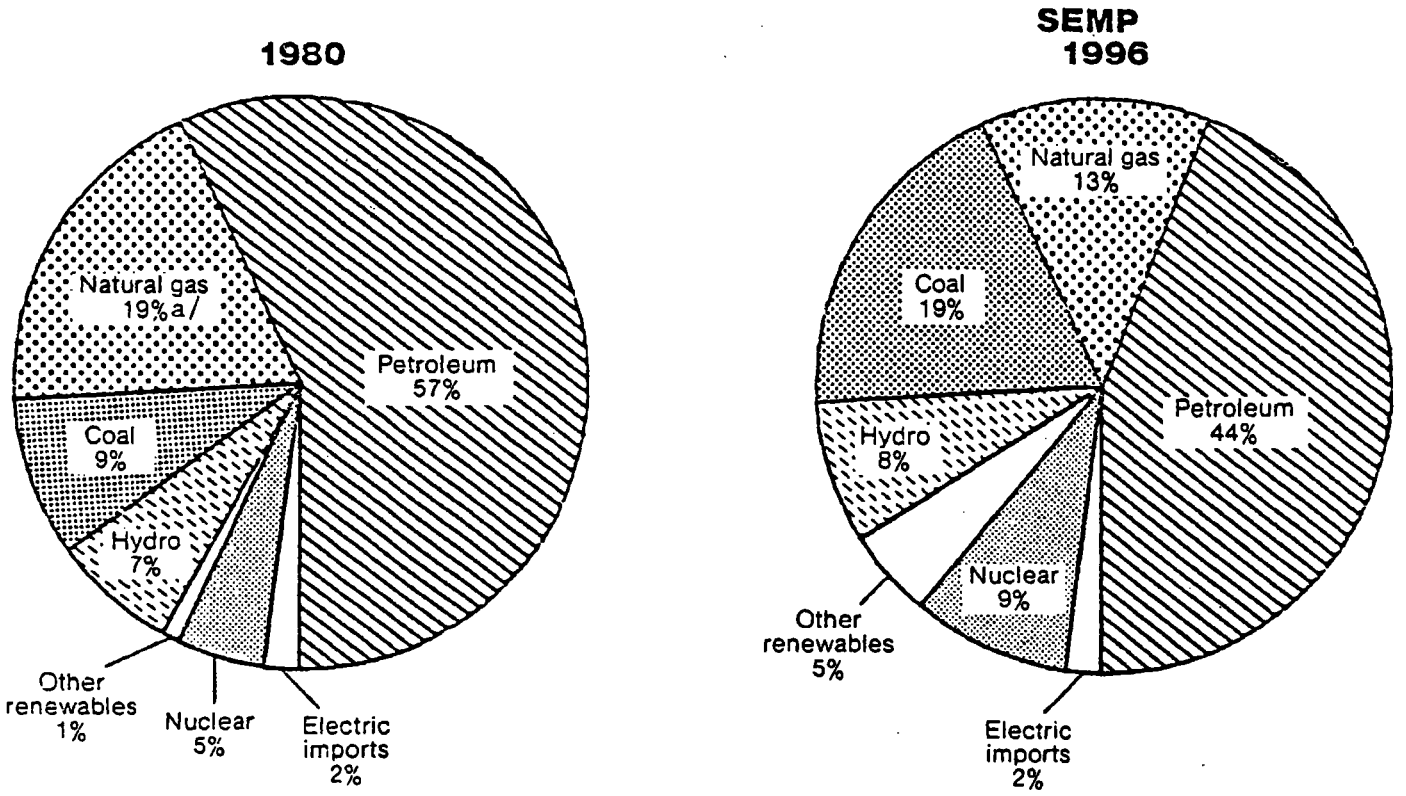


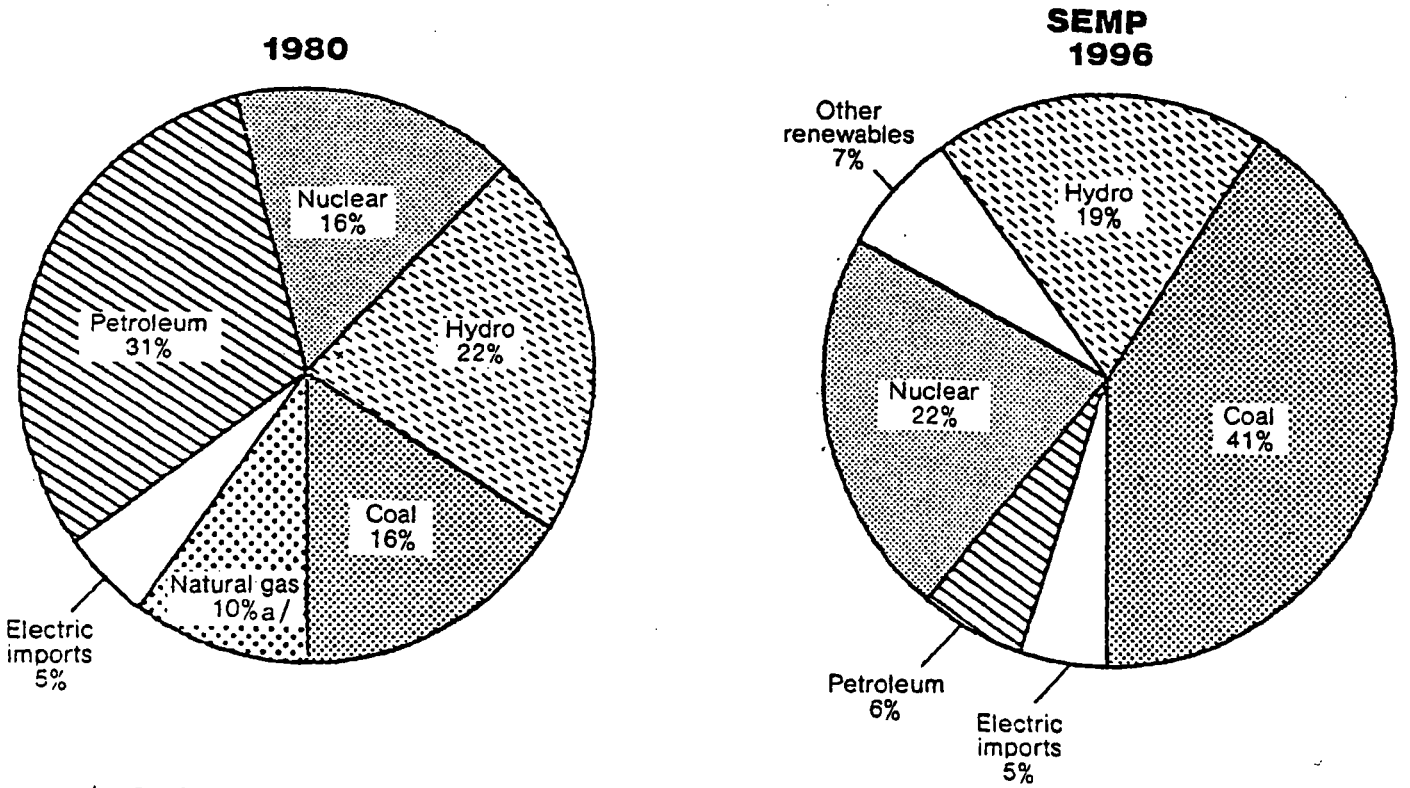
Fig. I-2 Total primary energy consumption

NEW YORK STATE, 1980 and 1996



Primary energy used to generate electricity

NEW YORK STATE, 1980 and 1996



a/ Includes use of natural gas on a temporary and interim basis under electric utility boilers.

- Petroleum use would decline from 57 percent of total State primary energy consumption in 1980 to 44 percent in 1996; imported petroleum use would decline from 70 percent of petroleum use in 1980 to 27 percent in 1996; and petroleum imports from OPEC countries would decline from 54 percent of petroleum use in 1980 to 14 percent in 1996.
- Coal use would increase from 9 percent of total State primary energy consumption in 1980 to 19 percent in 1996.
- Renewable resource use (other than hydro) would increase from 1 percent of total State primary energy consumption in 1980 to 5 percent in 1996; and renewable resource use including hydro would increase from 8 percent in 1980 to 13 percent in 1996.
- Petroleum use for electricity generation would decline from 31 percent in 1980 to 6 percent in 1996.
- Coal use for electricity generation would increase from 16 percent in 1980 to 41 percent in 1996.

Full implementation of the Plan's programs and policies will also save approximately one billion barrels of oil over the planning period. By 1996, oil consumption in New York State could be reduced by approximately 97 million barrels per year, primarily due to the effect of increased conservation, increased use of renewable resources and coal conversions. The cumulative savings resulting from full implementation of the Plan's programs and policies are projected to be approximately $10 billion over the planning period.

Full implementation of the Plan's programs and policies would also have a significant and favorable impact on the State's economy, resulting in the creation and support of an estimated 25,000 jobs and $467 million in earnings annually over the planning period.

Finally, the Plan's programs and policies would, if implemented, have a limited incremental effect upon the State's environment (compared to not implementing the Plan's programs and policies): SO_x emissions would decrease by approximately one percent; NO_x emissions would decrease by approximately seven percent; and particulates would increase by approximately three percent. Although the quantity of solid waste generated is expected to double as a result of the significant increase expected in the use of coal, the environmental impacts of this increase are expected to be minimal.

SECTION II

STATE ENERGY POLICIES

This section presents and discusses the specific State energy policies adopted by the Energy Planning Board in its Opinion and Order of March 25, 1982. These State energy policies are the major themes of the Plan from which the proposed legislative and administrative actions contained in the Section IV supply plans flow.

1. *The State's consumption of petroleum products must be reduced. The economic cost and vulnerability to disruption resulting from the State's continued disproportionate reliance on oil strongly support actions to shift to less costly and/or more secure energy sources.*

Reduction in the State's reliance upon petroleum is a primary objective of the State energy policy. Events over the last few years, including dramatic increases in the price of petroleum and continued Middle East instability, demonstrate the need for a continued effort to reduce the State's dependence on petroleum and, in particular, imported petroleum.

Significant progress has been made in furthering this policy since issuance of the first SEMP in 1979. The State's dependence upon petroleum declined in all demand sectors and overall from 65 percent to 57 percent, and its dependence upon imported petroleum declined from 46 percent to 40 percent. Reduction of petroleum use in New York exceeded that for the nation as a whole. Petroleum use in New York declined by over 18 percent from 1978 to 1980, compared to a 12 percent reduction nationally. Many factors have contributed to this result, including rapidly rising petroleum prices, State and national conservation and renewable resource programs, greater use of natural gas, and, to a certain extent, life style changes.

Despite recent progress in achieving this goal, the need for further reduction in petroleum use and reduced dependence on OPEC remains. New York still consumes more OPEC oil than any other state. The State's dependence upon petroleum exceeds the national average by 16 percentage points (57 percent to 41 percent) and its reliance on imported petroleum exceeds the national average by 24 percentage points (40 percent to 16 percent).

Notwithstanding recent national energy policy changes, compelling reasons continue to exist for both New York State and the nation to pursue policies directed toward reducing dependence upon imported petroleum. A major disruption in oil supply would impose intolerable burdens on the State's economy and the impact would be swifter, more far-ranging and more difficult to cope with than for the nation as a whole. Even with the significant progress made over the past two years, our vulnerability still exceeds that of the pre-Arab oil embargo period. A recent DOE study conducted in cooperation with the International Energy Agency confirmed that a serious cut-off of foreign oil would have particularly disastrous impacts on the Northeastern United States.

Petroleum product prices have approximately doubled since 1979 as a result of OPEC price increases and decontrol of domestic crude oil. This has raised New York's oil bill to a staggering $18 billion in 1981. This drain of wealth weakens the competitive economic position of the State, and reduces prospects for growth in New York employment.

Although prices for competing fuels have also risen since 1979, the increases have been far more modest than for petroleum products, as shown below:

Fuel	Percent Increase (March 1979-March 1981)
Home Heating Oil	112%
Gasoline	85%
Natural Gas	37%
Electricity	48%
Coal (Utility)	17%

The SEMP goal of reducing petroleum dependence and checking petroleum prices is sound. New York must continue and intensify its efforts to achieve cost-effective reductions in petroleum use, especially imported petroleum use, in all end-use sectors.

2. *Conservation and renewable resources must make a greater contribution to energy supply and will require substantial additional government support to do so, at least in the near-term. In many applications, conservation and renewables appear to be the least costly, most economically productive and environmentally benign means to satisfy a significant portion of the State's current and anticipated energy requirements. Government action must enhance the respective contributions to be made by conservation and renewables in meeting those requirements.*

The first State Energy Master Plan established conservation as the cornerstone of State energy policy. Conservation, which primarily involves increasing the efficiency of energy use, represents, in many applications, the least expensive, quickest, environmentally safest and most economically beneficial method for reducing New York's dependence on petroleum. Estimates of the costs of various conservation actions range from one-half to one-tenth of the cost of adding an equivalent amount of energy from new sources. Moreover, conservation can continue to have a positive impact on New York's economy by reducing the cost of energy to industry and business, creating business opportunities and jobs, and reducing the flow of money from the State.

Renewable resources, which are energy resources which can be replaced by natural ecological or physical cycles and sound management practices, have important energy and environmental advantages. They are, by definition, less susceptible to depletion than conventional energy forms, and are relatively immune to sudden price increases or artificial interruptions in supply. They also add diversity to the State's fuel mix, are generally environmentally benign, and will create job opportunities in the State.

New York State has assumed a national leadership role in the development of legislation, codes, standards and programs which have encouraged and promoted conservation and the use of renewable resources. Conservation programs worthy of special note include the Energy Conservation Construction Code, the Lighting Standards for existing public and private non-residential buildings, the Energy Advisory Service to Industry, the multi-family housing audit program, the boiler efficiency seminars, and the schools, hospitals and public buildings program. Each of these programs has begun to address critically important sectors of the State's building stock and economy and has resulted in substantial oil and cost savings.

In the area of renewable resources, the State has removed non-utility owned alternate energy production facilities from the scope of regulation by the Public Service Commission and has authorized investor owned utilities to establish partially deregulated subsidiaries to own and operate alternate energy production facilities. The ability of municipalities to recapture energy from their wastes has been facilitated by new legislation and funding. And the potential for the use of solar and wind systems has been increased by providing better financial incentives under State personal income tax credit and utility financing programs.

As a result of substantially higher energy prices and implementation of numerous state conservation programs, conservation is now occurring at a faster rate and to a greater extent than many obervers thought possible even two years ago. The State's conservation performance has, in fact, exceeded that of the nation. As a result of substantially higher conventional fuel prices and implementation of the State's renewable resource programs, renewable resource use and activity has also increased considerably over the last three years. Still greater oil and cost savings are achievable if the State and Federal governments maintain and expand their commitment to energy conservation and renewable resource programs.

The current federal policy of relying solely on the high price of energy to bring about conservation and renewable resources is seriously flawed. While market forces alone may suffice in many instances, there are many other circumstances under which it will not bring about energy conservation or renewable resources: when sound technical information necessary for informed choices is lacking; when access to capital at a reasonable cost is limited; when institutional or market barriers inhibit correct choices by energy users; and when government sharing of the financial risk is necessary for the commercialization of new alternate energy technologies.

The inability of the marketplace alone to respond in these four instances will be felt most seriously in states such as New York, where prices are already higher than the rest of the nation, and where conservation and renewable resources are among the primary options available to offset further price increases. The State must, therefore, commit itself to action on these four fronts if the full potential for conservation and renewable resources is to be achieved.

3. *The State of New York and its agencies should encourage the efficient use of natural gas and stimulate efforts to secure additional supplies of natural gas from sources that are economic, and compatible with environmental, public health, and safety standards in order to reduce New York's dependence on oil. Natural gas is and will likely remain an economic and environmentally compatible alternative to oil. This policy will help insure that supply and demand remain balanced throughout the planning period.*

The first State Energy Master Plan endorsed the increased efficient use of natural gas in order to reduce the State's reliance on foreign oil, further diversify sources of energy supply and mitigate air quality problems, particularly in urban areas.

Substantial progress has been made over the past two years in increasing the efficient use of natural gas. Natural gas has assumed a larger role in the State's energy picture. Residential, commercial and industrial natural gas consumption as a share of non-transportation direct end-use increased from 28 percent in 1978 to 33 percent in 1980.

The principal reasons for this increased consumption are the substantial differential in the prices of natural gas and petroleum, and the improved availability of natural gas. In the past two years, petroleum prices have increased 112 percent while natural gas prices, which are regulated under the Natural Gas Policy Act of 1978 (NGPA), have increased only 37 percent. As of January, 1981, the average price of natural gas for home heating in New York State was $4.65 per million british thermal units (MMBTU) while the average price of home heating oil was $8.00 per MMBTU.

Natural gas availability has improved as a result of the gradual deregulation of producer prices under NGPA, which has increased sales of natural gas into the interstate markets, encouraged greater production and exploration, and encouraged a substantial increase in natural gas customer conservation activities. Indeed, the average natural gas home heating customer in the State decreased natural gas use by 8.2 percent over the last two years.

Nationally, and within New York, exploration, drilling and production activities have increased substantially during the past two years. Total national reserve additions have increased from a level equivalent to 53 percent of consumption in 1978, to 83 percent of consumption in 1980. Nearly 30,000 natural gas wells were completed nationwide in the past two years, a dramatic increase from the pre-NGPA period. Activity within the State has also increased in the past two years: onshore production of natural gas has increased and new exploration activities have been announced in the New York State portion of the Eastern overthrust belt.

There continue to be sound economic, environmental and energy security advantages associated with natural gas use in New York State as an alternative to imported petroleum. Although average natural gas prices are projected to rise substantially following decontrol of most natural gas in 1985, they should remain slightly below the price of distillate oil in most New York demand sectors at the end of the planning period (although not necessarily below the price of all competing energy sources in all demand sectors). The clean burning characteristics of natural gas also favor its use over other fossil fuels, especially in urban areas of the State where air quality is a concern. Natural gas is also a preferred fuel for security reasons since nearly all of New York's current gas supply originates from domestic sources as compared with only 30 percent of New York's petroleum supplies.

Notwithstanding these advantages, the recent growth in natural gas use is not projected to continue over the forecast period. The principal reason for this change is that future conservation actions among gas customers, responding to the additional price increases which will be experienced in the next few years under NGPA and the even more substantial prices increases expected in 1985 and thereafter following price decontrol of all "new" (post April 1977) natural gas supplies, are projected to more than offset the increased use of gas from new customers attached during the forecast period. As a result, demand for natural gas is projected to decrease over the forecast period at an average annual rate of 0.6 percent. Natural gas supplies are projected to be more than sufficient to meet this demand.

Forecasting the demand, supply and price of natural gas over the 15 year planning period is complicated by the fact that beginning in 1985, the natural gas industry will shift from a predominantly price controlled to a generally decontrolled market, at which time natural gas prices, now far below the price of petroleum, are expected to rise dramatically. It is further complicated by the fact that the Federal government is considering accelerating the schedule for decontrolling the price of natural gas supplies established under NGPA. This proposed change, if implemented, would result in an immediate and substantial increase in the price of natural gas and reduce supplies for New York.

Given the substantial advantages associated with natural gas use and the considerable uncertainties associated with the many complex factors which will influence the demand, supply and price of natural gas beyond 1985, New York should

continue to encourage the acquisition of economic natural gas supplies. New York should also continue to design natural gas rates in a manner that will encourage efficient use of natural gas by all gas customers and use of gas in markets where gas is an economic alternative to imported oil.

4. *The increased use of coal must be promoted where economically feasible and consistent with applicable environmental standards. Compared to continued use of oil, particularly in the utility sector, use of coal will result in economic advantages, given current and forecast cost differentials between coal and oil, and significant improvement in certainty of supply over the forecast period. Increased utilization of eastern coal is likely to stabilize regional energy costs and will stimulate regional economic development.*

The first State Energy Master Plan endorsed the increased use of coal, where economically and environmentally sound, as a means of reducing our reliance on the use of insecure and expensive petroleum, particularly in the utility sector.

Consistent with this policy, New York State Siting Boards have certified the construction of two new coal-fired power plants at Lake Erie and Jamesport, and a coal/RDF plant at Arthur Kill. However, progress beyond the certification stage has been either slow or non-existent for each of these facilities. Niagara Mohawk, the sponsor of the Lake Erie facility, and Long Island Lighting Company and New York State Electric and Gas Corporation, sponsors of the Jamesport facility, have both obtained delays in the post-certification siting process. Although the Arthur Kill plant is being aggressively pursued by the Power Authority of the State of New York (PASNY), a State court has annulled the Arthur Kill certificate of environmental compatibility and public need and has remanded the case to the Siting Board for additional hearings regarding the facility's compliance with local laws and ordinances.

Little real progress can be cited with respect to the SEMP I recommended coal conversions, despite vastly improved coal conversion economics. Only two utilities, Con Edison and Orange and Rockland, are actively pursuing the conversion of a total of five units (2,134 MW).* This lack of progress has resulted in large measure from regulatory uncertainties regarding the type of air pollution control devices that would be required (particularly whether scrubbers would be required at specific facilities) and from the failure of the Federal government to adequately address long-range transport of air pollution from midwestern facilities (the curtailment of which might permit the State to ease its sulfur-in-fuel limitations).

The environmental uncertainties facing the bulk of the coal conversions recommended in SEMP I are surmountable. In approving the coal conversion program of the first State Energy Master Plan, the Energy Planning Board expressed a concern for the potential cumulative environmental impacts which might result from converting up to 6,000 MW of oil-fired capacity to coal. In response to the Board's request for an analysis of such impacts, in-depth investigations were undertaken by State agencies. This subject has also been a topic of parallel Federal studies.

This past December the Energy Research and Development Authority published a report prepared with the assistance of the State Energy Office based on studies performed by the Department of Environmental Conservation which addresses the cumulative impact of converting 6,000 MW of existing capacity to coal and operating 4,400 MW of new coal capacity within the State. In addition, the Federal Department of Energy recently issued the Draft Environmental Impact Study for the conversion of 42 oil-fired power plants (14,142 MW of capacity) within 11 states in the Northeast.

Both studies examined cumulative environmental impact issues related to coal conversions such as air quality, water quality and supply, solid waste disposal, transportation, visual and aesthetic impacts. Although these cumulative impact studies cannot substitute for the site-specific studies which must be undertaken, their findings can complement site-specific work and are significant in the support they provide for moving forward with the State's coal conversion strategy.

The ERDA report, which is part of the Final Environmental Impact Statement approved by the Energy Planning Board, finds that:

—the coal conversion plan and the new coal-fired capacity approved in the first Master Plan could be implemented without causing significant adverse cumulative environmental effects, provided that appropriate mitigation measures and coordinated planning occur;

—minor environmental impacts, primarily of a site-specific nature, are expected to occur. However, a variety of mitigation measures are available to control these impacts adequately. These impacts and mitigation measures are appropriate topics for each site-specific coal conversion permitting proceeding. It is at this level that the need for scrubbers to address emission impacts can best be addressed.

With respect to the potential contribution of the coal conversion program and new coal plant construction to the acid rain problem, the study concluded that the coal conversions and new coal plant construction are expected to produce minimal increases in acid rain formation over sensitive regions in the State, particularly in comparison to the substantial contributions to acid rain being made by facilities in midwestern states. This is principally because use of low sulfur coal which was recommended in the first Energy Master Plan has been assumed, and because most of the pollutants emitted from these facilities which form acid rain would be deposited over the Atlantic Ocean.

The economic benefits of coal conversion continue to be significant. Indeed, recent studies project that of the 21 oil units (5638 MW) recommended for conversion in the first State Energy Master Plan, 15 units (3594 MW) would recoup the costs of conversion, as a result of lower fuel costs, in less than three years if scrubbers are not required, and in less than 6 years if scrubbers are required.

In view of the slow progress being made in achieving the SEMP I coal conversion goals, the Energy Planning Board has decided that the coal conversion program should concentrate on those units, totalling 3594 megawatts, for which the range of specific concerns has narrowed and the economics appear exceptional. The second phase of conversions, totaling 2044 megawatts, should also go forward, provided that the substantial remaining economic, technical and environmental issues are resolved.

Implementation of the 3594 MW of coal conversions recommended for immediate action would result in oil savings of 365 million barrels and could result in a cumulative cost savings of $4.5 billion over the planning period. Implementation of the nearly 5700 MW included in both Phases I and II of the conversion program would result in oil savings of 466 million barrels and could result in a cumulative cost savings of $4.8 billion over the planning period.

*In a recent positive development, the Department of Environmental Conservation, on April 13, 1982, issued a decision approving, with conditions, the application by Orange and Rockland to convert its Lovett Steam Electric Generating Units 4 and 5 to coal fired generation.

New York is reducing its dependence on oil through the increased use of conservation and renewable resources, but oil reduction goals cannot be achieved without the increased use of coal—especially in the electric utility sector.

5. *Regional cooperation, coordination, and action must be promoted to enhance the region's energy supply prospects. Interconnection of New York's electric and natural gas supply systems with Canada should be pursued as a vehicle for reducing costs and oil dependence to the extent economic and feasible. Interconnection may also lessen the adverse impacts on the State's environment from construction and operation of energy supply facilities.*

The first State Energy Master Plan recommended regional cooperation, coordination and action as a means for improving the State's supply prospects, and, specifically recommended increased interconnection of the State's electric system with neighboring systems as a component of the State's long-range electric supply strategy.

The Energy Planning Board indicated a strong interest in the role that increased economic regional power sales might play in meeting the State's capacity requirements at lowest possible cost of service, in reducing New York's oil dependence, and in minimizing adverse environmental impacts within the State resulting from power generation. The Board advocated increased economic interconnection of New York's electric system with neighboring and distant systems and other necessary arrangements which would permit additional purchases of non oil-fired electric power, and urged Congress and relevant Federal agencies to reduce constraints that exist on economic power sales between regions.

New York State can point to solid progress in implementing this policy of regional cooperation. Imports of Canadian power have increased from less than 6 billion KWH in 1978 to 9 billion KWH in 1980. PASNY has signed contracts and agreements with Hydro Quebec which assure continuing imports in the future. PASNY has also sought necessary approval for additional transmission interconnections with Ontario Hydro at Niagara Falls. Hydro Quebec, a winter peaking utility system, should find development of Quebec's vast hydropower potential advantageous if stable markets for its off-peak summer power are assured. The downstate New York region, a summer peaking system dependent upon expensive oil-fired capacity on the margin, provides such a stable market. Ontario Hydro has recently announced its intention to make available for the foreseeable future a substantial increase in electric power exports. These significant additional supplies of electric power from Canada should be pursued, as long as that power can be purchased on an economic basis, below the cost of alternative generation in New York.

The opportunity for increased interconnection with the Canadian natural gas supply system is also significant. New York State provides a large and stable market for supplies of Canadian natural gas. The Boundary Gas-Tennessee Gas Pipeline Project could result in a 9.2 percent increase in the State's natural gas supplies.

Interconnections with power pools and utilities in adjacent states are not as promising, since they are generally as dependent on oil as New York's utilities. In fact, at present New York State utilities export significant quantities of primarily oil-fired generation to neighboring systems. Nor do more remote systems such as the Tennessee Valley Authority and the American Electric Power System present attractive interconnection options at present. Transmission capacity for such interconnection is not now available and these systems appear unwilling or unable to make commitments for long-term sales.

6. *New nuclear power plants beyond those now licensed or under construction should not be included in the State's electricity supply plan at this time. There is first a need to develop a fully adequate national nuclear waste disposal program, and a need to clarify substantial uncertainties associated with economic, safety and regulatory issues related to the nuclear option. The electricity supply plan contemplates the continued availability of the State's current inventory of licensed nuclear plants.*

In approving this policy in the first State Energy Master Plan, a majority of the Board indicated the belief that uncertainties surrounding this fuel, particularly the then existing Nuclear Regulatory Commission moratorium regarding the licensing of new plants, the probability of significant changes in safety requirements, and the failure of the Federal government to establish firm policies and programs for nuclear wastes, made it inappropriate to count on additional nuclear capacity becoming available during the planning period. The board included in the Electricity Supply Plan the continued utilization of the five currently licensed nuclear facilities and completion and licensing of the two facilities (Nine Mile Point II and Shoreham) now under construction in the State.

Significantly, the New York Power Pool does not include any new nuclear power plants in its April 1981 filing. This contrasts dramatically with its April 1979 filing, which called for the construction of six additional nuclear units. The NYPP does suggest, however, that New York not foreclose the nuclear option.

Substantial uncertainties in the areas of financing, economics, regulatory requirements, and the treatment and storage of nuclear wastes, all of which have reduced public acceptance of nuclear power, remain to be resolved. The Administration in Washington has expressed a determination to resolve these uncertainties so that nuclear power can play a greater part in the diversification of the nation's fuel mix. As progress is made in each of these areas, New York will continue to evaluate the role of nuclear power in its master plan for energy.

7. *All consuming sectors must be given increased choice among competing energy forms, including conventional fuels, conservation, and renewable resources. Increased choice will benefit consumers by increasing price competition among energy forms, and will benefit the State by stimulating innovation and efficiency improvements.*

8. *Government must act to remove any existing legislative and administrative barriers inhibiting the development of energy sources, competition among fuel forms and energy conservation, except where such action would clearly compromise public health, safety or environmental quality. Justification for any such institutional barriers must be reexamined in light of compelling State energy needs.*

The lack of viable choices among fuels for energy consumers can limit the shifts in fuel use which should occur in light of changes in relative fuel prices. For example, in several areas where natural gas service is not available, conventional residential space heating choices are limited to either oil-fired electricity or heating oil. Accordingly, the Board recommended in the first State Energy Master Plan that every reasonable effort be made to stimulate conditions which allow all economic energy choices, including conservation and renewable resource technologies, to compete in the same market.

Significant State action has been taken toward implementing this goal. The Alternate Energy Production Act of 1980*, as

*Throughout this plan, we have used the title "Alternate Energy Production Act of 1980" to refer to this legislation, although Chapter 553 of the Laws of 1980 which established this act, contained no title by which the legislation could be referred to.

amended in 1981, put in place a legal and regulatory framework which increases competition among energy forms. The Act enables utility subsidiaries and non-utility owners of small hydro, cogeneration, wood, wind, resource recovery or other alternate energy facilities to sell electricity, gas, or useful heat without being subject to regulation as a utility, and to buy power from and sell power to utilities at reasonable rates.

Additionally, State assisted conservation audits, technical assistance programs and renewable resource programs have begun to respond to the public's need for accurate information concerning energy savings potential and techniques. The lack of such information was one of the significant barriers to conservation and renewables identified in the first State Energy Master Plan.

Finally, remaining restrictions on attachment of large industrial and commercial users of natural gas in large measure have been removed (except in the Con Edison and Long Island Lighting Company service territories) as a result of the improved natural gas supply situation.

Significant changes in fuel use are occurring and can be expected to continue as government eliminates unnecessary regulations which impede competition among fuel forms. The reexamination of existing laws, rules and regulations, and the elimination of unnecessary impediments must be a continuing process.

9. *The State's electric and gas utilities, as well as PASNY, should encourage and stimulate conservation and efficient use of energy by their customers. Electric and gas utilities should become more active purveyors of conservation and renewable resource technologies.*

The State's utilities have in the past been recognized as, and remain, appropriate and effective vehicles for the dissemination of information and assistance which will enable ratepayers to conserve energy, particularly electricity and gas, and to increase use of renewable resources. The electric and gas utilities should expand their activities in this area and become more active purveyors of conservation and renewable resource devices. Broader utility involvement in non-traditional energy services can benefit the State's ratepayers and the State's economy as a whole.

The on-going relationship maintained by utilities with the large and diverse audience of energy consumers allows them to reach all the State's residents and commercial and industrial concerns to promote energy conservation and the use of renewable resources. Moreover, because of this existing relationship and the utilities' access to technical expertise and financial resources, they can also play an important role in financing, supplying and/or in some cases actually installing conservation and renewable resource devices. To the extent that cost-effective conservation devices and renewable resource technologies are used, the utilities' need to tap more marginal and expensive fuel supplies will be reduced, and the cost of energy for all ratepayers will rise more slowly.

New York State is a national leader in establishing a strong role for utilities in encouraging and stimulating energy conservation through enactment of the Home Insulation and Energy Conservation Act (HIECA) of 1977. This program is the principal delivery mechanism for energy audits and low-interest financing for conservation measures in one-to-four family homes in the State.

Legislative amendments to the HIECA program have been enacted which add solar and wind energy systems and heat pumps to the list of conservation measures to be audited by the utilities and eligible for utility financing; raise the financing limits for energy conservation and renewable resource measures; eliminate the $10 audit fee for one-to-four family dwellings; encourage the involvement of community groups in the HIECA program; expand the number of customers eligible for auditing under the HIECA program by including multi-family dwellings; and authorize funds for the Public Service Commission to promote the program.

In addition to the HIECA program, other State actions have been taken which set the stage for expanded utility involvement in renewable resource activities. The Alternate Energy Act of 1980, as amended in 1981, established a framework for the formation of partially unregulated subsidiaries to develop, own and operate cogeneration, small hydro, wind and resource recovery facilities. The involvement of the regulated electric and gas companies in renewable resources should increase with this authorization. One utility, Niagara Mohawk, has formed a subisidiary corporation to develop cogeneration facilities.

Certain utilities have established conservation subsidiaries under general provisions of the Public Service Law. Brooklyn Union Gas has incorporated a conservation subsidiary which markets efficient heating systems and cogeneration equipment. Greater utility involvement in similar ventures will help to realize more fully the potential energy savings from conservation and renewable resources.

There are still additional avenues through which the State's electric and gas utilities can become more active providers of conservation and renewable resource technologies. In other parts of the nation, utilities are directly investing in such devices by providing interest free loans to ratepayers who purchase such devices, or are performing on-the-spot "weatherization" services for no charge or for only a modest materials charge. In the past, the extent to which New York's utilities should pursue such programs was questioned in light of their energy demand patterns, supply capacities and financial situation. The Board has reviewed this matter and has concluded that the electric and gas utilities in the State should become more active purveyors of conservation and renewable resource technologies. Expanded utility programs in this area, properly designed on an individual service area basis, should result in cost and fuel savings to the regulated utilities. The State's economy as a whole would also benefit by further reducing our reliance on imported oil and diversifying the State's fuel mix.*

10. *No person should be without adequate heat or should be forced to forego conservation improvements by reason of inability to pay. A commitment to protect public health and safety requires no less.*

The first State Energy Master Plan concluded that all New Yorkers, and in particular low-income and elderly New Yorkers, are affected more severely than similar groups nationally as a result of increasing fuel prices. Differences in climate, widespread dependence on oil for residential heating and electricity generation, and the condition of the existing housing stock cause winter energy costs within New York to exceed the national average.

Rising energy costs continue to have a substantial adverse impact upon elderly and low income households. The more than doubling of home heating oil prices since 1978 has compounded the possible adverse impacts of a severe winter upon elderly and low income households in New York. Average home heating oil prices in New York have increased from 52¢/gal in 1978 to 98¢/gal in mid-1980 to $1.25/gal in mid-1981.

*The Public Service Commission has recently convened a proceeding (#28223) to inquire into the benefits to ratepayers and utilities from the implementation of conservation programs that will reduce the use of electricity.

Most household energy is used for necessities: space and water heating, refrigeration, cooking and lighting. The cost of such necessities will continue to rise as energy prices increase. Since energy is a necessity of life, rising costs have forced many low income households into the intolerable choice of staying warm or buying food. Free market solutions clearly break down when many elderly and poor people lack the financial resources to pay their monthly energy bills, much less make cost-effective conservation investments.

The Federal government and the State have initiated programs and actions to mitigate the impact of rising energy costs upon the elderly and low income household. Congress has authorized and appropriated funding for low income energy assistance through the Home Energy Assistance Program (HEAP) and the U.S. Department of Energy has improved the Weatherization Program to increase its effectiveness. Nonetheless, the funds available from these programs have not kept pace with rising energy bills.

In view of the magnitude of the potential problem and the fiscal resources required, the responsibility for energy assistance to low income and elderly households rests squarely with the Federal government. New York must continue to seek an equitable and adequate level of Federal funding to assist those who are affected most severely by still rising energy prices. New York, acting alone, does not have the resources to meet this need.

11. *The energy research, development and demonstration programs being pursued in New York must be expanded and must emphasize those technologies that will, over the mid- to long-term, mitigate energy cost increases and energy supply interruption. Formal and informal coordination of the numerous energy RD&D programs throughout the State is essential to assure that these activities support and complement State energy policy.*

The first State Energy Master Plan stressed the need for a close relationship between energy planning and energy research, development and demonstration (RD&D). Established energy policy and the operational requirements of the system of energy production, distribution and use must guide RD&D priorities, just as new knowledge and technologies emerging from RD&D efforts and market forces must help shape policy development.

RD&D activities in New York must focus on technologies that will help mitigate the increasing cost of energy to New Yorkers, and help reduce our reliance on vulnerable supplies and distribution systems. In making the difficult choices among RD&D expenditure opportunities, it is important that all New York research organizations be guided by the rapid developments in the energy markets so as not to place undue emphasis on technologies that are being impelled by market forces toward near-term commercial availability. Nor should significant research funds be applied to programs aimed toward hastening market penetration of newly developed commercial technologies. Rather, such commercialization activities should be left to the developers of the technology and, where justified by special conditions, to governmental groups whose mission includes promotional activities. Instead, New York's research organizations should balance their RD&D portfolios more heavily in favor of mid- to long-term technologies particularly sensitive to New York's environmental requirements, intra-state energy supply and distribution systems, weather conditions and long-term energy/economy growth considerations. In doing so, New York's RD&D decision makers should recognize and adapt technological advances being developed elsewhere by university, industrial and governmental sponsors and, where consistent with New York's R&D interests, seek to cause available research dollars and programs to flow to New York's research institutions.

Within New York State, a vigorous and diverse energy research and development program is being supported and carried out by a variety of distinguished institutions and consortiums. These include the Empire State Elecric Energy Research Corporation (ESEERCO), the New York Gas Group (NYGAS), the State University Research Foundation, leading private institutions of higher education, the individual gas and electric companies and the New York State Energy Research and Development Authority (ERDA) and the Power Authority of the State of New York (PASNY).

These organizations and their counterparts throughout the country have just completed a most revolutionary decade of energy market development and technological advance. Technologies and products, such as heat pumps, thought to be far from commercially reliable and economic, came rapidly into widespread acceptance and use; and, the roles of government, industry and the regulated energy companies went through tortured evolution. Faith was renewed in the ability of unregulated energy markets to efficiently allocate resources and spur innovation, exploration and discovery. This change in attitude may prove a watershed of technological innovation in energy R&D.

As we permit market forces to guide our energy resource allocation decisions to a greater extent, industry and government will continue the struggle to define their respective roles. In the area of RD&D, government must, as it has for several decades, assume the largest burden for exploring and advancing basic research and technological development. Only government, absent the pressure of short-term competitive forces, has the long-term perspective required to see the technological horizon and beyond and the resources to move the nation's R&D efforts through the maze of setback and success that is the road to technological advance.

The State's research organizations are already positioned to adjust to the new Federal direction and to work with one another on projects that take the longer view. New Federal directions and programmatic shifts by research organizations also will cause other governmental programs to adjust well. In some instances, this may mean a de-emphasis or elimination of marginal State programs heavily supported by Federal dollars. In others, it may mean the State itself should increase its efforts on short-term horizon programs, particularly programs of technology commercialization.

In short, the decade ahead should see more reliance on energy market mechanisms and an emphasis on mid- to long-term R&D by government and industry.

12. *In view of the extensive reliance on oil in the transportation sector, the State should continue to take action to maximize the efficient use of energy in this sector. Moreover, the relatively energy efficient mass transit and railroad systems throughout the State must be maintained to prevent shifts of mass transit and railroad riders to less efficient automobiles.*

The Energy Planning Board, in approving the first State Energy Master Plan, noted that improving energy efficiency in the State's transportation sector is vital to reducing the State's dependence on petroleum products. Nearly one-half of all petroleum products consumed in the State are consumed in this sector.

However, unlike other sectors which rely heavily on petroleum and for which we have proposed a number of State actions to reduce its use significantly, the State, acting alone, is limited in its ability to take energy-conserving actions in the transportation sector. There are several reasons for this: the State's transportation system is already relatively efficient compared with the transportation systems in other states; pas-

senger auto efficiencies are within exclusive Federal purview; many potential actions the State might take which would impact on highway, rail and air freight are constrained by Federal preemption of interstate commerce regulation; and the investments required to improve or expand transit systems are massive.

Significant progress in reducing petroleum consumption has occurred. As a result of the substantial increase in the price of gasoline, and to a lesser extent as a result of government programs, gasoline consumption has declined 9.7 percent in the State. The average efficiency of new cars sold in the State has increased from 20 MPG in 1978 to an estimated 25 MPG in 1980, a figure surpassing the Federal 1980 corporate average fuel economy standard for new vehicles. In addition, fuel-efficiency standards for State-owned vehicles have been established.

The most pressing transportation concern for the State may well be maintaining the high efficiency of the State's mass transit, railroad and highway systems. Federal budget reductions could, unfortunately, lead to a further decline in these systems and additional fare increases, since the State will simply be unable to replace all of the withdrawn funds. The State must resist such cutbacks, which could ultimately result in a shift of mass transit and railroad riders to automobiles.

Because of the substantial amount of petroleum consumed in the transportation sector, the State must continue to seek ways to improve energy efficiency in this sector. The State Energy Office, in consultation with the Department of Transportation, has identified additional actions the State can take (in addition to providing further financial assistance) to further this goal. These actions are described in Section IV-G of this volume.

13. *Comprehensive energy emergency preparedness activities, directed at mitigating the adverse economic and social impacts of an interruption in petroleum supplies, must be continued and increased in order to protect public health and safety.*

Since January, 1981 the Administration in Washington has taken a number of actions to terminate or drastically curtail virtually all the Federal programs necessary for an effective national response to future energy emergencies. These actions have included: removal of petroleum allocation controls; termination of the State set-aside program; cancellation of funding for the development of State Emergency Energy Conservation Act plans; dismantling the gasoline rationing program; administration opposition to the establishment of standby petroleum allocations authority; and withdrawal of Federal Emergency Energy Conservation Act measures.

As a result of these actions, there is virtually no national energy emergency plan in place or on paper. These Federal actions are widely recognized to be based on the premise that the international and domestic energy markets are free markets which will respond without constraint to the forces of supply and demand; that these markets will meet the needs of the public during energy emergencies; and that the current situation of adequate petroleum supply will continue indefinitely.

This is a dangerously mistaken view which fails to recognize the economic, social, political and practical problems which serious supply shortfalls will create, and which does not account for the real hardship that will result for those least able to compete for resources during an emergency.

A variety of Federal actions are necessary for an effective response to a serious supply disruption: continued collection of data on petroleum supplies, distribution and prices; continued support for the Emergency Energy Conservation Act program, including adequate Federal funding for state planning efforts; timely action towards filling the Strategic Petroleum Reserve (SPR), and establishing a system of Regional Petroleum Reserves which has long been included in SPR planning; authorization of a streamlined Federal standby allocation program to replace the Emergency Petroleum Allocation Act of 1973; and establishment of a Strategic Natural Gas Reserve in the Northeast.

UPDATE

NEW YORK STATE

Energy Master Plan

& Long-range Electric & Gas Report

VOLUME 1

FINAL REPORT
MARCH, 1982

N.Y. STATE ENERGY OFFICE Hugh L. Carey, Governor. James L. Larocca, Commissioner

Exhibit IV-D-33 were used in developing the Electricity Supply Plan. It is important to note the distinction between the capacity projections which can be depended upon for power at specific times and economy energy projections which occur only at certain times and are not used as a capacity credit.

8) Pumped Storage Hydro Electric

Pumped storage hydro electric facilities are used for storing inexpensive energy on off-peak hours and using the energy during peak hours. In the beginning of 1981 coal cost one-third as much as oil. Pumped storage can store the excess energy from hydro, coal, or nuclear capacity at night and on weekends when the demand is low and use this less expensive energy to displace oil during the peak demand hours on weekdays.

Pumped storage facilities also have other beneficial characteristics such as the ability to rapidly switch between pumping and generating modes which improves reliability and allows pumped storage to work well with variable energy sources such as wind generation.

Currently there are two pumped storage facilities operating in New York—one near Niagara Falls and the other near Gilboa. PASNY has applied for a license to construct a third 1000 MW pumped storage facility near Prattsville in Schoharie County.

9) Oil

Oil-fired capacity currently accounts for over 60 percent of New York State's electricity generation capacity. Most of the oil is imported from other countries. High prices and unreliable sources make oil an undesirable source of electric energy. New oil-fired capacity was not included in the Electricity Supply Plan.

10) Natural Gas

As of July 15, 1981, the Power Plant and Industrial Fuel Use Act of 1978 (PIFUA) prohibits use of natural gas under new utility boilers and under existing power plants after 1990. Currently, a large amount of natural gas is being burned in New York under utility boilers with short-term exemptions to this prohibition pursuant to the Federal Energy Regulatory Commission's Order #30 program. Given current Federal policy, natural gas was not considered a viable long-term fuel for baseload power plants in developing the Electricity Supply Plan.

11) Nuclear Power

A majority of the Energy Planning Board in approving SEMP I indicated the belief that uncertainties surrounding this fuel, particularly the then existing Nuclear Regulatory Commission moratorium regarding the licensing of new plants, the probability of significant changes in safety requirements, and the failure of the Federal government to establish firm policies and programs for nuclear wastes, made it inappropriate to count on additional nuclear capacity becoming available during the planning period. The Board endorsed continued utilization of the five currently licensed nuclear facilities in the State, and completion and licensing of two facilities (Nine Mile Point 2 and Shoreham).

Significantly, the New York Power Pool does not include any new nuclear power plants in its April 1981 filing. This contrasts dramatically with its April 1979 filing which called for the construction of six additional nuclear units. The NYPP does suggest, however, that New York not foreclose the nuclear option.

Substantial uncertainties in the areas of financing, economic regulatory requirements, and the treatment and storage of nuclear wastes, all of which have reduced public acceptance of nuclear power, remain to be resolved. The new Administration in Washington has expressed a determination to resolve these uncertainties so that nuclear power can play a greater part in diversification of the nation's fuel mix. As progress is made in each of these areas, SEO will continue to evaluate the role of nuclear power in the Electricity Supply Plan.

12) Coal

As discussed in the Coal Supply Plan, coal is one of the most abundant sources of energy in the United States. The economic advantage of coal over oil makes it a strong candidate for replacement of oil in the electric utility sector. In New York, electric capacity using coal can be added by building new plants or converting existing oil plants to burn coal.

With new air pollution abatement technologies, coal can be as clean or cleaner than existing oil plants. Solution to problems with coal transport and waste disposal appear to be available. Coal was the primary fossil fuel candidate used in the development of the Electricity Supply Plan.

13) Synthetic Fuels and Coal Mixtures

Technologies are now under development which can convert an alternative fuel form, usually coal, into a gas or slurry that could be burned in a power plant. In the near to mid-term, coal mixtures offer the best possibility for displacing oil in utility plants not capable of converting to the direct combustion of coal. These mixtures are formulated by combining highly pulverized coal with either oil or water. Coal/Oil Mixtures (COM) are commercially developed. However, the economics of this form are only marginally better than direct oil-firing, since between 50 percent to 70 percent of product cost is based upon prevailing oil prices. Coal/Water Mixtures (CWM) are believed to present more promising economic benefits since oil use would be totally eliminated. However, CWM commercialization is considerably behind COM efforts.

In the mid to far-term, the on-site gasification of coal is expected to present opportunities for electric utilities to further displace oil use. In this technology, gas is produced by combusting coal with steam and various levels of oxygen. Certain forms of coal gasification have been commercialized, although further work appears necessary to allow this technology to use eastern coals. Gasification offers the potential of producing a clean fuel having a favorable air emission profile. However, other waste streams will be developed which must be addressed. Also, gasification could require considerable capital investment which may strongly influence the economics of this technology.

SEMP II continues to support the development and use of such technologies where they represent the least-cost alternative to other fuel forms. In developing the Electricity Supply Plan, coal based synthetic fuel technologies were considered too economically speculative for inclusion as generation capacity. The potential of coal based synthetic fuels is discussed more fully in the Coal Supply Section.

D. Modeling Assumptions

In developing the Electricity Supply Plan many assumptions were input into the generation and transmission planning models. Figure IV-D-41 summarizes the basic as-

THE ELECTRIC INDUSTRY IN NEW YORK

Sheldon Silver
Speaker of the Assembly

Assemblyman Paul Tonko
Chair, Assembly Standing Committee on Energy

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Dear Colleague:

New Yorks exorbitant electric rates for residents and businesses are hindering our efforts toward a stable economy.

To address this problem, we brought together electric industry leaders, industrial and commercial customers, public interest representatives, and members of the academic community for an Electric Energy Roundtable.

The discussions were very productive on October 19th, we announced the Assembly majority is developing a proposal to introduce competition and reduce electricity costs in New York. As Chair of the Energy Committee, Paul Tonko is holding public hearings to help put our proposal into action. We ask that each of you seek your constituents input so that you may fully participate in deliberations on this issue.

Enclosed is a briefing paper with basic information on the current situation in the electric industry and the framework of the discussions we expect to have in 1996. We anticipate more briefing documents will be forthcoming as our deliberations continue.

We look forward to working with each of you to address this important issue during the 1996 legislative session.

Sincerely,

SHELDON SILVER
Speaker of the Assembly

Paul Tonko
Chair, Assembly Standing Committee on Energy

EXECUTIVE SUMMARY

Electricity prices in New York are escalating in comparison to prices nationwide in fact, the average electric rate in New York is 50 percent higher than the national average.

This poses a serious problem for our consumers and businesses. High electric rates have a negative impact on job retention and growth especially in the manufacturing sector. Often, the cost of electricity plays an important role in where these businesses will locate and whether they will expand.

A variety of factors, including higher capital costs, purchased power costs, and taxes, are responsible for the difference between New Yorks electricity rates and those in other states.

The electric industry is heavily regulated at both the state and federal levels. In addition to investor-owned utilities, the industry in New York includes independent power producers, the Power Authority of the State of New York, municipal electric systems, rural electric cooperatives, and energy service companies.

• Competition is Key

Introducing competition into the electric industry is one of the most promising options available for reducing costs. Various models of wholesale and retail competition are under consideration. In fact, the State has already implemented a limited form of wholesale competition; however, existing utility investments and independent power contracts are not subject to the rigors of a competitive generation market. Retail competition promises even further cost reductions by allowing customers to choose among a variety of electricity suppliers, producing not only lower prices, but also a greater variety in the types of service available.

- **Some Risks Are Involved**

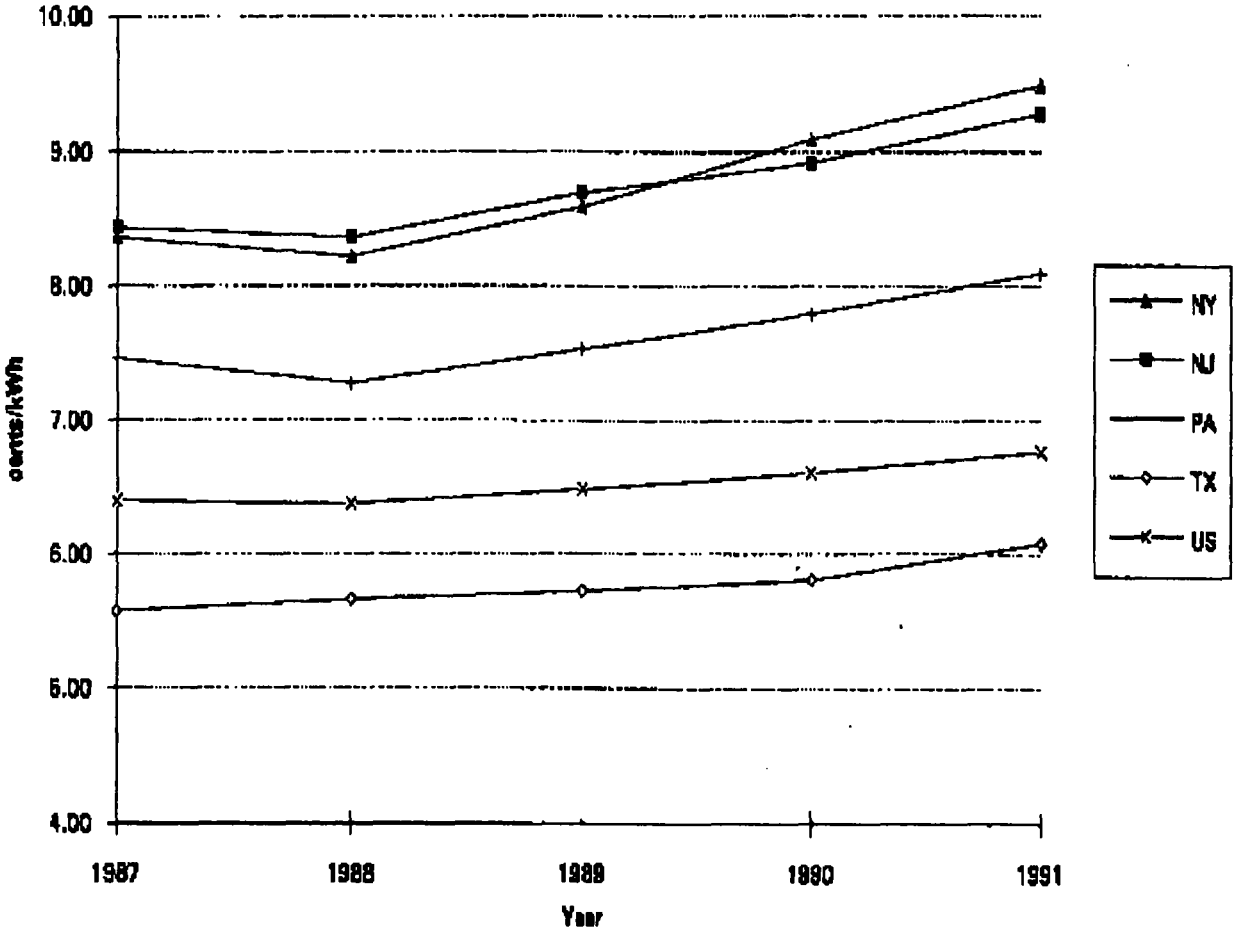
Any proposal for competition must be analyzed with the risks in mind. Competition could result in cost-shifting among customer classes, to the detriment of residential customers and small businesses. Utilities and independent power producers investing money in existing plants could find their investments stranded. Disruption of the industry could have an inequitable effect on some workers. Competition, if not carefully structured, could also have adverse impacts on the safety and reliability of the electric system. Many of the social benefits provided through utilities, such as universal access and energy efficiency services, could be jeopardized.

I. ELECTRICITY PRICES

New Yorkers electricity costs are among the highest in the nation yet they vary substantialy across the state. This section demonstrates how trends in electricity prices and rates continue to erode New Yorks competitive position,even though New Yorks electric prices are more in line with the Northeast than they are with the country as a whole.

Figure 1, based on the most recent comparative data available from the U.S. Department of Energy, shows that from 1987 through 1991,the average price for electricity in New York, New Jersey, and Pennsylvania increased faster than the national average. In 1990, New Yorks average rate surpassed that of New Jersey. In 1992, the average electric rate charged by New Yorks utilities was 50 percent higher than the average rate nationwide, nine percent higher than the 1987 differential of 31 percent.

Figure 1
Average Electric Prices



Source: U.S. Department of Energy/Energy Information Administration.

The trend of increasing electricity prices in New York appears to be growing. Between 1988 and 1992, real electric prices, that is prices adjusted for inflation, decreased by 7 percent nationwide while increasing by 2 percent in New York. By 1992, the average nominal price per kilowatt-hour in New York was 10.92 cents compared to 7.06 cents nationwide.

Between 1992 and 1994, average rates increased for all the states utilities, although the extent of the rate increases varied widely. The average bill for residential customers in the state grew from $764 to $854 with no significant change in usage levels.

Table 1 provides additional evidence of the high costs of electricity in New York State. New York City has higher electricity costs than most other major cities across the country. Electricity costs are a function of both the electric rate and usage. For example, while the rate per kilowatt hour in Philadelphia is higher than New York City for home use, most of the annual cost differential results from typically higher usage of electricity in Philadelphia.

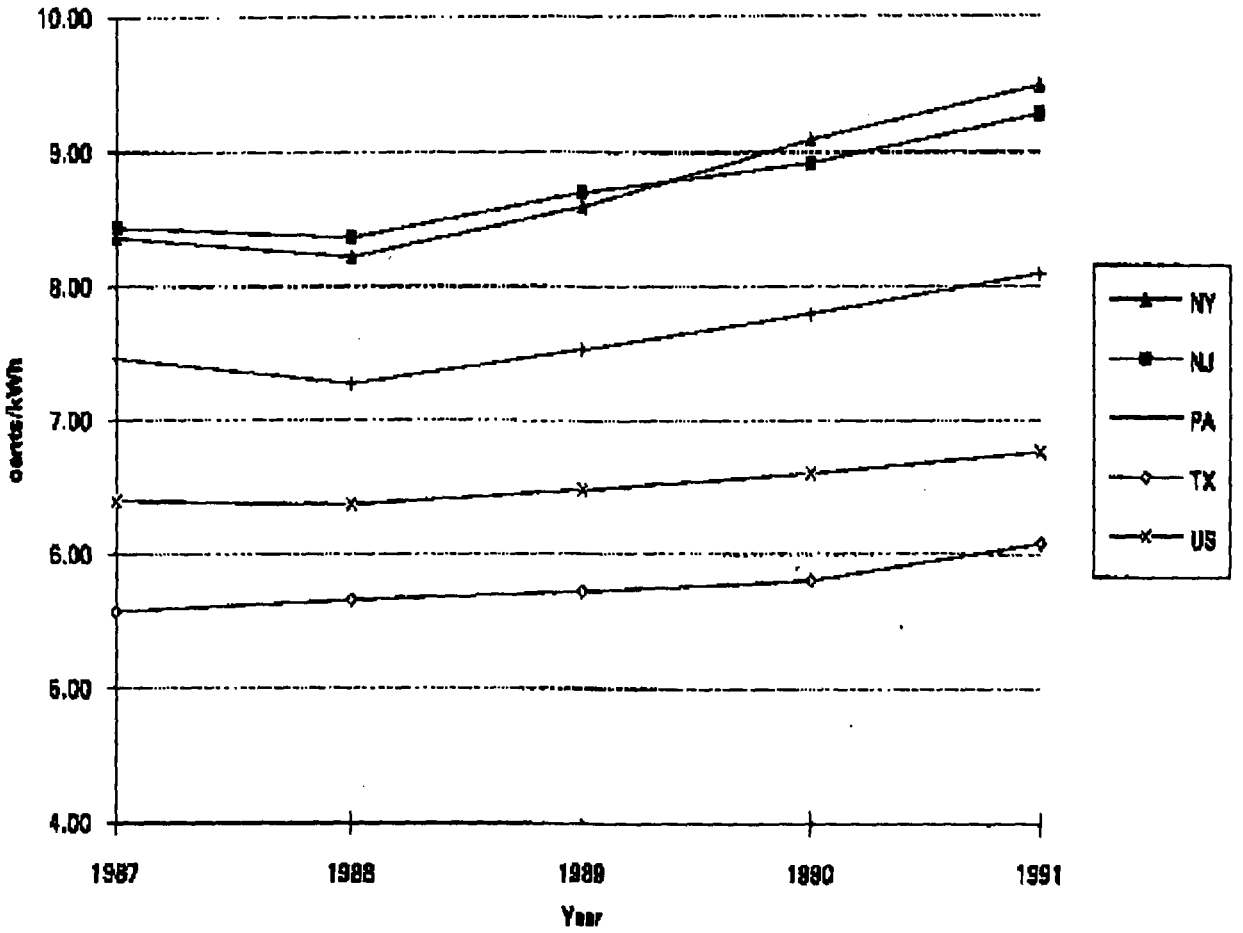
Table 1
Typical Annual Home and Business Electricity Costs forSome Major US Cities as of November 1995

City	Home Electricity Costs		Business Electricity Costs	
	cents/kwh	Annual Cost	cents/kwh	Annual Cost per 12,500 mwh Load
Atlanta, GA	6.27	$589	3.96	$494,878
Chicago, IL	10.46	$752	6.56	$820,605
Dallas, TX	6.36	$755	4.49	$560,923
Los Angeles, CA	12.75	$725	7.33	$916,756
Miami, FL	6.54	$1,097	4.67	$583,430
Philadelphia, PA	14.61	$1,477	6.6	$825,533
New York City	13.78	$1,119	11.09	$1,386,624
Raleigh, NC	8.56	$865	6.02	$752,731

Source: MYKYTYN Consulting Group, Inc., Strategic Analyzer of Utility Rates in the United States.

As illustrated below in Figure 2, New York State Electric Prices by Utility (1980 - 1993),the utilities in New York State with the highest average nominal electric prices operate downstate. During the period from 1980 to 1993, electricity prices for the Long Island Lighting Company (LILCO), Consolidated Edison of New York (ConEdison), and Orange & Rockland (O&R) were generally above the average electric prices in New York. For the same period, New York State Electric and Gas (NYSEG), Rochester Gas & Electric (RG&E), Niagara Mohawk Power Corporation (NIMO) and Central Hudson (Cen. Hud.) were generally below the New York average electric price.

Figure 2
NYS Electric Prices by Utility (1980-1993)
(cents/Kwh)



Source: New York State Energy Office.

Although the average nominal price charged by each electric utility company has increased over the 13 year period, their rates of increase have been different. During the period between 1980 and 1993, the average state electric price rose 67 percent. LILCO, NYSEG, NIMO, and RG&E prices increased by more than 67 percent. For the period between 1988 and 1993, the states average electric price rose 26 percent and LILCO and NIMO had larger increases.

II. THE ELECTRIC POWER INDUSTRY IN NEW YORK

The prices of electricity, as well as the safety and reliability of the electric system, are subject to regulation at the state and federal levels. Although the industry is dominated by the states seven investor-owned utilities, there are a number of other significant participants in the industry including independent power producers (IPPs) and the Power Authority of the State of New York (PASNY). This section provides general background on the industry.

A. Investor-owned Utilities

New York has seven investor-owned utilities providing electricity to consumers. These utilities, ranked

by size, are Consolidated Edison Company of New York, Inc., Niagara Mohawk Power Corporation, Long Island Lighting Company, New York State Electric & Gas Corporation, Rochester Gas and Electric Corporation, Central Hudson Gas and Electric Corporation, and Orange and Rockland Utilities, Inc.

These utilities serve over 7.2 million electric customers, with total electric revenues exceeding $14.2 billion annually. Each year the utilities sell, or transmit for sale by the Power Authority, nearly 150 billion kilowatt-hours throughout the state. (A kilowatt-hour is the amount of energy required to run a 100-watt light bulb for ten hours.) At peak hours, total statewide demand exceeds 27,000 megawatts. In order to meet this demand, and also to be prepared for unexpected contingencies, utilities must maintain over 32,000 megawatts of generating capacity. (A very large power plant such as a nuclear plant would represent approximately 1,000 megawatts.) Currently, the states utilities own and operate over 160 generating units. Table 2 provides some basic information for each of these utilities.

Table 2

Sales of Electricty by Selected Customer Classes and TotalElectric Revenues in 1994 for the Seven Major Investor-Owned Utilities in New York State

	Total kwh sold (includes sales for resale)	Residential kwh	Commercial/ industrial kwh	Peak demand in Mw	Total electric revenues
Central Hudson	4,564,848,660	1,590,766,356	2,635,168,025	892	$411,081,853
Con ED	38,558,937,417	10,660,148,758	25,511,973,835	8,833	$5,152,350,866
Lilco	16,390,827,474	7,159,322,151	8,394,136,264	3,882	$2,482,045,124
NYSEG	19,975,287,310	5,398,968,262	6,311,763,316	2,864	$1,600,074,707
NIMO	41,223,871,940	10,316,346,597	23,253,654,810	6,268	$3,505,231,174
O&R	4,802,605,935	1,117,685,031	1,949,178,784	1,022	$409,637,829
RG&E	7,542,018,259	2,110,263,519	3,889,543,887	1,374	$672,735,467
Total	133,058,396,995	38,353,500,674	71,945,418,912	Note 1	$14,233,157,020

[1]Individual utility peaks cannot be aggregated because they occur on different days. The peak demand for the entire New York Power Pool in 1994 was 27,062 Mw.

Source: 1994 Annual Report filed with the New York PSC; New York Power Pool; Load and Capacity Data, 1995.

In terms of energy or kwh sold, Niagara Mohawk is the state's largest utility with Con Edison the largest in terms of revenues. Con Edison also has the largest peak demand, that is , the greatest amount of electric power demanded simultaneously by all customers of a utility.

The reliability and efficiency of this system's operation is assisted by the efforts of the New York Power Pool. The Power Pool coordinates power flows across the system of generating plants and transmission lines ensuring adequate power to meet all customer demands.

For most of this century, regulation of electric utilities has followed a predictable set of rules under rate of return regulation. A utility:

- is obligated to provide power on demand to any customer in its service territory;
- enjoys a monopoly over retail service within its territory; and,
- is entitled to recover the costs of providing electric service, to the extent that those costs were prudently incurred.

A utilitys cost of providing electric service includes the cost of fuel, labor, capital investments in equipment, a return to investors, purchased power, and taxes. After calculating the cost of providing electric service, including the allowable return to investors, regulators determine the rate structure, i.e., the manner in which the various classes of customers will pay for the cost of service. Typically, industrial rates are lower than commercial or residential rates because of economic advantages of serving a large customer.

Most of these regulatory activities are performed at the state level by the Public Service Commission. The Federal Government has jurisdiction over wholesale transactions among utilities, while states have jurisdiction over retail transactions between utilities and their customers.

Over the past 15 years, major changes affecting the regulatory environment have swept through the electric industry:

- Utilities no longer have exclusive control over the generation of power. State and federal laws require utilities to purchase power from certain types of independent power producers. State law requires utilities to consider all reasonably available sources of power before investing in their own facilities, and the Public Service Commission requires utilities to conduct competitive bidding for new generating capacity.

- Since 1992, under the National Energy Policy Act of 1992 (EPACT), utilities must transmit or wheel the power of other generators. Utilities must now make their transmission lines available to outside generators for purposes of wholesale transactions.

- Not only have utilities lost their monopoly over power generation, but the monopoly over retail sales is also threatened. Independent power producers may sell power directly to industrial customers adjacent to their facilities. Also, EPACT appears to grant states the authority to order utilities to wheel electricity for retail purposes. In 1994, sources other than New Yorks utilities were responsible for 5% of retail sales.

B. Ratemaking Process Changing

In New York, the traditional ratemaking process has also undergone considerable change. Annual rate cases are frequently replaced by multi-year settlements. The traditional cost of service formula has been modified by the introduction of performance incentives and revenue decoupling mechanisms. Performance incentives not only allow utilities to earn extra profits for improved customer service, but also penalize them if they fail to meet quality of service goals. Revenue decoupling mechanisms have separated utility profits from the volume of electricity sold; this promotes energy efficiency by reducing the utilitys incentive to sell more power.

Utilities may also offer negotiated rates to businesses in order to retain them as customers. Businesses with competitive options for electricity supply, such as self-generation, or businesses at risk of closing

their operations in New York, may be eligible to receive lower rates.

C. Independent Power Producers

Independent power producers (IPPs) are private companies selling power to utilities; the utilities then resell the power to consumers. IPPs supply approximately 20 percent of the states electricity, and many also sell steam to neighboring industrial and institutional facilities.

Federal and state laws enacted in the late 1970s and early 1980s require utilities to purchase power from IPPs. The purpose of these laws is to foster competition, reduce reliance on imported oil, and boost employment at industrial facilities that are the thermal hosts for independent power plants.

IPP rates are not subject to cost of service regulation by the state because, with certain exceptions, IPPs do not sell directly to retail customers. IPPs contract with utilities for the sale of the power they produce. The federal government has jurisdiction over these wholesale contracts. The federal government has, however, delegated to the states the authority to establish the price forecasts, forming the basis for many IPP contracts.

D. The Power Authority of the State of New York

The Power Authority of the State of New York (PASNY) supplies approximately 25 percent of the states electricity. Annual revenues from PASNYs generating facilities exceed $1.3 billion. As well as selling to utilities for resale, PASNY sells directly to municipal electric systems, rural cooperatives, certain municipal entities, and certain industrial customers.

More than two-thirds of the power generated by PASNY is hydropower from the St. Lawrence-Franklin D. Roosevelt Power Project and from the Niagara Power Project. PASNY also owns and operates two nuclear power plants, one large gas/oil fired generating station, a 1000 megawatt pumped storage facility, and five small hydro projects.

PASNY owns a large network of transmission lines which they share with investor-owned utilities. PASNY is also a member of the Power Pool. With the exception of a few large industrial customers, PASNY does not deliver electricity directly to ultimate users but relies on the seven investor owned utilities to either buy and resell the power or to transmit and distribute the power to PASNY customers.

Unlike a utility, which combines all of its costs in a blended rate, PASNY charges a separate rate for each of its power plants. PASNY rates are not regulated by the state Public Service Commission. Instead, sales of electricity generated by PASNY are controlled by the federal Niagara Redevelopment Act and the State Public Authorities Law. PASNY has contracts with individual businesses or municipalities for the sale of power.

E. Municipal Electric Systems and Rural Electric Cooperatives

The 51 municipal and cooperative electric systems, serving fewer than 2% of the people in New York, own and operate their own distribution networks within their service areas. Under federal law, most of the 51 are entitled to preference in purchasing inexpensive Niagara hydropower from PASNY. Access to PASNY hydropower enables these systems to provide electricity at some of the lowest rates in the nation.

Rates of municipal electric systems and rural cooperatives are established pursuant to contracts with

PASNY, consistent with the federal Niagara Redevelopment Act. Municipal systems receiving power from sources other than the Power Authority are regulated by the state Public Service Commission.

F. Energy Efficiency Providers

Although discussion of electricity costs tends to focus on rates, rates are not the only factor in establishing electricity costs. The bills customers pay reflect usage levels as well as rates.

Between 1973 and 1992, New Yorks electricity consumers reduced their usage by 28 percent. Utilities, the Power Authority, private energy service companies, and various state agencies encouraged consumers to reduce their usage by providing energy audits, financing assistance, and direct subsidies for the purchase of energy-efficient equipment. Efficiency programs run by utilities are regulated by the Public Service Commission. The costs of these programs are included in utility rates, but are offset by lower customer bills due to reduced usage. Programs run by the Power Authority are funded by the participants energy savings.

III. FACTORS AFFECTING ELECTRICITY COSTS

There is considerable controversy over who or what is responsible for New Yorks relatively high electric prices. Contracts between utilities and independent power producers, nuclear plants, and taxes are among the factors commonly cited. There is a difference of almost 4 cents per kilowatt-hour in average electric prices between New Yorks utilities and the national average due to:

- Higher operating costs, including higher operation and maintenance costs, wages and benefits,and fuel and purchased power costs;
- Higher utility capital costs; and
- Higher federal, state, and local taxes

The influence of these factors in explaining the price differences between New Yorks utilities and the national average varies by company as shown by Table 3.

Table 3
Electric Utility Cost Structure for 1994 in Cents/kwh

	LILCO	Con Edison	Orange & Rockland	NYSEG	RG&E	NIMO	Central Hudson	1992 US Average
Fuel and Purchased Energy	3.18	3.11	2.75	2.37	1.10	3.23	2.17	2.38
Wage & Benefits	1.28	1.98	1.32	0.83	1.41	1.67	1.07	0.81
Operations	1.56	1.58	1.15	1.07	1.66	0.78	1.28	0.78
Taxes	3.07	3.46	1.63	1.43	2.00	1.21	1.62	0.96

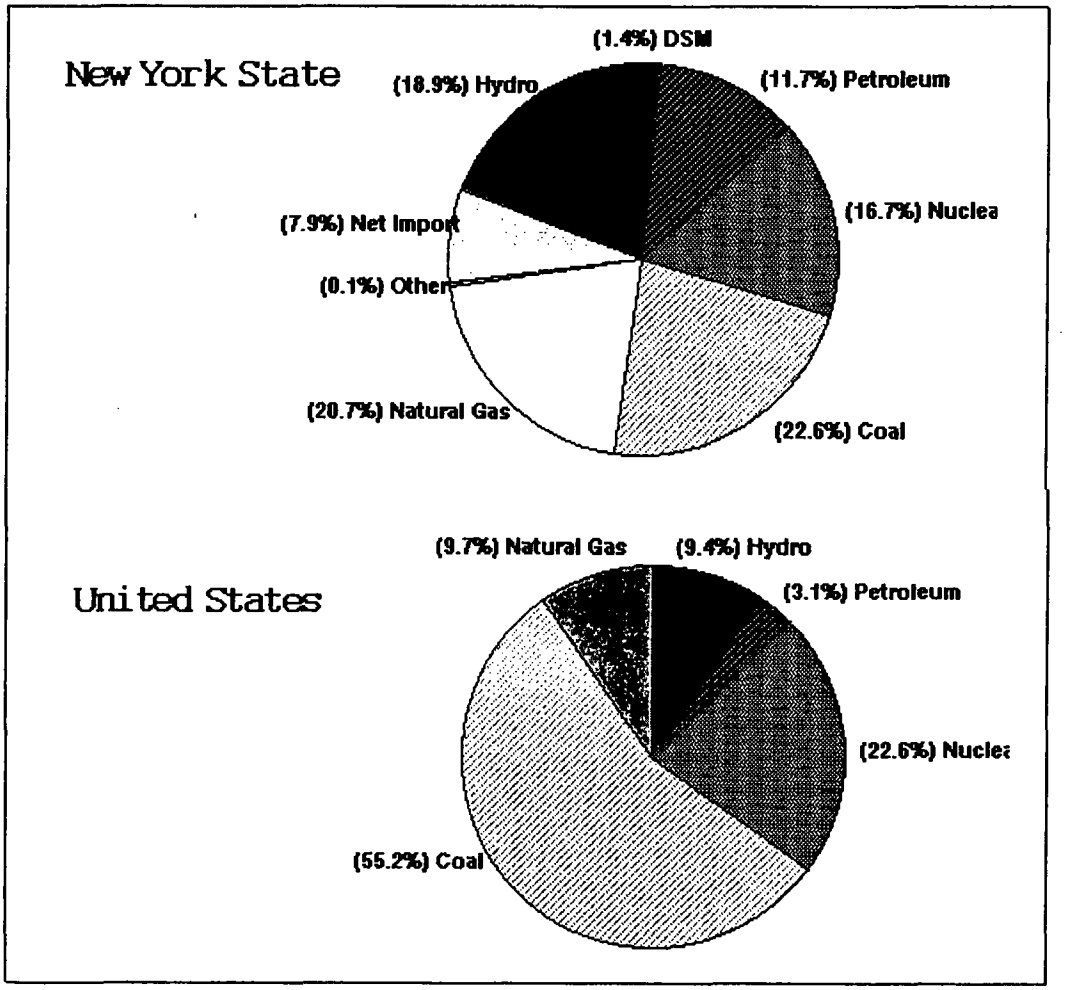
Capital	6.05	3.24	1.67	2.31	2.75	1.61	2.02	2.13
TOTAL	15.14	13.36	8.53	8.01	8.92	8.50	8.16	7.06

Source: Financial Statistics of the Major Privately Owned Utilities in New York State, 1994; New York State Energy Plan, 1994.

• Type of Fuel Affects Cost

Differences in the prices of primary fuels used in the generation of electricity affect how electricity costs in New York compare with the rest of the nation. As illustrated by Figure 3, the fuel mix used by New Yorks electric industry is considerably more diverse than the national average. Although fuel diversity prevents price shocks and enhances reliability, in the short term it may have costs. For example, more than 50 percent of electricity nationwide is generated using coal, a relatively inexpensive fuel, while coal accounts for less than 25 percent of the fuel generation mix in New York.

Figure 3
Consumption of Energy by Electric Utilities in 1992



Source: The New York State Energy Plan, New York State Energy Office.

• IPP Contracts Too High

Another factor contributing to higher electric prices in New York appears to be the cost of purchased power from IPPs. Many of the long-term contracts entered into in the late 1980s were based on energy price forecasts that were, in hindsight, too high. This is due largely to reductions in demand for electricity and a lower- than-anticipated price of oil. As a result, utilities are now paying more for independent power than if they were to generate the energy themselves or purchase the power on the spot market. Although some of these costs may be recovered by ratepayers in the future, the front loaded contracts, which provide for higher payments by utilities to independent power producers in the early years of the contract, are costly now.

• Paying for Unused Power

Excess generating capacity is another reason for New Yorks high electric rates. Excess capacity tends to result in high rates because ratepayers are paying for power plants that are not being used. According to the 1995 Load & Capacity Data Book of the New York Power Pool, the states electric generating capacity is currently 8 percent more than what is needed, and no new generating capacity will be required until after 2004.

• Some Nuclear Plants Prove Poor Investment

Another factor affecting prices is that the states utilities, to varying degrees, have made significant investments in nuclear generating facilities. Some of these have turned out to be uneconomical because, like long-term IPP contracts, they were based on inflated price forecasts. Nuclear plants have also cost far more than they were originally designed to cost, due to increasing concerns over safety. Under the current regulatory scheme, utilities can recover costs from ratepayers for nuclear facilities and contracts with independent power producers, to the extent that the PSC determines the costs were prudent at the time they were incurred.

• Ratepayers Carrying Burden

The only cost factor on which there is little dispute is the tax burden on New Yorks utility ratepayers. On average, 43 percent of the price gap between New York and other states is due to higher taxes paid by New York utilities. Local taxes account for 56 percent of all taxes paid by the states utilities; state taxes account for 34 percent; and federal taxes account for 10 percent.

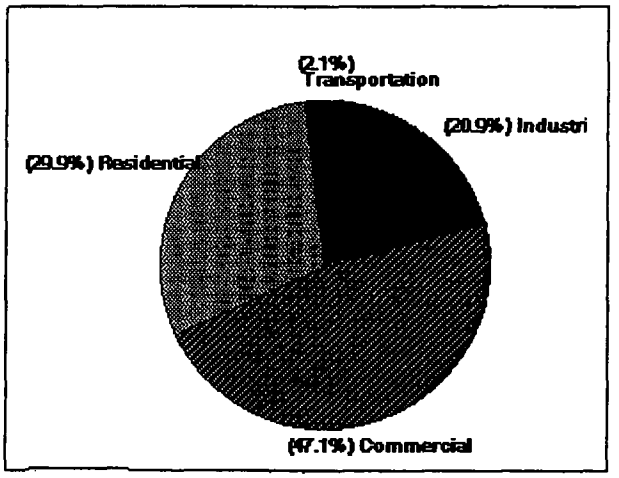
IV. IMPACT OF ELECTRICITY PRICES ON THE STATES ECONOMY

Electricity prices may affect companies decisions to locate or expand in New York and, consequently, the number and quality of jobs created and retained in the state. New York businesses must compete with those in other states with lower electric costs. In some cases,companies in New York have been forced to either leave the state or close down. Even where energy represents a relatively small percentage of a facilitys overall expenses, high electric costs may play an important role in a location decision. Firms in the process of deciding whether to locate to a new facility in New York are even more likely to be influenced by the relatively high cost of energy. For some large companies, major costs, such as material supplies and labor, are uniform throughout the nation, and any variation in local costs,

such as energy, becomes significant. Conversely, facilities that purchase supplies locally will be sensitive to the impact that high electric costs have on local suppliers.

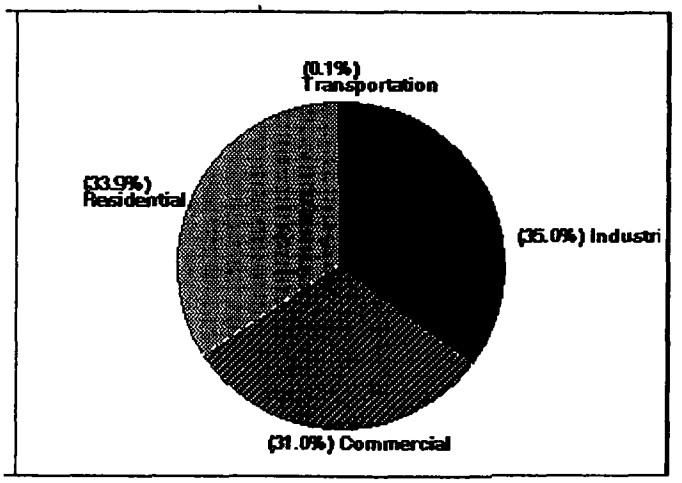
As Figures 4 and 5 show, the commercial sector consumes nearly half of all electricity in our state. Nationwide, the commercial, industrial, and residential sectors each represent approximately one-third of electricity consumption. However, the amount of energy consumed by each customer differs according to the energy intensiveness or cost of energy consumed relative to other operation costs of the sector.

Figure 4
Electricity Sales in New York
Broken Down by Consuming Sector, 1992



Source: New York State Energy Plan, New York Energy Office.

Figure 5
Electricity Sales in United States
Broken Down by Consuming Sector, 1992



Source: New York State Energy Plan, New York Energy Office.

Table 4 shows that the most electric energy intensive sector in New York States economy is the

manufacturing sector. And the most job intensive sector is the service sector. Because the cost of electricity represents such a significant portion of business costs in the manufacturing sector as compared to other sectors, electricity costs may play a more critical role in job creation and retention in the manufacturing sector. Also, the more electricity intensive the business, the more effect electricity prices may have on business location and expansion decisions.

Table 4

Electricity Intensiveness and Job Contribution for Major Sectors of New York State's Economy

Sector	Electricity (Cents/$ of total production cost)[1]	Rank of Energy Use	Rank Number of Jobs	Number of Jobs $x 1,000)[2]	Percent of Total NYS Jobs
Agriculture, Forestry, Fisheries	0.63	5	9	40.3	0.51
Mining	1.04	3	8	5.5	0.07
Construction	0.13	8	7	259.0	3.28
Manufacturing	1.51	1	4	948.3	11.99
Transportation/ Utilities	0.51	6	6	397.7	5.03
Wholesale/ Retail Trade	1.16	2	2	1,589.1	20.10
Services	0.75	4	1	2,526.6	31.95
Real Estate and Finance	0.06	9	5	729.6	9.23
Government	0.46	7	3	1,411.6	17.85
TOTAL				7,908.0	100.00

[1]1994 NYS Energy Plan using 1982 data from DOE.

[2]May 1995 data from NYS Department of Labor.

V. COMPETITION IN THE ELECTRIC INDUSTRY

• Competition: Some Central Policy Issues

- How extensive are the systemwide cost savings that could potentially result from competition?
- What other policy goals must be accommodated in a restructuring of the electricity industry? Is competition compatible with resonably affordable service for all residents? Energy efficiency?

Environmental improvement and longrange planning? To what extent can or should a competitive industry be regulated to achieve these goals?

- How can dislocations and inequities in the transition to competition be minimized?

While increasing competition in the electric industry offers the potential for lower overall rates and a healthier economy, it also presents significant risks. Some suggest that competition is inevitable, but there is much debate over the nature of the market structures that a competitive industry should employ. Questions also arise regarding the transition from the current market structure to a more competitive structure. In the end, nearly everybody favors competition, but what is required is fair competition. Electricity producers must be able to compete fairly, and the outcome must be fair to consumers. Issues include the potential benefits of retail wheeling, the effects of retail competition on smaller customers, the possible impairment of reliability, fuel diversity, and energy efficiency, and the effects on utility employees and investors.

Competition can reduce prices by directly exposing industry participants to the risks and rewards of their decisions, while increasing customer choices. Several models for competition have been discussed during the Public Service Commissions Competitive Opportunities Proceeding (Case 94-E-0952) and similar proceedings in other states. Specific proposals have been put forward. For example, a great deal of discussion centers on the difference between wholesale and retail competition. Table 5 indicates some of the key features of the current system and wholesale and retail competition. Although this report describes the differences between wholesale and retail competition, it is important to note that any specific competitive proposals may combine elements of each type of competition. The challenge faced by policy makers is not simply to choose between wholesale and retail competition, but to establish a competitive structure which best meets policy goals.

Table 5
Whoesale and Retail Competition in Electricity Generation

	WHOLESALE	RETAIL	CURRENT SYSTEM
Basic Structure	**Utilities purchase power in an open competitive market and resell to retail customers**	**Retail customers can choose their electricity providers and purchase power directly from various suppliers.**	**Utilities generate power, purchase from IPPs, and purchase in a partially competitive market. Utilities resell to retail customers.**
Mechanism for establishing prices	**Wholesale prices paid by utilities are established competitively; retail prices paid by consumers are established through regulation.**	**Consumers and unregulated service providers enter into direct contracts.Transmission and distribution service prices are established through regulation.**	**Wholesale costs are established through contract and regulation. Retail prices are established through regulation.**
Monopoly functions retained by utilities	**Transmission, distribution, and retail sales.**	**Transmission and distribution.**	**Transmission, distribution, and retail sales. Generation is a partial monopoly.**
Stranded	**Uncompetitive utility**	**Uncompetitive utility plants and**	**Utilities will fully recover**

Investment	**plants and IPP contracts will result in stranded investment. Utilities and IPPs may be expected to forego some recovery of their stranded investment.**	**IPP contracts will result in stranded investment. Utilities and IPPs may be expected to forego some recovery of their stranded investment.**	**their prudent investments, and IPP contracts will be fulfilled.**
Impacts on various customer classes	**Utilities costs will continue to be allocated among customer classes by the PSC.**	**Allocation of costs will be left to the market; large customers may be able to save money because of their bargaining power and economies of scale.**	**Utilities costs are allocated among customer classes by the PSC.**
Safety and reliability	**The safety and reliability of the distribution and transmission system will continue to be heavily regulated. Planning for generating reserves could be a market or power pool function.**	**The safety and reliability of the distribution and transmission system will continue to be heavily regulated. Planning for adequate generating reserves would be primarily a market function.**	**The safety and reliability of the distribution, transmission and generation system are heavily regulated. Planning for generating reserves is regulated through integrated resource planning.**
Utility workers	**Workers in generating facilities may be affected.**	**Workers in many functions may be affected.**	**Workers have experienced layoffs.**
Environmental factors in generating choices	**Competitive process could consider environmental factors.**	**Retail customers could consider environmental factors.**	**State law requires consideration of environmental factors.**
Utility-sponsored energy efficiency	**Utilities can continue to provide efficiency services.**	**Efficiency services would be more dependent on market forces.**	**PSC requires utilities to implement energy efficiency programs.**

A. Wholesale Competition

Under a system of wholesale competition, utilities continue providing retail service to all customers, but purchase electricity in a competitive wholesale market. Due to recent state and federal laws, partial wholesale competition has already been achieved. The New York State Public Service Law requires utilities to consider all reasonably available alternative sources of supply prior to making significant capital investments in electric capacity. The National Energy Policy Act requires utilities to transmit power for purposes of wholesale competition. The Federal Energy Regulatory Commission recently proposed a rule requiring utilities to provide transmission services to all energy producers.

• FERC's Proposed Rulemaking

- Utilities must provide wholesale transmission service to other generators on terms comparable to the service they provide themselves.
- Utilities are entitled to recover 100% of any investmant stranded by loss of wholesale customers.
- Recovery of utility investmant stranded by retail competition is a matter of state jurisdiction.

Utilities are not, however, required to divest themselves of their generating facilities. Nor are existing utility facilities and independent power contracts required to compete against other sources of supply. An aggressive approach to wholesale competition, exposing existing facilities and contracts to market pressures, would create stranded investment problems. That is, existing investments in some power generating plants of both the utilities and IPPs could become uneconomical in the sense that the prevailing market price under competition would not permit full recovery of the investment.

B. Retail Competition

Under a system of retail competition, consumers are free to purchase electricity from power producers other than their local utilities, and local utilities are required to transmit or wheel the power from the producers to the customers. Because power is currently available on the market at lower prices than retail rates generally charged by New Yorks investor-owned utilities, customers could achieve significant savings by entering into contracts with competitive generators, utilities in other service territories, or utilities in other states.

C. Risks of Competition

Competition could provide substantial benefits to electricity consumers in the state. However, if not properly managed, an immediate transition into competition could adversely affect ratepayers, investors, and current energy policy goals.Competition proposals offering immediate benefits to some customers must be analyzed to determine whether they will result in long-term benefits to all customers, or merely shift burdens.

1. Risk to small consumers

The customers best able to take advantage of retail wheeling are larger energy consumers. The customers with the least bargaining power to purchase power elsewhere i.e. residential and small commercial customers could experience large and volatile rate increases. If a number of customers were suddenly to stop purchasing power from their local utility during the transition phase from the current regulatory system to retail competition, the utility would have to recover all of its fixed costs from a smaller pool of customers. This exodus of customers could result in substantial rate increases, which in turn may lead more customers to purchase power from other producers, necessitating additional rate increases. Although it is likely that purchasing pools or buying cooperatives would be formed to enable some small customers to participate in bulk purchases, it is questionable whether this segment of the market would develop rapidly enough to avoid some of the consequences described above. It is also a concern whether such purchasing pools would be available to consumers in remote rural areas or some urban areas, or to consumers with very low usage or with troubled payment histories.

One way to mitigate this adverse effect is by requiring all participants in the electricity supply industry to contribute to a fund continuing electric service at regulated prices to consumers for whom there are few options. It is unknown, however, whether the costs would outweigh the benefits of retail competition for other consumers.

2. System Reliability

Maintaining the reliability of the electric system is of paramount importance. Some are concerned that opening up the utilities transmission and distribution systems to other power producers will make it more difficult for utilities to maintain the high standards of reliability brought about by the creation of the New York Power Pool. If electricity is being generated by producers with no statutory or regulatory

obligation, it may be more difficult to coordinate all of the sources contributing power into the grid, particularly during emergencies. There is also concern that power producers in a competitive environment would hesitate to assist each other during storms and other emergencies.

3. Fuel Diversity

New York has a very diverse mixture of fuel sources for its electric generation system. This enhances the reliability of the system and provides insulation from price shocks due to sudden fluctuations in the cost of any one particular fuel. Under the current regulatory structure,any investments in new generating capacity must be evaluated to determine their impact on fuel diversity. In an unregulated market, types of generating technology and fuel choice, driven by choice, may be less diverse and more vulnerable to interruption.

• Utility-Sponsored Energy Efficiency Programs

- fluorescent lamps and fixtures
- air-cooled packaged air conditioning equipment
- optical reflectors
- packaged water chiller
- metel halide and sodium vapor lamps and fixtures
- packaged terminal air conditioning units
- efficient magnetic lamps and electronic ballasts
- T-8 fluorescant lamps and electronic ballast systems
- LED exit signs
- solar window film
- high efficiency electric air conditioning

4. Energy Efficiency Programs

From 1990 to 1994, New Yorks utilities spent over one billion dollars on energy efficiency programs for their customers. According to the Public Service Commission, these programs will reduce customers energy bills over time, more than compensating for the cost of the programs.

Such programs may not be able to continue in a purely competitive marketplace. One of the most frequently-cited barriers to the introduction of energy efficiency technology is the fact that consumers tend to invest only in technologies that pay for themselves within one or two years. Power producers, on the other hand, are able to make investments that require twenty or more years to pay for themselves. This places energy efficiency at a competitive disadvantage.

5. Stranded Investments

Electric utilities have made investments in generating facilities in order to fulfill their obligation to provide service. Changing economic or regulatory circumstances may render some utility investments uneconomical, even though the investments were prudent at the time they were undertaken.Historically, utilities have been entitled to recover their capital costs for all prudent investments.

A sudden transition into retail or wholesale competition could leave many of the states utilities holding stranded investments for which they could not recover their full capital costs. Some utility-owned plants, particularly the nuclear plants, have such high capital costs that the utilities may have to assume substantial losses, possibly to the point of bankruptcy, in order to be competitive with other power

producers.

Another type of stranded investment consists of long-term power purchase contracts signed by utilities at rates that may exceed market rates. If these contracts are honored and their costs are passed on to utility customers, the utilities will have trouble competing with other power producers.

A third type of stranded investment is regulatory assets. These are utility expenses for which rate recovery has been extended over a number of years. Examples of such assets are the Shoreham Nuclear facility debt and expenses of utility energy efficiency programs.

Although the utilities may have difficulty marketing their power at rates that allow full recovery of their power plants costs, purchase contracts, and regulatory assets utilities do own transmission facilities with substantial value. The market value of utility-owned transmission facilities probably exceeds the costs. And the value of the transmission system may be used to offset the cost of utility stranded investments resulting from the advent of competition.

6. Stranded Benefits

While utilities face stranded investment problems, consumers face the threat of stranded benefits. If consumer service and other functions currently performed by utilities are no longer performed in a competitive marketplace, many sectors of the states economy would experience a significant loss. The question of competition cannot be addressed without facing the fundamental policy issue of the utilities current role in providing these programs.

- **Program Functions of Electric Utilities**
    - Universal Service at Regulated Prices
    - Energy Efficiency and Environmental Programs
    - Economic Development Subsidies
    - Low-Income Assistance Programs
    - Outreach and Education/Customer Information
    - Resource Planning
    - Research & Development
    - Tax Base for Local and State Governments

7. Impacts on Employees of Energy Providers and their Communities

The decline in demand for electricity that accompanied the recent recession, coupled with mandatory purchases of power from independent power producers, forced utilities to curtail operations at some power plants. This resulted in significant job losses for employees of these plants and impacts on the communities where the plants are located. Cost-cutting efforts by the utilities have led the companies to lay-off workers throughout their systems. A transition to competition could result in further displacement of utility workers.

On the other hand, the presence of some power plants operated by independent power producers contributes to the stabilization of jobs at facilities that are the steam hosts, or users of steam created by the capture of waste heat from the independent power plants. This steam supply allows facilities to benefit from lower operatonal costs.

The displacement of workers that may result from competition may result in the need to retrain or

reassign workers. In this way, we can ensure expertise and economic benefits for the community are not sacrificed by efforts to obtain the least expensive power.

D. Competition in Other States

New York State is generally keeping pace with other states in the movement toward competition. As of October 1995, no state has required full retail competition. Regulators in several states, including California and Massachusetts, have taken more detailed positions than New Yorks, but it remains unclear when and to what extent competition will be required. Regulators in 26 states, including New York, are examining competition.

APPENDIX

NOTE ON SOURCES

Current data on New Yorks utilities are readily available through the Public Service Commission and the New York Power Pool. However, recent budget cuts at the state and federal levels, most notably the elimination of the State Energy Office, have made it more difficult to assemble current data on comparative electricity costs. The data presented in this report are derived from the following sources:

New York State Energy Plan, 1994

New York State Public Service Commission, Financial Statistics of the Major Privately Owned Utilities in New York State, 1994

New York Power Pool, Load and Capacity Data, 1995

Power Authority of the State of New York, Annual Report, 1994

United States Dept. of Energy, Energy Information Administration

New York State Dept. of Public Service

New York State Energy Research and Development Authority

New York State Dept. of Labor

Energy Association of New York State

Independent Power Producers of New York

Edison Electric Institute

MYKYTYN Consulting Group, Inc.

Public Utilities Commission of the State of California

Massachusetts Dept. of Public Utilities

Excerpt

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

OPINION NO. 96-12

CASES 94-E-0952 et al. - In the Matter of Competitive Opportunities Regarding Electric Service.

OPINION AND ORDER REGARDING COMPETITIVE OPPORTUNITIES FOR ELECTRIC SERVICE

mechanisms to reduce rates[123] and address strandable costs;

(4) identification of the public policy programs, whose funding is not recoverable in a competitive market, that need special rate treatment and competitively neutral mechanisms to recover such costs;

(5) an examination of the load pockets unique to the utility, identification of potential market power problems, and proposals to mitigate market power; and

(6) a plan for the provision of energy services, including addressing the continued provision of customer protections consistent with an emerging competitive market.

FINDINGS UNDER STATE ENVIRONMENTAL QUALITY REVIEW ACT

On May 3, 1996, the Commission issued a Final Generic Environmental Impact Statement (FGEIS) in this proceeding. As lead agency for environmental impact review, the Commission makes these findings pursuant to §8-0109(8) of the State Environmental Quality Review Act and 6 NYCRR §617.11 of its implementing regulations. The proposed action in this proceeding is the adoption of a policy supporting increased competition in electric markets, including a preferred method to achieve electric competition; and regulatory and ratemaking practices that will assist in the transition to a more competitive and efficient

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[123] We note that a result of restructuring in both the gas and telecommunications industries is that many commercial and industrial users experienced significant rate reductions primarily as a result of competitive options, while smaller rate reductions were generally experienced in the residential sector.

electric industry, while maintaining safety, environmental, affordability, and service quality goals.

The FGEIS disclosed certain environmental impacts, facts, and conclusions that are considered here. The likely environmental effects of a shift to a more competitive market for electricity are not fully predictable due to:

(1) the complexity of the electric industry in New York;

(2) the interaction of New York's regulatory activities with those of other states and the federal government;

(3) the level and types of market responses; and

(4) the lack of relevant examples of such a shift to competition.

In general, the proposed action will have environmental impacts that are modest or not distinguishable from those of alternative actions, including the no-action alternative identified by the FGEIS as the evolving regulatory model. Apart from the areas of substantial concern noted below, the FGEIS did not identify reasonably likely significant adverse impacts.

With respect to air quality impacts related to oxides of nitrogen and sulfur, it appears likely that the retail or wholesale electric market structures would have greater impacts than the no action alternative. It appears likely that, in the absence of mitigation measures, research and development in environmental and renewables areas would lose funding if competitive restructuring moves forward. In addition, there would likely be a decrease in the amount of cost-effective energy efficiency during any transition to wholesale or retail competition, with a long-term reduction in energy efficiency in a

wholesale market; in a genuinely competitive retail market, energy efficiency may stabilize or increase.

Electric industry restructuring will have impacts on the human environment as well. Specifically, retirements of electric generating stations under competition will have local economic effects and displace workers at those plants. These impacts will likely be limited to the localities in which generating plants are retired or constructed, or where new transmission or distribution facilities are constructed. Moreover, from an overall New York State perspective, it is likely that a shift to competition, if successful in reducing the cost of electricity, will yield considerable net benefits of an economic and social nature. Reduced electricity prices should yield increased economic growth and employment statewide well in excess of the jobs lost at retired plants. New plants may be built to meet growing demand, and ancillary businesses such as energy service companies providing DSM and related services should grow considerably. These businesses will have jobs and property taxes associated with them, though their locations are not yet known.

In order to address the adverse environmental effects identified above on air quality, energy efficiency, and research and development, several mitigation measures will be employed as necessary. First, a system benefits charge will be used as appropriate to fund DSM and research and development in environmental and renewable resource areas during the transition to competition. Second, the competitive restructuring will be monitored closely to ensure that specific mitigation measures are implemented if needed. Finally, the Commission will support and assist efforts by New York State and federal agencies to ensure that adverse environmental impacts to the state's air quality from upwind sources of air contamination do not occur as a result

of the movement toward competition.[124]

Notwithstanding the mitigation measures identified, the proposed action to restructure the electric industry may result in an unavoidable adverse environmental impact on air quality related to oxides of nitrogen and sulfur, loss of some DSM activity, loss of some research and development funding in the environmental and renewables areas, and displacement of workers and local economic loss where plants are closed. Nevertheless, weighing and balancing these likely environmental effects of the shift to competition in the electric industry in New York with social, economic, and other essential considerations, leads to the conclusion that implementing the proposed action toward greater competition is desirable. A chief economic consideration regarding greater competition in the electricity market is the benefit of lower rates to customers. A principal social consideration is the benefit of increased customer choice from among generators, marketers, and energy services companies. Other essential considerations include continued provision of reliable electric service, maintenance of programs and activities, such as those involving fuel diversity, research and development, energy efficiency, environmental protection, and customer protections (including the obligation to serve) that are in the public interest, and continued assurance that concerns over the exercise of undue market power will be addressed.

Although likely environmental effects are hard to predict and the simulated scenarios examined were not model-specific, the flexible retail poolco model (under which a competitive market is expected to flourish) could yield as much

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[124] In order to assess whether additional mitigation measures are required in specific cases, each utility may be required to file with its restructuring plans a completed full environmental assessment form with a recommendation on whether further environmental review is necessary.

or more energy efficiency as the evolving regulatory model, and potentially at a lower cost. A situation in which many sellers compete to offer customers the best service at the least cost could overcome some of the market barriers which have left many efficiency opportunities unexploited. Moreover, over the long term, a flexible retail poolco model driven by market forces may provide as much or more research and development than would occur under the evolving regulatory model. Wholesale competition, by contrast, does not offer very good prospects for market driven electric energy efficiency or research and development to improve consumer functions. The monopoly seller might recover stranded assets through a volumetric wires charge which would present a strong disincentive to promoting reduced consumption through energy efficiency and technological improvements.

Regarding social and economic considerations, because many suppliers, marketers, and ESCOs are expected to enter the market under a flexible retail poolco model, customers will be more likely to have increased choices in obtaining electric services than under a wholesale model in which a regulated transmission and distribution company sells electricity to all end users. Similarly, prices to all classes of customers are expected to be lower under such a model than under a long-term wholesale model, because vigorous competition by a large number of buyers and sellers is expected to drive down the price of electricity on the wholesale level, while competition among companies striving to improve the efficiency of their operations, in order to attract and retain customers, is anticipated to lead to lower prices on the retail level. ESCOs are also expected to assume the price volatility risk inherent in a retail model.

Concerning the maintenance of reliable electric service, market signals under a flexible retail poolco model are expected to provide proper price signals in the electric generation market, so that the safety and reliability of New

York's bulk electric system should not be jeopardized. Moreover, the reliability of the electric system will continue to be monitored and appropriate measures taken to ensure reliability in the event of market failure. Finally, regarding public policy initiatives, a wholesale model has no advantage over a retail model.

On the basis of the foregoing discussion, the Commission makes the findings stated above regarding the environmental impacts of the proposed action and certifies that:

(1) the requirements of the State Environmental Quality Review Act, as implemented by 6 NYCRR Part 617, have been met;

(2) consistent with social, economic, and other essential considerations, from among the reasonable alternatives available, the action being undertaken is one that avoids or minimizes adverse environmental impacts to the maximum extent practicable, and that adverse environmental impacts will be avoided or minimized to the maximum extent practicable by incorporating as conditions to the decision those mitigative measures that were identified as practicable;[125] and

(3) as applicable to the coastal area, the action being undertaken is consistent with applicable policies set forth in 19 NYCRR §600.5,

---

[125] These mitigation measures are: (1) monitoring environmental impacts; (2) system benefits charge; and (3) assisting efforts undertaken by other agencies to address interstate pollution transport.

regarding development, fish and wildlife, agricultural lands, scenic quality, public access, recreation, flooding and erosion hazards, and water resources.

FLEXIBLE RATES GUIDELINES

As previously stated, we asked that two limited flexible rate issues be addressed in this proceeding--issues related to contracts having prices set for longer than seven years and the treatment of special attraction contracts.

The flexible rates recommended decision (issued October 19, 1995) suggested retaining the general limitation of fixed prices for seven years (unless a longer term is approved on a case-by-case basis) and allowing negotiated rates for attraction contracts, in accordance with the existing flexible rate guidelines. The flexible rate guidelines and a summary of the briefs that were filed are attached as Appendix E. This section provides a brief analysis of the main exceptions.

Multiple Intervenors urges that utilities be allowed to enter into fixed flexible rate contracts for periods longer than seven years without prior approval, claiming that the seven-year limitation restricts the utilities' ability to compete and that adequate incentive mechanisms currently exist.

Because any utility can petition for a longer fixed price term, it appears unnecessary to change the guideline at this time. Given the many substantive restructuring changes being contemplated during the transition to competition, and the decision reached earlier in this opinion and order to revisit these guidelines in their entirety in a few years, the existing approach is sufficient.

Staff prefers that sharing mechanisms for attraction contracts be the same as those for retention contracts, due to a concern about the parties' time and resources when the reasons

403340618DEDI

Control Number	WIID Number	Instrument Type
403340618	2000334-000154	DED

WESTCHESTER COUNTY RECORDING AND ENDORSEMENT PAGE
(THIS PAGE FORMS PART OF THE INSTRUMENT)
*** DO NOT REMOVE ***

THE FOLLOWING INSTRUMENT WAS ENDORSED FOR THE RECORD AS FOLLOWS:

TYPE OF INSTRUMENT DED - DEED
FEE PAGES 11 **TOTAL PAGES** 11

RECORDING FEES

STATUTORY CHARGE	$5.25
RECORDING CHARGE	$33.00
RECORD MGT. FUND	$4.75
RP 5217	$25.00
TP-584	$5.00
CROSS REFERENCE	$0.00
MISCELLANEOUS	$0.00
TOTAL FEES PAID	$73.00

TRANSFER TAXES

CONSIDERATION	$39,947,496.00
TAX PAID	$159,790.00
TRANSFER TAX #	12822

RECORDING DATE	12/20/2000
TIME	12:30:00

MORTGAGE TAXES

MORTGAGE DATE	
MORTGAGE AMOUNT	$0.00
EXEMPT	
YONKERS	$0.00
BASIC	$0.00
ADDITIONAL	$0.00
SUBTOTAL	$0.00
MTA	$0.00
SPECIAL	$0.00
TOTAL PAID	$0.00

SERIAL NUMBER
DWELLING

THE PROPERTY IS SITUATED IN WESTCHESTER COUNTY, NEW YORK IN THE:
TOWN OF CORTLANDT

WITNESS MY HAND AND OFFICIAL SEAL

LEONARD N. SPANO
WESTCHETSER COUNTY CLERK

Record & Return to:
GOODWIN PRACER & HEER LLP
599 LEXINGTON AVE

NEW YORK, NY 10022

DEED
(75 acre parcel – IP3)

THIS INDENTURE, made as of the 21st day of November, two thousand between the **Power Authority of the State of New York**, a corporate municipal instrumentality and political subdivision of the State of New York created by the Legislature of the State by Chapter 772 of the Laws of 1931, as last amended by Chapter 386 of the Laws of 1998, having its principal office at 1633 Broadway, New York, New York 10009 ("Grantor") and **Entergy Nuclear Indian Point 3, LLC**, a Delaware limited liability company, having an address of c/o LL&F Service Corp., One Rodney Square, 10th Floor, Tenth & King Streets, Wilmington, Delaware 19810 ("Grantee").

WITNESSETH, that Grantor, in consideration of ten dollars and other valuable consideration paid by the Grantee, does hereby remise, release and quitclaim unto Grantee, the heirs or successors and assigns of Grantee forever.

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Village of Buchanan, Town of Cortlandt and County of Westchester, in the State of New York, as more specifically described in Schedule A attached hereto and made a part hereof being the same premises described by that certain deed to Grantor from Consolidated Edison Company of New York, Inc. ("Con Edison") herein recorded on December 31, 1975 in Liber 7306 page 736 (the "IP3 Deed").

TOGETHER with all right title and interest, if any, of Grantor, in and to any streets and roads abutting the above-described premises to the center lines thereof; together with the appurtenances including, without limitation, all appurtenant easements, interests and rights, including fixtures, structures, improvements and other interests located on Easement Parcels 1 or 2, as described in the IP3 Deed, and including the lands now or formerly underwater granted by the People of the State of New York in Letters Patent dated October 27, 1959 to Con Edison as described in the IP3 Deed and all the estate and rights of Grantor in and to said premises; to have and to hold the premises herein granted unto Grantee, the heirs or successors and assigns of Grantee forever.

It is mutually and reciprocally agreed and confirmed by Con Edison and Grantee by their execution of this deed that, subject to the terms and conditions of that certain Mutual Waiver and Consent Agreement dated November 9, 2000 by and among Grantor, Grantee and Con Edison to be recorded immediately prior to the recording of this deed, (i) no part or all of the undivided interests of Con Edison and of the Grantee (as such interests are more fully described and set forth in the IP3 Deed) as tenants in common in any facilities and improvements thereto shall be transferred, conveyed or assigned to any third party unless the party desiring to

convey or assign, after the receipt of a bona fide written offer from a third party to purchase part or all of such interest, shall have in writing offered to sell such interest to the other tenant in common, on terms and conditions at least as favorable as those contained in said bona fide offer, and shall have held such offer open for at least 180 days, provided that if the other tenant in common does not accept such offer within such period of 180 days, such offer shall be deemed to have been declined and the party desiring to sell shall be free to accept such bona fide offer and thereafter upon receipt of any necessary approval of any governmental body then having jurisdiction, to transfer, convey or assign to said third party such interest pursuant to the terms of such bona fide offer (the foregoing being hereinafter referred to as the "First Refusal Rights and Obligations"); and (ii) none of such facilities or improvements in which Con Edison and the Grantee have undivided interests shall be subject to partition or sale for division; such rights to partition or sale for division being hereby effectively waived, surrendered and released by Con Edison and the Grantee (the foregoing being hereinafter referred to as the "Partition/Sale For Division Rights Waiver").

AND Grantor, in compliance with Section 13 of the Lien Law, covenants that Grantor will receive the consideration for this conveyance and will hold the right to receive such consideration as a trust fund to be applied first for the purpose of paying the cost of the improvement and will apply the same first to the payment of the cost of the improvement before using any part of the total of the same for any other purpose.

IN WITNESS WHEREOF, Grantor has duly executed this deed the day and year first above written.

POWER AUTHORITY OF THE STATE OF NEW YORK

By: _____
Name: MICHAEL ERBATI
Title: CHIEF FINANCIAL OFFICER

STATE OF NEW YORK)

) SS.:

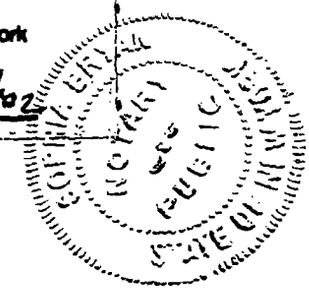
COUNTY OF New York)

On the 15th day of November, in the year 2000 before me, the undersigned, personally appeared Michael Urbach, personally known to me or proved to me on satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Sophia Bryan

Notary Public, State of New York

SOPHIA BRYAN
Notary Public, State of New York
No. 01BR6042226
Qualified in Queens County
Certificate Filed in New York
Commission Expires May 5, 20__



For the sole purpose of confirming their mutual and reciprocal obligations pursuant to the First Refusal Rights and Obligations and the Partition/Sale For Division Rights Waiver, Consolidated Edison Company of New York, Inc. and Grantee hereby execute this deed as of the day and year first above written.

ENTERGY NUCLEAR INDIAN POINT 3, LLC

By: _____
Name: MICHAEL R. KANSLER
Title: SR VP + COO

STATE OF NEW YORK)

) SS.:

COUNTY OF New York)

On the 15th day of November, in the year 2000 before me, the undersigned, personally appeared Michael Kansler, personally known to me or proved to me on satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public, State of New York

SOPHIA BRYAN
Notary Public, State of New York
No. 01BR6042226
Qualified in Queens County
Certificate Filed in New York
Commission Expires May 5, 2002

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

cc By: Robert P. Stelben
Name: Robert P. Stelben
Title: Vice President and Treasurer

STATE OF NEW YORK)

) SS.:

COUNTY OF New York)

On the 16th day of November, in the year 2000 before me, the undersigned, personally appeared Robert P. Stelben, personally known to me or proved to me on satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Audrey Lilloo-Fraser
Notary Public, State of New York

AUDREY LILLOO FRASER
Notary Public, State of New York
No. 41-4993984
Qualified in Queens County
Commission Expires March 30, 2002

SCHEDULE A

ALL THOSE certain lots, pieces or parcels of land situate, lying and being in the Village of Buchanan, Town of Cortlandt, County of Westchester and the State of New York, and more particularly bounded and described as follows:

BEGINNING at a point on the northwesterly boundary line of Broadway where the same is intersected by the southwesterly boundary line of the Village of Buchanan; said point being an iron pin located at North 459,973.773, East 604,934.334 of The New York Coordinate System-East Zone; thence along said village boundary line the following three (3) bearings and distances:

(1) North 61° 12' 30" West 1,130.00 feet;
(2) South 36° 32' 40" West 984.00 feet, and
(3) North 61° 12' 30" West 320.00 feet;

Thence along the division line between property now or formerly of Georgia-Pacific Corporation on the west and now or formerly of Consolidated Edison Company of New York, Inc. on the east the following four (4) bearings and distances:

(1) North 23° 17' 30" East 575.00 feet;
(2) North 31° 19' 30" East 425.00 feet;
(3) North 16° 54' 30" East 675.00 feet, and
(4) North 33° 22' 50" West 597.28 feet;

To a point in the former high water line of the Hudson River; thence along said former high water line the following two (2) bearings and distances:

(1) North 58° 40' 30" East 94.93 feet, and
(2) North 26° 13' 20" East 22.38 feet

To a point at the most southerly corner of lands now or formerly under water granted by The People of the State of New York in Letters Patent dated October 27, 1959 to Consolidated Edison Company of New York, Inc. and recorded in the Office of the Clerk of the County of Westchester on December 14, 1959 in Liber 5973 of Deeds at Page 289; thence along the southwesterly and northwesterly boundary line of said grant the following two (2) bearings and distances:

(1) North 51° 43' 00" West 166.03 feet, and
(2) North 38° 17' 00" East 90.39 feet

To a point at the most westerly corner of premises conveyed by Consolidated Edison Company of New York, Inc. to the New York State Atomic and Space Development Authority in Indenture dated July 26, 1971 and recorded August 13, 1971 in the

Office of the Clerk of the County of Westchester in Liber 7006 of Deeds at Page 298; thence along the southwesterly, southeasterly and northeasterly boundary lines of said premises the following six (6) bearings and distances:

(1) South 51° 43' 00" East 70.00 feet;
(2) North 31° 20' 43" East 88.35 feet;
(3) North 42° 44' 52" East 94.95 feet;
(4) North 71° 46' 23" East 39.42 feet;
(5) North 34° 54' 28" East 41.80 feet, and
(6) North 51° 43' 00" West 86.00 feet

To a point at the most northerly corner of said premises; thence along the aforesaid northwesterly boundary line of said grant;

North 38° 17' 00" East 817.43 feet

To a point; thence through property now or formerly of Consolidated Edison Company of New York, Inc. the following eleven (11) bearings and distances:

(1) South 51° 43' 00" East 558.88 feet to a point located North 68° 09' 01" West, 47.50 feet distant measured radially from the center of a circular curve;

(2) Northerly, easterly and southerly along said curve a distance of 196.36 feet to a point located South 11° 17' 55" East, 47.50 feet distant measured radially from the center of said curve;

(3) South 38° 17' 00" West 19.47 feet;

(4) South 51° 43' 00" East 433.65 feet;

(5) South 29° 14' 02" East 227.28 feet;

(6) South 38° 17' 00" West 1229.14 feet;

(7) South 57° 11' 26" East 355.78 feet;

(8) South 63° 41' 22" East 215.25 feet;

(9) South 77° 36' 34" East 168.54 feet;

(10) South 63° 30' 45" East 229.13 feet; and

(11) South 63° 43' 41" East 310.02 feet

To a point on the aforesaid northwesterly boundary line of Broadway; thence along said northwesterly boundary line of Broadway:

South 36° 32' 40" West 757.79 feet

To the point of beginning, containing 76.5749 acres, more or less. All bearings are referred to true North at the 74° 20' meridian of West Longitude.

SHEETS

BLOCKS

LOTS

COUNTY OR TOWN

Return by Mail to:

Ross D. Gillman, Esq.
Goodwin, Procter & Hoar LLP
599 Lexington Avenue
New York, New York 10022

WAS1 #824765 v11

DEED

N-995187-B

COMMONWEALTH LAND TITLE
INSURANCE COMPANY
655 THIRD AVENUE
NEW YORK, NY 10017-5617

**POWER AUTHORITY OF THE
STATE OF NEW YORK**

TO

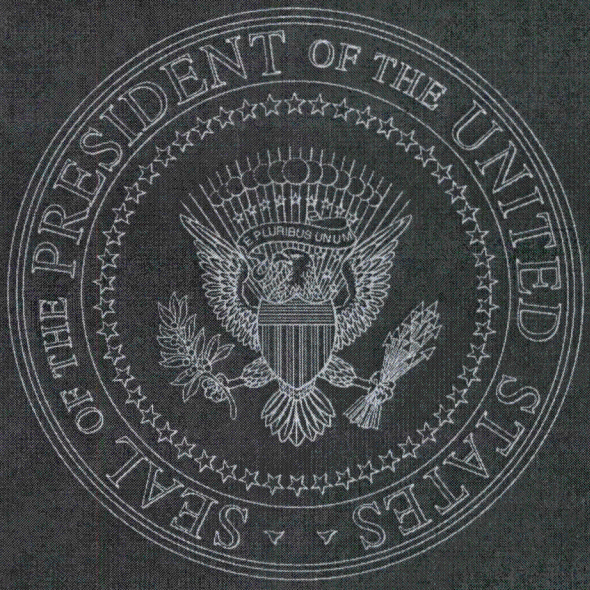
**ENTERGY NUCLEAR
INDIAN POINT 3, LLC**

Record & Return To:
Ross Gillman, Esq.
Goodwin Procter & Hoar LLP
599 Lexington Avenue
New York, NY 10022

Westchester County, Township of Cortlandt, Village of Buchanan

Sec.	43.10	Blk 2	Lot 2
Sec.	43.10	Blk 2	Lot 1 (part of)
Sec.	43.10	Blk 1	Lot 1 (part of)
Sec.	43.06	Blk 1	Lot 1 (part of)

National Energy Policy



Report of the National Energy Policy Development Group

May 2001

Reliable, Affordable, and Environmentally Sound Energy for America's Future

Report of the

National Energy Policy Development Group

"America must have an energy policy that plans for the future, but meets the needs of today. I believe we can develop our natural resources and protect our environment."

— President George W. Bush

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ISBN 0-16-050814-2

THE VICE PRESIDENT

WASHINGTON

May 16, 2001

The Honorable George W. Bush
President of the United States
The White House
Washington, D.C. 20500

Dear Mr. President:

On behalf of the National Energy Policy Development Group, I submit for your consideration our National Energy Policy report. As you directed us at the outset of your Administration, we have developed a national energy policy designed to help bring together business, government, local communities and citizens to promote dependable, affordable and environmentally sound energy for the future.

The report reflects the requirements and philosophy you set out for our work. It envisions a comprehensive long-term strategy that uses leading edge technology to produce an integrated energy, environmental and economic policy. To achieve a 21st century quality of life -- enhanced by reliable energy and a clean environment -- we must modernize conservation, modernize our infrastructure, increase our energy supplies, including renewables, accelerate the protection and improvement of our environment, and increase our energy security.

We submit these recommendations with optimism. The tasks ahead are great but achievable. To meet our energy challenge, we must put to good use the resources around us and the talents within us. It summons the best of America and offers a healthier environment, a stronger economy and a brighter future for the American people.

Sincerely,

Dick Cheney

Enclosure

Members of the National Energy Policy Development Group

DICK CHENEY
The Vice President

COLIN L. POWELL
The Secretary of State

PAUL O'NEILL
The Secretary of the Treasury

GALE NORTON
The Secretary of the Interior

ANN M. VENEMAN
The Secretary of Agriculture

DONALD L. EVANS
The Secretary of Commerce

NORMAN Y. MINETA
The Secretary of Transportation

SPENCER ABRAHAM
The Secretary of Energy

JOE M. ALLBAUGH
The Director of the Federal Emergency Management Agency

CHRISTINE TODD WHITMAN
The Administrator of the Environmental Protection Agency

JOSHUA B. BOLTEN
The Assistant to the President and Deputy Chief of Staff for Policy

MITCHELL E. DANIELS
The Director of the Office of Management and Budget

LAWRENCE B. LINDSEY
The Assistant to the President for Economic Policy

RUBEN BARRALES
Deputy Assistant to the President and Director of Intergovernmental Affairs

Executive Director: Andrew D. Lundquist

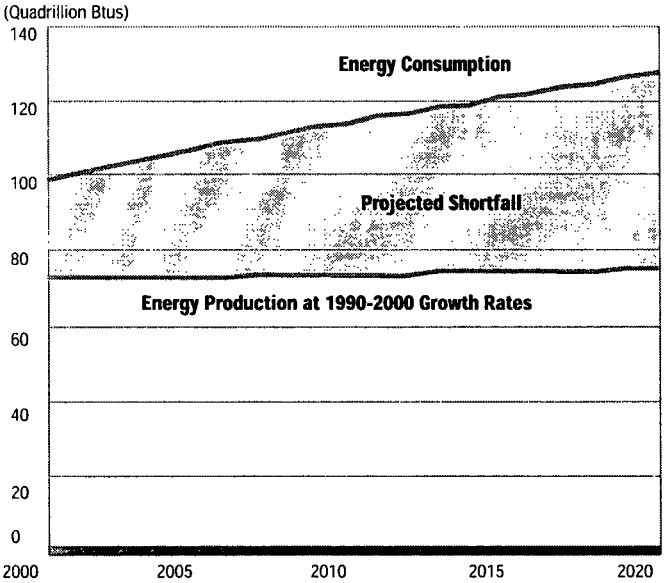
Contents

Overview

Reliable, Affordable, and Environmentally Sound Energy for America's Future

In his second week in office, President George W. Bush established the National Energy Policy Development Group, directing it to "develop a national energy policy designed to help the private sector, and, as necessary and appropriate, State and local governments, promote dependable, affordable, and environmentally sound production and distribution of energy for the future." This Overview sets forth the National Energy Policy Development (NEPD) Group's findings and key recommendations for a National Energy Policy.

Figure 1
Growth in U.S. Energy Consumption Is Outpacing Production



Over the next 20 years, growth in U.S. energy consumption will increasingly outpace U.S. energy production, if production only grows at the rate of the last 10 years.

Sources: Sandia National Laboratories and U.S. Department of Energy, Energy Information Administration.

America in the year 2001 faces the most serious energy shortage since the oil embargoes of the 1970s. The effects are already being felt nationwide. Many families face energy bills two to three times higher than they were a year ago. Millions of Americans find themselves dealing with rolling blackouts or brownouts; some employers must lay off workers or curtail production to absorb the rising cost of energy. Drivers across America are paying higher and higher gasoline prices.

Californians have felt these problems most acutely. California actually began the 1990s with a surplus of electricity generating capacity. Yet despite an economic boom, a rapidly growing population, and a corresponding increase in energy needs, California did not add a single new major electric power plant during the 1990s. The result is a demand for electricity that greatly succeeds the amount available.

A fundamental imbalance between supply and demand defines our nation's energy crisis. As the chart illustrates, if energy production increases at the same rate as during the last decade our projected energy needs will far outstrip expected levels of production.

This imbalance, if allowed to continue, will inevitably undermine our economy, our standard of living, and our national security. But it is not beyond our power to correct. America leads the world in scientific achievement, technical skill, and entrepreneurial drive. Within our country are abundant natural resources, unrivaled technology, and unlimited human creativity. With forward-looking leadership and sensible policies, we can meet our fu-

America's expanding economy, growing population, and rising standard of living will be sustained by our unmatched technological know-how.

ture energy demands and promote energy conservation, and do so in environmentally responsible ways that set a standard for the world.

The Challenge

America's energy challenge begins with our expanding economy, growing population, and rising standard of living. Our prosperity and way of life are sustained by energy use. America has the technological know-how and environmentally sound 21st century technologies needed to meet the principal energy challenges we face: promoting energy conservation, repairing and modernizing our energy infrastructure, and increasing our energy supplies in ways that protect and improve the environment. Meeting each of these challenges is critical to expanding our economy, meeting the needs of a growing population, and raising the American standard of living.

We are already working to meet the first challenge: using energy more wisely. Dramatic technological advances in energy efficiency have enabled us to make great strides in conservation, from the operation of farms and factories to the construction of buildings and automobiles. New technology allows us to go about our lives and work with less cost, less effort, and less burden on the natural environment. While such advances cannot alone solve America's energy problems, they can and will continue to play an important role in our energy future.

The second challenge is to repair and expand our energy infrastructure. Our current, outdated network of electric generators, transmission lines, pipelines, and refineries that convert raw materials into usable fuel has been allowed to deteriorate. Oil pipelines and refining capacity are in need of repair and expansion. Not a single major oil refinery has been built in the United States in nearly a generation, causing the kind of bottlenecks that lead to sudden spikes in the price of gasoline. Natural gas distribution, likewise, is hindered by an aging and inadequate network of pipelines. To match supply and demand will require some 38,000 miles of new gas pipelines, along with 255,000 miles of distribution lines. Similarly, an antiquated and inadequate transmission grid prevents us from routing electricity over long distances and thereby avoiding regional blackouts, such as California's.

"America must have an energy policy that plans for the future, but meets the needs of today. I believe we can develop our natural resources and protect our environment."

— President
George W. Bush

Increasing energy supplies while protecting the environment is the third challenge. Even with successful conservation efforts, America will need more energy.

Renewable and alternative fuels offer hope for America's energy future. But they supply only a small fraction of present energy needs. The day they fulfill the bulk of our needs is still years away. Until that day comes, we must continue meeting the nation's energy requirements by the means available to us.

Estimates indicate that over the next 20 years, U.S. oil consumption will increase by 33 percent, natural gas consumption by well over 50 percent, and demand for electricity will rise by 45 percent. If America's energy production grows at the same rate as it did in the 1990s we will face an ever-increasing gap.

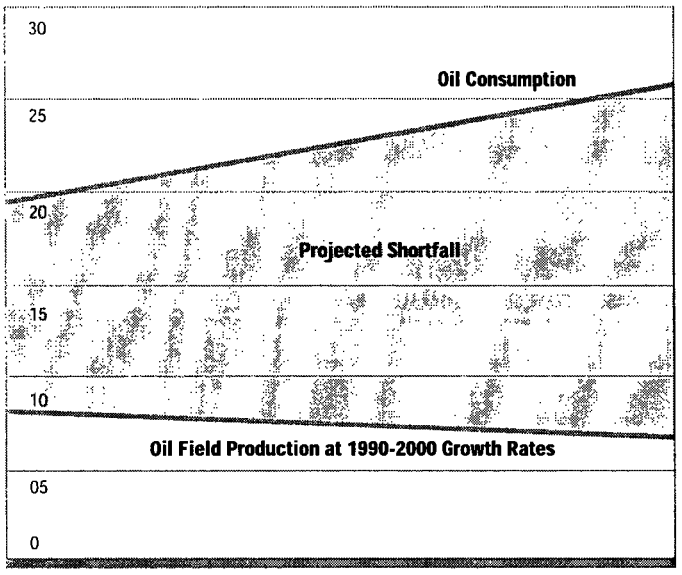
Increases on this scale will require preparation and action today. Yet America has not been bringing on line the necessary supplies and infrastructure.

Extraordinary advances in technology have transformed energy exploration and production. Yet we produce 39 percent less oil today than we did in 1970, leaving us ever more reliant on foreign suppliers. On our present course, America 20 years from now will import nearly two of every three barrels of oil – a condition of increased dependency on foreign powers that do not always have America's interests at heart. Our increasing demand for natural gas – one of the cleanest forms of energy – far exceeds the current rate of production. We should reconsider any regulatory restrictions that do not take technological advances into account.

Figure 2

U.S. Oil Consumption Will Continue to Exceed Production

(Millions of Barrels per Day)



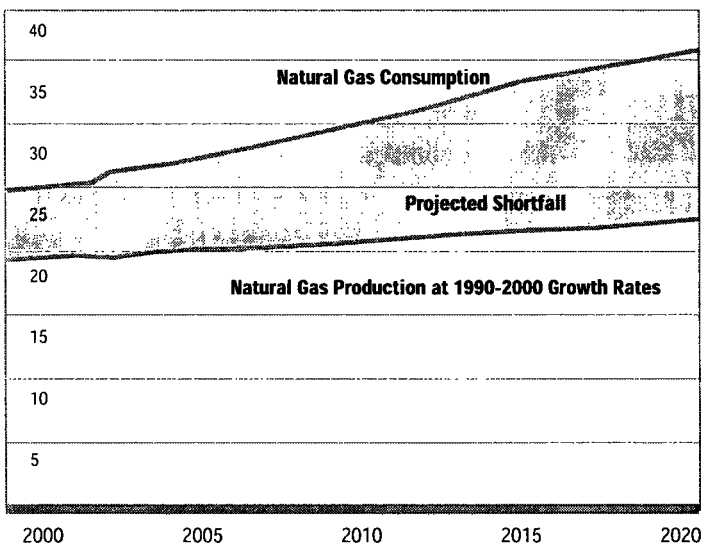
Over the next 20 years, U.S. oil consumption will grow by over 6 million barrels per day. If U.S. oil production follows the same historical pattern of the last 10 years, it will decline by 1.5 million barrels per day. To meet U.S. oil demand, oil and product imports would have to grow by a combined 7.5 million barrels per day. In 2020, U.S. oil production would supply less than 30 percent of U.S. oil needs.

Sources: Sandia National Laboratories and U.S. Department of Energy, Energy Information Administration.

Figure 3

U.S. Natural Gas Consumption Is Outpacing Production

(Trillion Cubic Feet)



Over the next 20 years, U.S. natural gas consumption will grow by over 50 percent. At the same time, U.S. natural gas production will grow by only 14 percent, if it grows at the rate of the last 10 years.

Sources: Sandia National Laboratories and U.S. Department of Energy, Energy Information Administration.

We have a similar opportunity to increase our supplies of electricity. To meet projected demand over the next two decades, America must have in place between 1,300 and 1,900 new electric plants. Much of this new generation will be fueled by natural gas. However, existing and new technologies offer us the opportunity to expand nuclear generation as well. Nuclear power today accounts for 20 percent of our country's electricity. This power source, which causes no greenhouse gas emissions, can play an expanding part in our energy future.

The recommendations of this report address the energy challenges facing America. Taken together, they offer the thorough and responsible energy plan our nation has long needed.

Components of the National Energy Policy

The National Energy Policy we propose follows three basic principles:

- The Policy is a long-term, comprehensive strategy. Our energy crisis has been years in the making, and will take years to put fully behind us.
- The Policy will advance new, environmentally friendly technologies to increase energy supplies and encourage cleaner, more efficient energy use.
- The Policy seeks to raise the living standards of the American people, recognizing that to do so our country must fully integrate its energy, environmental, and economic policies.

Applying these principles, we urge action to meet five specific national goals. America must modernize conservation, modernize our energy infrastructure, increase energy supplies, accelerate the protection and improvement of the environment, and increase our nation's energy security.

Modernize Conservation

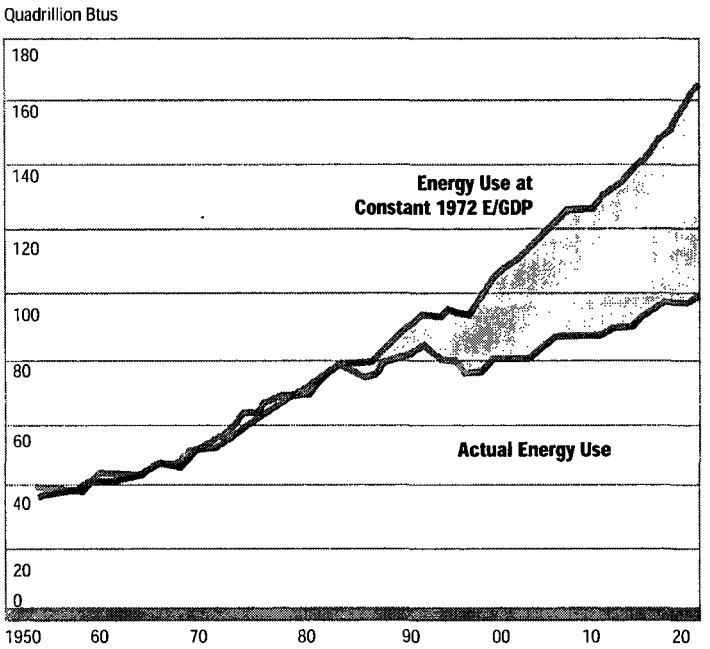
Americans share the goal of energy conservation. The best way of meeting this goal is to increase energy efficiency by applying new technology – raising productivity, reducing waste, and trimming costs. In addition, it holds out great hope for improving the quality of the environment. American families, communities, and businesses all depend upon reliable and affordable energy services for their well being and safety. From transportation to communication, from air conditioning to lighting, energy is critical to nearly everything we do in life and work. Public policy can and should encourage energy conservation.

Over the past three decades, America has made impressive gains in energy efficiency. Today's automobiles, for example, use about 60 percent of the gasoline they

"Here we aim to continue a path of uninterrupted progress in many fields... New technologies are proving that we can save energy without sacrificing our standard of living. And we're going to encourage it in every way possible."

— Vice President
Richard B. Cheney

Figure 4
U.S. Economy is More Energy Efficient (Energy Intensity)
Primary Energy Use



Improvements in energy efficiency since the 1970s have had a major impact in meeting national energy needs relative to new supply. If the intensity of U.S. energy use had remained constant since 1972, consumption would have been about 70 quadrillion Btus (74 percent) higher in 1999 than it actually was.

Source: U.S. Department of Energy, Energy Information Administration.

did in 1972, while new refrigerators require just one-third the electricity they did 30 years ago. As a result, since 1973, the U.S. economy has grown by 126 percent, while energy use has increased by only 30 percent. In the 1990s alone, manufacturing output expanded by 41 percent, while industrial electricity consumption grew by only 11 percent. We must build on this progress and strengthen America's commitment to energy efficiency and conservation.

The National Energy Policy builds on our nation's successful track record and will promote further improvements in the productive and efficient use of energy. This report includes recommendations to:

- Direct federal agencies to take appropriate actions to responsibly conserve energy use at their facilities, especially during periods of peak demand in regions where electricity shortages are possible, and to report to the President on actions taken.
- Increase funding for renewable energy and energy efficiency research and development programs that are performance-based and cost-shared.
- Create an income tax credit for the purchase of hybrid and fuel cell vehicles to promote fuel-efficient vehicles.
- Extend the Department of Energy's "Energy Star" efficiency program to include schools, retail buildings, health care facilities, and homes and extend the "Energy Star" labeling program to additional products and appliances.
- Fund the federal government's Intelligent Transportation Systems program, the fuel cell powered transit bus program, and the Clean Buses program.
- Provide a tax incentive and streamline permitting to accelerate the development of clean Combined Heat and Power technology.
- Direct the Secretary of Transportation to review and provide recommendations on establishing Corporate Average Fuel Economy (CAFE) standards with due consideration to the National Academy of Sciences study of CAFE standards to be released in July, 2001.

"For the electricity we need, we must be ambitious. Transmission grids stand in need of repair, upgrading, and expansion. . . . If we put these connections in place, we'll go a long way toward avoiding future blackouts."

— Vice President
Richard B. Cheney

Modernize Our Energy Infrastructure

The energy we use passes through a vast nationwide network of generating facilities, transmission lines, pipelines, and refineries that converts raw resources into usable fuel and power. That system is deteriorating, and is now strained to capacity.

One reason for this is government regulation, often excessive and redundant. Regulation is needed in such a complex field, but it has become overly burdensome. Regulatory hurdles, delays in issuing permits, and economic uncertainty are limiting investment in new facilities, making our energy markets more vulnerable to transmission bottlenecks, price spikes and supply disruptions. America needs more environmentally-sound energy projects to connect supply sources to growing markets and to deliver energy to homes and business.

To reduce the incidence of electricity blackouts, we must greatly enhance our ability to transmit electric power between geographic regions, that is, sending power to where it is needed from where it is produced. Most of America's transmission lines, substations, and transformers were built when utilities were tightly regulated and provided service only within their assigned regions. The system is simply unequipped for large-scale swapping of power in the highly competitive market of the 21st century.

The National Energy Policy will modernize and expand our energy infrastructure in order to ensure that energy supplies can be safely, reliably, and affordably transported to homes and businesses. This report includes recommendations to:

- Direct agencies to improve pipeline safety and expedite pipeline permitting.
- Issue an Executive Order directing federal agencies to expedite permits and coordinate federal, state, and local actions necessary for energy-related project approvals on a national basis

in an environmentally sound manner, and establish an interagency task force chaired by the Council on Environmental Quality. The task force will ensure that federal agencies set up appropriate mechanisms to coordinate federal, state and local permitting activity in particular regions where increased activity is expected.

- Grant authority to obtain rights-of-way for electricity transmission lines with the goal of creating a reliable national transmission grid. Similar authority already exists for natural gas pipelines and highways.
- Enact comprehensive electricity legislation that promotes competition, encourages new generation, protects consumers, enhances reliability, and promotes renewable energy.
- Implement administrative and regulatory changes to improve the reliability of the interstate transmission system and enact legislation to provide for enforcement of electricity reliability standards.
- Expand the Energy Department's research and development on transmission reliability and superconductivity.

Increase Energy Supplies

A primary goal of the National Energy Policy is to add supply from diverse sources. This means domestic oil, gas, and coal. It also means hydropower and nuclear power. And it means making greater use of non-hydro renewable sources now available.

One aspect of the present crisis is an increased dependence, not only on foreign oil, but on a narrow range of energy options. For example, about 90 percent of all new electricity plants currently under construction will be fueled by natural gas. While natural gas has many advantages, an over-reliance on any one fuel source leaves consumers vulnerable to price spikes and supply disruptions. There are several other fuel sources available that can help meet our needs.

Currently, the U.S. has enough coal to last for another 250 years. Yet very few coal-powered electric plants are now under construction. Research into clean coal technologies may increase the attractiveness of coal as a source for new generation plants.

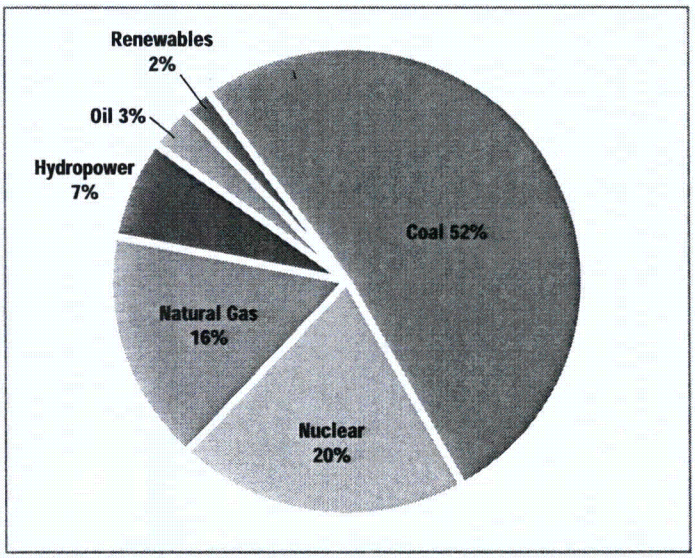
Nuclear power plants serve millions of American homes and businesses, have a dependable record for safety and efficiency, and discharge no greenhouse gases into the atmosphere. As noted earlier, these facilities currently generate 20 percent of all electricity in America, and more than 40 percent of electricity generated in 10 states in the Northeast, South, and Midwest. Other nations, such as Japan and France, generate a much higher percentage of their electricity from nuclear power. Yet the number of nuclear plants in America is actually projected to decline in coming years, as old plants close and none are built to replace them.

Enormous advances in technology have made oil and natural gas exploration and production both more efficient and more environmentally sound. Better technology means fewer rigs, more accurate drilling, greater resource recovery and envi-

"As a country, we have demanded more and more energy. But we have not brought on line the supplies needed to meet that demand.... We can explore for energy, we can produce energy and use it, and we can do so with a decent regard for the natural environment."

—Vice President
Richard B. Cheney

Figure 5
Fuel Sources for Electricity Generation in 2000



Electricity is a secondary source of energy, generated through the consumption of primary sources. Coal and nuclear energy account for nearly 75 percent of U.S. electricity generation.

Source: U.S. Department of Energy, Energy Information Administration

ronmentally friendly exploration. Drilling pads are 80 percent smaller than a generation ago. High-tech drilling allows us to access supplies five to six miles away from a single compact drilling site, leaving sensitive wetlands and wildlife habitats undisturbed. Yet the current regulatory structure fails to take sufficient account of these extraordinary advances, excessively restricting the environmentally safe production of energy from many known sources.

Our policy will increase and diversify our nation's sources of traditional and alternative fuels in order to furnish families and businesses with reliable and affordable energy, to enhance national security, and to improve the environment. This report includes recommendations to:

- Issue an Executive Order directing all federal agencies to include in any regulatory action that could significantly and adversely affect energy supplies a detailed statement on the energy impact of the proposed action.
- Open a small fraction of the Arctic National Wildlife Refuge to environmentally regulated exploration and production using leading-edge technology. Examine the potential for the regulated increase in oil and natural gas development on other federal lands.
- Earmark $1.2 billion of bid bonuses from the environmentally responsible leasing of ANWR to fund research into alternative and renewable energy resources – including wind, solar, biomass, and geothermal.
- Enact legislation to expand existing alternative fuels tax incentives to include landfills that capture methane gas emissions for electricity generation and to electricity produced from wind and biomass. Extend the number of eligible biomass sources to include forest-related sources, agricultural sources, and certain urban sources.
- Provide $2 billion over 10 years to fund clean coal technology research and a new credit for electricity produced from biomass co-fired with coal.
- Direct federal agencies to streamline the hydropower relicensing process with proper regard given to environmental factors.
- Provide for the safe expansion of nuclear energy by establishing a national repository for nuclear waste, and by streamlining the licensing of nuclear power plants.

"We will insist on protecting and enhancing the environment, showing consideration for the air and natural lands and watersheds of our country."

— Vice President
Richard B. Cheney

Accelerate Protection and Improvement of the Environment

America's commitment to environmental protection runs deep. We are all aware of past excesses in our use of the natural world and its resources. No one wishes to see them repeated. In the 21st century, the ethic of good stewardship is well established in American life and law.

We do not accept the false choice between environmental protection and energy production. An integrated approach to policy can yield a cleaner environment, a stronger economy, and a sufficient supply of energy for our future. The primary reason for that has been steady advances in the technology of locating, producing, and using energy. Since 1970, emissions of key air emissions are down 31 percent. Cars today emit 85 percent less carbon monoxide than 30 years ago. Lead emissions are down 90 percent. Lead levels in ambient air today are 98 percent lower than they were in 1970. America is using more, and polluting less.

One of the factors harming the environment today is the very lack of a comprehensive, long-term national energy policy. States confronting blackouts must take desperate measures, often at the expense of environmental standards, requesting waivers of environmental rules, and delaying the implementation of anti-pollution efforts. Shortfalls in electricity generating capacity and shortsighted policies have blocked construction of new, cleaner plants, leaving no choice but to rely on older, inefficient plants to meet demand. The increased use of emergency power sources, such as diesel generators, results in greater air pollution.

New anti-pollution technologies hold great promise for the environment. The same can be said of 21st century power generators that must soon replace older models; signifi-

cant new resources for land conservation efforts; and continued research into renewable energy sources. All have a place in the National Energy Policy.

The National Energy Policy will build upon our nation's successful track record and will promote further improvements in the productive and efficient use of energy. This report includes recommendations to:

- Enact "multi-pollutant" legislation to establish a flexible, market-based program to significantly reduce and cap emissions of sulfur dioxide, nitrogen oxides, and mercury from electric power generators.
- Increase exports of environmentally friendly, market-ready U.S. technologies that generate a clean environment and increase energy efficiency.
- Establish a new "Royalties Conservation Fund" and earmark royalties from new, clean oil and gas exploration in ANWR to fund land conservation efforts.
- Implement new guidelines to reduce truck idling emissions at truck stops.

Increase Energy Security.

The National Energy Policy seeks to lessen the impact on Americans of energy price volatility and supply uncertainty. Such uncertainty increases as we reduce America's dependence on foreign sources of energy. At the same time, however, we recognize that a significant percentage of our resources will come from overseas. Energy security must be a priority of U.S. trade and foreign policy.

We must look beyond our borders and restore America's credibility with overseas suppliers. In addition, we must build strong relationships with energy-producing nations in our own hemisphere, improving the outlook for trade, investment, and reliable supplies.

Energy security also requires preparing our nation for supply emergencies, and assisting low-income Americans who are most vulnerable in times of supply disruption, price spikes, and extreme weather.

To ensure energy security for our nation and its families, our report includes these recommendations:

- Dedicate new funds to the Low Income Home Energy Assistance Program by funneling a portion of oil and gas royalty payments to LIHEAP when oil and natural gas prices exceed a certain amount.
- Double funding for the Department of Energy's Weatherization Assistance Program, increasing funding by $1.4 billion over 10 years.
- Direct the Federal Emergency Management Administration to prepare for potential energy-related emergencies.
- Support a North American Energy Framework to expand and accelerate cross-border energy investment, oil and gas pipelines, and electricity grid connections by streamlining and expediting permitting procedures with Mexico and Canada. Direct federal agencies to expedite necessary permits for a gas pipeline route from Alaska to the lower 48 states.

Looking Toward the Future

The President's goal of reliable, affordable, and environmentally sound energy supplies will not be reached overnight. It will call forth innovations in science, research, and engineering. It will require time and the best efforts of leaders in both political parties. It will require also that we deal with the facts as they are, meeting serious problems in a serious way. The complacency of the past decade must now give way to swift but well-considered action.

Present trends are not encouraging, but they are not immutable. They are among today's most urgent challenges, and well within our power to overcome. Our country has met many great tests. Some have imposed extreme hardship and sacrifice. Others have demanded only resolve, ingenuity, and clarity of purpose. Such is the case with energy today.

We submit these recommendations with optimism. We believe that the tasks ahead, while great, are achievable. The energy crisis is a call to put to good use the resources around us, and the talents within us. It summons the best of America, and offers the best of rewards – in new jobs, a healthier environment, a stronger economy, and a brighter future for our people.

"The goals of this strategy are clear: to ensure a steady supply of affordable energy for America's homes and businesses and industries."

— President
George W. Bush

Taking Stock

Energy Challenges Facing the United States

America's current energy challenges can be met with rapidly improving technology, dedicated leadership, and a comprehensive approach to our energy needs. Our challenge is clear—we must use technology to reduce demand for energy, repair and maintain our energy infrastructure, and increase energy supply. Today, the United States remains the world's undisputed technological leader; but recent events have demonstrated that we have yet to integrate 21st-century technology into an energy plan that is focused on wise energy use, production, efficiency, and conservation.

Prices today for gasoline, heating oil, and natural gas are dramatically higher than they were only a year ago. In California, homeowners, farmers, and businesses face soaring electricity prices, rolling blackouts, increasing financial turmoil, and an uncertain energy future. Our nation's dependence on foreign sources of oil is at an all-time high and is expected to grow. Current high energy prices and supply shortages are hurting U.S. consumers and businesses, as well as their prospects for continued economic growth.

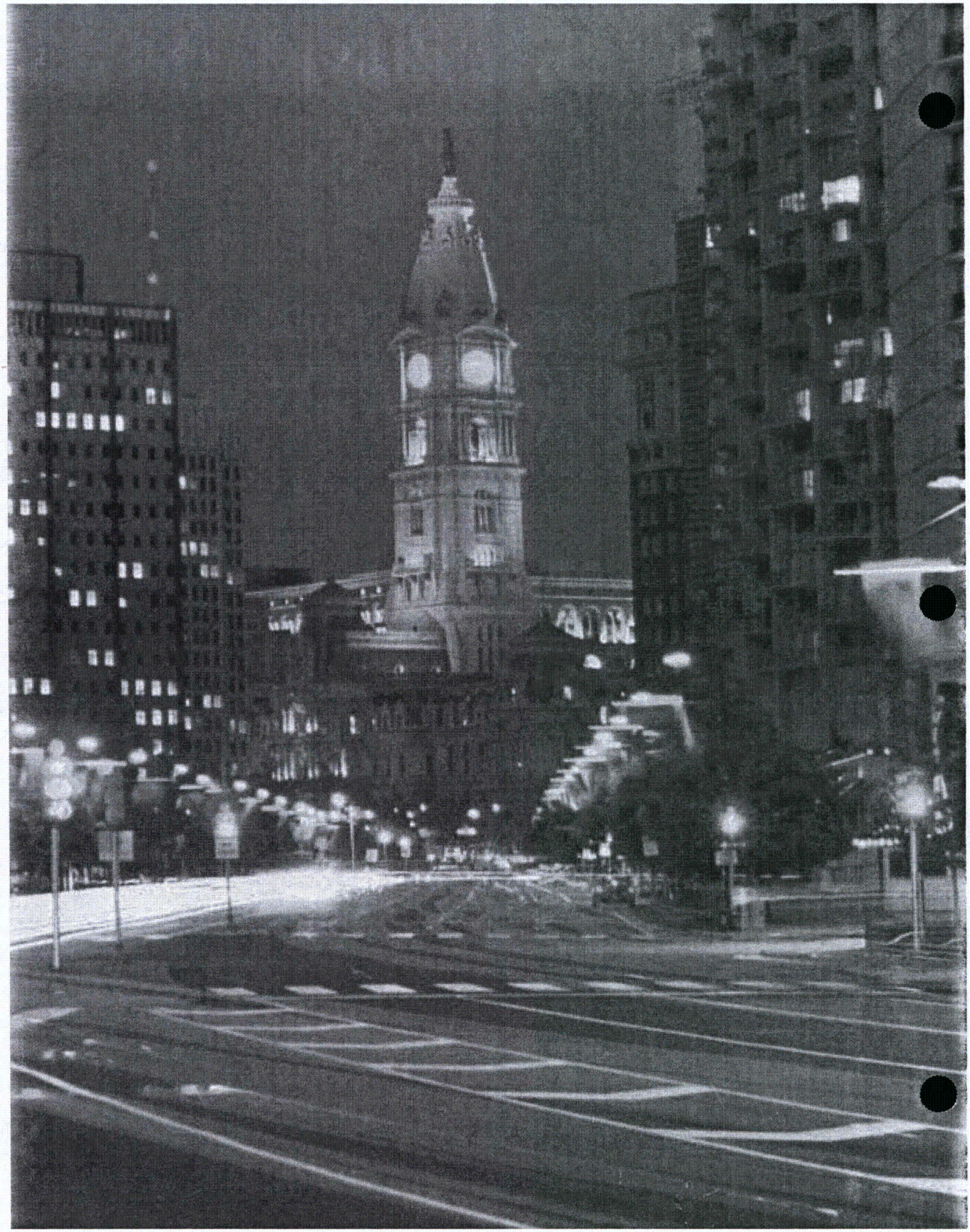
Our national energy policy must be comprehensive in scope. It must protect our environment. It must also increase our supply of domestic oil, natural gas, coal, nuclear, and renewable energy sources. Our failure over the past several years to modernize our energy infrastructure—the network of transmission lines, gas pipelines, and oil refineries that transports our energy to consumers and converts raw materials into usable fuels—is a result of the lack of careful planning and lack of a comprehensive national energy plan. The United States faces serious energy challenges: electricity shortages and disruptions in California and elsewhere in the West, dramatic increases in gasoline prices due to record-low inventories, a strained supply system, and continued dependence on foreign suppliers. These challenges have developed from years of neglect and can only be addressed with the implementation of sound policy. There are no easy, short-term solutions.

Our increased dependence on foreign oil profoundly illustrates our nation's failure to establish an effective energy policy. Between 1991 and 2000, Americans used 17 percent more energy than in the previous decade, while during that same period, domestic energy production rose by only 2.3 percent. While U.S. production of coal, natural gas, nuclear energy, and renewable energy has increased somewhat in recent years, these increases have been largely offset by declines in domestic oil production. As a result, America has met almost all of its increased energy demand over the past ten years with increased imports.

U.S. energy consumption is projected to increase by about 32 percent by 2020. Unless a comprehensive national energy policy is adopted, Americans will continue to feel the effects of an inadequate electrical transmission grid, a pipeline system stretched to capacity, insufficient domestic energy supply, and a regional imbalance in supply sources. It is important that we meet these challenges with a comprehensive energy plan that takes a long-term approach to meeting our energy needs.

The U.S. economy depends on reliable and affordable energy. In the coming months, we face several serious long-term energy challenges: electricity shortages and disruptions in California and the West, dramatic increases in gasoline prices due to record-low inventories, a strained supply system, and continued dependence on foreign suppliers.

PHILADELPHIA CONVENTION & VISITORS BUREAU



California's Energy Challenge

Recent and looming electricity blackouts in California demonstrate the problem of neglecting energy supply. They also foretell the consequences of failing to implement a long-term energy plan for our nation as a whole. Though weather conditions and design flaws in California's electricity restructuring plan contributed, the California electricity crisis is at heart a supply crisis.

Since 1995, California's peak summer demand for electricity has risen by at least 5,500 megawatts (MW), while in-state generation has failed to keep pace. California's generation shortfall did not stem from a lack of interest in building capacity. Since 1997, power producers filed applications to build an additional 14,000 MW of new capacity in California.

In addition to a lack of new generation, a crucial transmission bottleneck in the middle of the state—called Path 15—prevents power in the south from being shipped to the north during emergencies.

This year, reduced hydropower availability due to low rainfall, higher than expected unplanned plant outages, and the financial problems of California's utilities exacerbated this growing supply–demand imbalance. As a result, California's supply problem turned into a crisis, resulting in soaring electricity bills for homes and businesses and rolling blackouts.

In part due to the interconnected nature of the western electricity grid, California's critical electricity shortages have helped to drive up electricity costs in the West.

Unfortunately, there are no short-term solutions to long-term neglect. It can take new power plants and transmission facilities years to site, permit, and construct. Despite expedited federal permitting, California's emergency efforts to increase new generation by 5,000 MW by July appear to be falling short. Less than 2,000 MW of new generation is expected to be in place by summer. Even with aggressive conservation measures, peak demand this summer is projected to outstrip supply by several thousand megawatts. The California grid operator expects more than 30 days of blackouts.

California officials have warned that the crisis may last several years. Though California's efforts to increase generation may not suffice to prevent blackouts this summer, if continued and strengthened, they promise to limit the duration of the crisis.

Recommendations:

★ The National Energy Policy Development (NEPD) Group recommends that the President issue an Executive Order to direct all federal agencies to include in any regulatory action that could significantly and adversely affect energy supplies, distribution, or use, a detailed statement on (1) the energy impact of the proposed action, (2) any adverse energy effects that cannot be avoided should the proposal be implemented, and (3) alternatives to the proposed action. The agencies would be directed to include this statement in all submissions to the Office of Management and Budget of proposed regulations covered by Executive Order 12866, as well as in all notices of proposed regulations published in the Federal Register.

★ The NEPD Group recommends that the President direct the executive agencies to work closely with Congress to implement the legislative components of a national energy policy.

Conservation and Energy Efficiency

Conservation and energy efficiency are crucial components of a national energy plan. Energy efficiency is the ability to use less energy to produce the same amount of useful work or services. Conservation is closely related and is simply using less energy. Improved energy efficiency and conservation reduces energy consumption and energy costs, while maintaining equivalent service in our homes, offices, factories, and automobiles. Greater energy

efficiency helps the United States reduce energy imports, the likelihood of energy shortages, emissions, and the volatility of energy prices.

Over the last three decades, the United States has significantly improved its energy efficiency by developing and expanding the use of energy efficient technologies. Although our economy has grown by 126 percent since 1973, our energy use has increased by only 30 percent. Had energy use kept pace with economic growth, the nation would have consumed 171 quadrillion British thermal units (Btus) last year instead of 99 quadrillion Btus.

About a third to a half of these savings resulted from shifts in the economy, such as the growth of the service sector. The other half to two-thirds resulted from greater energy efficiency. Technological improvements in energy efficiency allow consumers to enjoy more energy services without commensurate increases in energy demand. The rate at which these efficiency improvements are made varies over time, depending on the extent to which factors—such as energy policies, research and development, prices, and market regulations—encourage the development of new, efficient products and consumer investment in these products. An increased rate of improvement in energy efficiency can have a large impact on energy supply and infrastructure needs, reducing the need for new power plants and other energy resources, along with reduced stress on the energy supply infrastructure.

Load management is the ability to adjust energy loads to reflect immediate supply conditions. In the very short term, direct appeals for conservation can ease strained energy supply markets for a time. Over the longer run, the ability to adjust demand on an as-needed basis can be an important source of energy reserves, resulting in lower energy bills for participating customers.

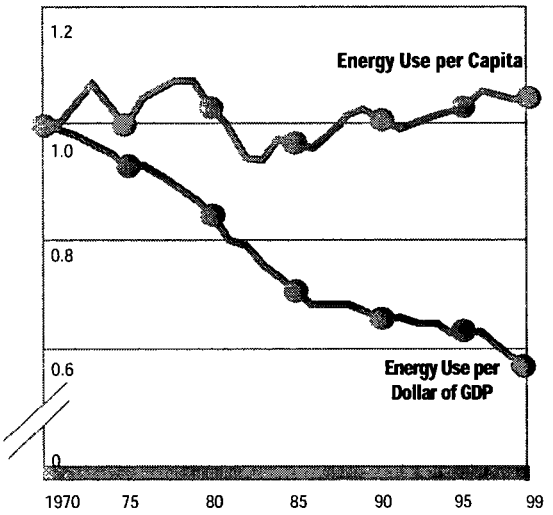
The impact that improvements in energy efficiency can have on energy supply markets grows over time. Electricity demand is projected to rise by 1.8 percent a year over the next 20 years, requiring the addition of some 393,000 MW of generation capacity. At the same time, energy efficiency is projected to continue to improve between 2000 and 2020. A decrease in demand from 1.8 percent to 1.5 percent would reduce the need for new generating capacity next year by about 2,000 MW. Extending that reduction over the next 20 years would reduce the need for new generation by 60,000 to 66,000 MW.

While this projection shows that conservation can help ensure the United States has adequate energy supplies for the future, it also shows that conservation alone is not the answer. Even with more conservation, the U.S. will need more energy supplies. Today, new technologies offer new opportunities to enhance our energy efficiency. As these technologies gain market acceptance, they will help ensure a reliable and affordable energy and electric power supply for the nation.

Energy Intensity

The energy intensity of the U.S. economy is measured by the amount of energy used to produce a dollar's worth of gross domestic product (GDP). It now takes only about 56 percent of the energy required in 1970 to produce a

Figure 1-1
U.S. Energy Use per Capita and per Dollar of GDP: 1970–1999
(Index: 1970 = 1)



The energy intensity of the U.S. economy is measured by the amount of energy used to produce a dollar's worth of gross domestic product (GDP). By that yardstick, U.S. energy intensity declined significantly between 1970 and 1985, and has continued to decline, albeit at a slower rate.

Source: U.S. Department of Energy, Energy Information Administration.

Measures of Electrical Power

A watt is a measure of the amount of energy that can be produced during a specific period of time.

1 kilowatt (KW)= 1,000 watts
1 megawatt (MW)=1million watts
1 gigawatt (GW)=1 billion watts
1 terawatt (TW)=1 trillion watts

U.S. Energy Efficiency Is Improving

- New home refrigerators now use about one-third less energy than they did in 1972.
- New commercial fluorescent lighting systems use less than half the energy they did during the 1980s.
- Federal buildings now use about 20 percent less energy per square foot since 1985.
- Industrial energy use per unit of output declined by 25 percent from 1980 to 1999.
- The chemical industry's energy use per unit of output has declined by roughly 40 percent in the past 25 years.
- The U.S. government has reduced its energy use in buildings by over 20 percent since 1985.
- The amount of energy required to generate 1 kilowatt-hour of electricity has declined by 10 percent since 1980.

What Causes Transmission Constraints?

When additional electricity flow from one area exceeds a circuit's capacity to carry that flow to another area, the overloaded circuit becomes congested and blocks a steady flow of power. To prevent transmission bottlenecks, system operators curtail transactions between areas or increase generation on the side of the constraint where the electricity is flowing and reduce generation on the opposite side. Transmission constraints result in price differences between regions that exceed differences due to line losses, because electricity can no longer flow freely to the affected area.

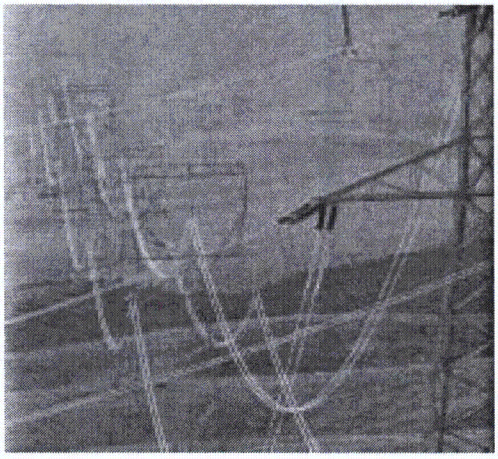
dollar of GDP today (Figure 1-1). This reduction is attributable to improved energy efficiency, as well as to structural changes in the economy, particularly the relative decline of energy-intensive industries.

The decline in the nation's energy intensity accelerated between 1999 and 2000, a period when nonenergy-intensive industries experienced rapid growth. Energy intensity is projected to continue to decline through 2020 at an average rate of 1.6 percent a year. This is a slower rate of decline than experienced in the 1970s and early 1980s, which was characterized by high energy prices and a shift to less energy-intensive industries, but is a more rapid rate of decline than experienced on average during the latter part of the 1980s and the 1990s.

Challenges Confronting Electricity Supply

Our nation's electricity supply has failed to keep pace with growing demand. This imbalance is projected to persist into the future. The adverse consequences have manifested themselves most severely in the West, where supply shortages have led to high prices and even blackouts. In other regions, inadequate supply threatens the reliability and affordability of electric power.

Large amounts of new generating capacity are slated for installation around the country from 2001 to 2004. However, there is a geographic mismatch between where we will generate energy and where it is needed. For example, little capacity is being added where it is most needed, such as in California and eastern New York.



A pressing long-term electricity challenge is to build enough new generation and transmission capacity to meet projected growth in demand.

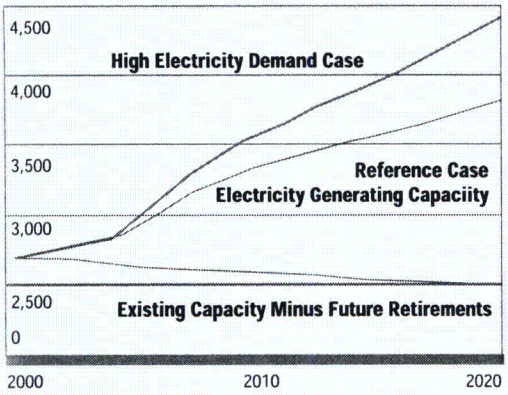
Electricity supply conditions in the Southeast are expected to be tight in the summer of 2001, much as they have been the previous two years. The Northeast may also face supply shortages. If the temperatures of the summer of 2000 had been normal rather than unseasonably cool, New York and New England would most likely have experienced electricity supply shortfalls and price spikes. Critical supply problems could arise if the weather in the summer of 2001 is unusually warm or if plant outages rise above average levels.

Our nation's most pressing long-term electricity challenge is to build enough new generation and transmission capacity to meet projected growth in demand. Across the country, we are seeing the same signs that California faced in the mid-1990s: significant economic regulatory uncertainty, which can result in inadequate supply. This level of uncertainty can vary across the country, depending on state and local regulations. Of the approximately 43,000 MW of new generating capacity that power companies planned in 1994 for construction from 1995 to 1999, only about 18,000 MW were actually built. Although plans have been announced to build more capacity than the country will need over the next five to seven years, this new construction assumes market and regulatory conditions that are not yet assured. Over the next twenty years, the United States will need 1,300 to 1,900 new power plants, which is the equivalent of 60 to 90 new power plants a year (Figure 1-2).

But even with adequate generating capacity, we do not have the infrastructure to ensure reliable supply of electricity. Investment in new transmission capacity has failed to keep pace with growth in demand and with changes in the industry's structure. Since 1989, electricity sales to consumers have increased by 2.1 percent annually, yet transmission capacity has increased by only 0.8 percent annually. As electricity markets become more regional, transmission constraints are impeding the movement of electricity both within and between regions.

The price spikes in the Midwest in the summer of 1998 were in part caused by trans-

Figure 1-2
The U.S. Needs More Power Plants



The nation is going to require significant new generation capacity in the next two decades. Depending on demand, the United States will need to build between 1,300 and 1,900 new power plants—or about one new power plant a week.

Source: U.S. Department of Energy, Energy Information Administration.

mission constraints, which limited the region's ability to import electricity from other regions at a time of high demand. Transmission bottlenecks contributed to the blackouts in California over the past year, and have been a persistent cause of price spikes in New York City during peak demand. Constraints on New England's ability to import low-cost power from Canada could raise electricity prices during periods of high demand.

Electricity is a secondary source of energy, generated through the consumption of primary sources (Figure 1-3). The largest source of U.S. electricity generation is coal, followed by nuclear energy, natural gas, hydropower, oil, and non-hydropower renewable energy.

Coal

Coal is America's most abundant fuel source. The United States has a 250-year supply of coal. Over 1 billion tons of coal were produced in 25 states in 2000. About 99.7 percent of U.S. coal production is consumed domestically, with electricity generation accounting for about 90 percent of coal consumption.

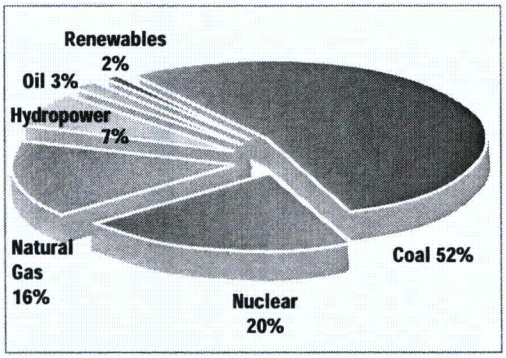
After peaking in 1982, coal prices have generally declined. This trend is projected to continue through 2020, reflecting an expanding shift into lower-cost western coal production and substantial increases in productivity. While coal is expected to remain the dominant fuel in meeting increasing U.S. electricity demand through 2020, energy policy goals must be carefully integrated with environmental policy goals. The Clean Air Act Amendments of 1990 and related state regulations require electricity generators to reduce emissions of sulfur dioxide and nitrogen oxide.

Nuclear Energy

Nuclear energy is the second-largest source (20 percent) of U.S. electricity generation. Nuclear power is used exclusively to generate electricity. Nuclear power has none of the emissions associated with coal and gas power plants, including nitrogen oxides, sulfur dioxide, mercury and carbon dioxide. Costs of electricity generation by nuclear plants compare favorably with the costs of generation by other sources.

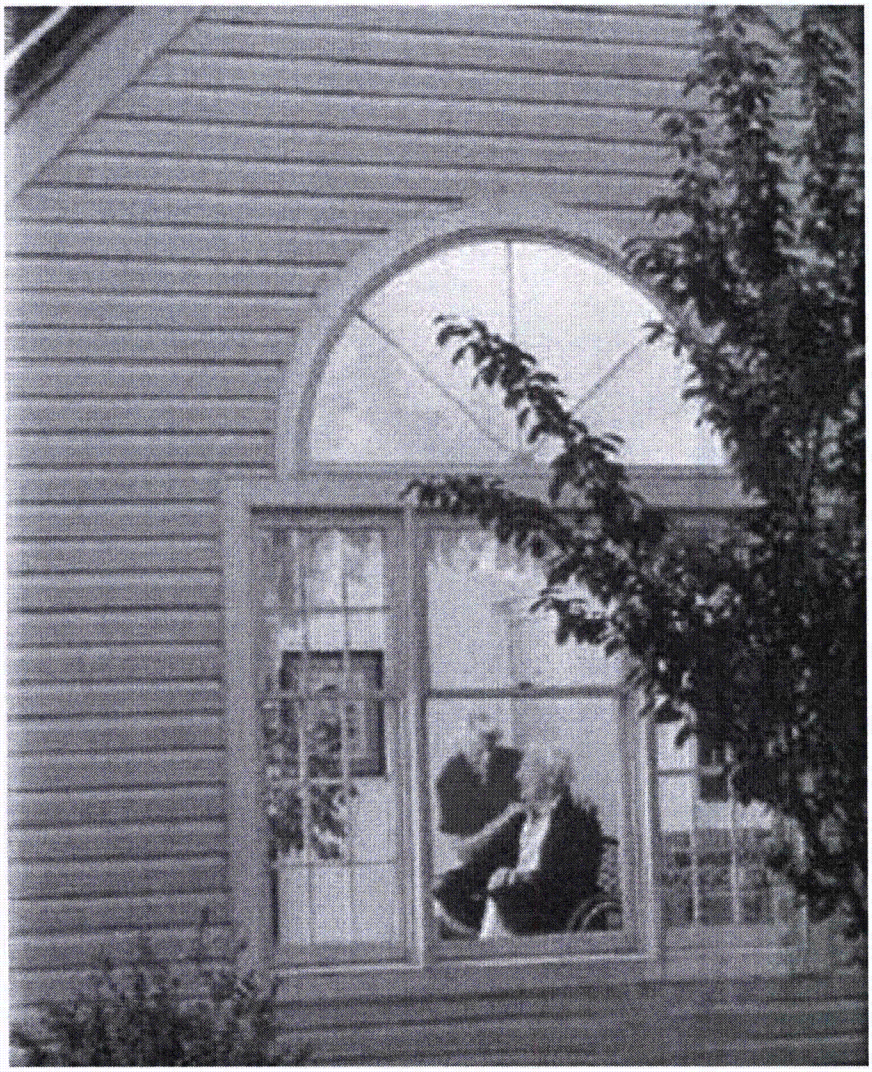
While the number of nuclear plants has declined due to retirements, nuclear electricity generation has steadily increased in recent years. Several factors have created a more favorable environment for nuclear energy: safe, standardized plant designs; an improved licensing process; effective safety oversight by the Nuclear Regulatory Commission (NRC); the advent of new technologies; and uncertain, volatile natural gas prices. This more favorable environment has resulted in increased re-licensing of nuclear plants and the consolidation of several plants in the hands of fewer, more experienced operators.

Figure 1-3
Fuel Sources for Electricity Generation in 2000



Electricity is a secondary source of energy, generated through the consumption of primary sources. Coal and nuclear energy account for over 70 percent of U.S. electricity generation.

Source: U.S. Department of Energy, Energy Information Administration.



Many Americans received high heating bills this winter as a result of sharp increases in natural gas prices.

The nuclear industry is closely regulated by the NRC, which provides oversight of the operation and maintenance of these plants. This oversight includes a comprehensive inspection program that focuses on the most significant potential risks of plant operations, and features full-time resident inspectors at each plant, as well as regional inspectors with specialized expertise. In addition to rigorous inspection criteria, the installation of new design features, improvements in operating experience, nuclear safety research, and operator training have all contributed to the nuclear industry's strong safety record.

An important challenge to the use of nuclear energy is the issue of safe and timely long-term storage of spent nuclear fuel and high- and low-level radioactive waste. Currently, no plans exist to construct any new nuclear plants. However, due to more favorable conditions, the decline in nuclear energy generation has not been as rapid as was predicted only a few years ago, as evidenced by increased re-licensing.

Natural Gas

Natural gas is the third-largest source of U.S. electricity generation, accounting for 16 percent of generation in 2000. Under existing policy, natural gas generating capacity is expected to constitute about 90 percent of the projected increase in electricity generation between 1999 and 2020. Electricity generated by natural gas is expected to grow to 33 percent in 2020—a growth driven by electricity restructuring and the economics of natural gas power plants. Lower capital costs, shorter construction lead times, higher efficiencies, and lower emissions give gas an advantage over coal and other fuels for new generation in most regions of the country.

However, natural gas is not just an electricity source. It is used in many different ways, including as vehicle fuel, as industrial fuel, and in our homes. In addition, natural gas is used as a feedstock during the manufacturing process of such products as chemicals, rubber, apparel, furniture, paper, clay, glass, and other petroleum and coal products. Overall, natural gas accounts for 24 percent of total U.S. energy consumed and for all purposes 27 percent of domestic energy produced.

Eighty-five percent of total U.S. natural gas consumption is produced domestically. The import share of consumption rose from 5 percent in 1987 to 15 percent in 2000, and net imports have comprised more than 50 percent of the growth in gas demand since 1990. Canada, with very large gas supplies and easy pipeline access to the lower 48 states, accounts for nearly all U.S. natural gas imports. Unlike oil, almost all natural gas is produced and sold within the same region. Therefore, prices are determined by regional, rather than global, markets.

In 2000, natural gas prices moved

sharply higher after fifteen years of generally flat prices. Futures prices surged by 320 percent in 2000 to an all-time high of $9.98 per million Btus in late December 2000—nearly five times higher than the $2.05 per million Btu average from 1991 to 1999. While prices have declined since the beginning of 2001, they remain much higher than recent levels.

Between 2000 and 2020, U.S. natural gas demand is projected by the Energy Information Administration to increse by more than 50 percent, from 22.8 to 34.7 trillion cubic feet. Others, such as Cambridge Energy Research Associates, expect gas consumption to increase by about 37 percent over that period. Growth is projected in all sectors—industrial, commercial, residential, transportation, and electric generation. More than half of the increase in overall gas consumption will result from rising demand for electricity generation.

Although high natural gas prices have negative effects on consumers, businesses, industries, and the economy as a whole, they also promote more rapid development and adoption of new energy efficient technologies, investment in distribution systems, and greater investment in exploration and development. Although these market responses do not occur rapidly enough to prevent near-term price spikes, over time, they help to hold down prices.

As a result of the sharp increase in natural gas prices, many consumers received historically high utility bills this winter. The price spike has had a particularly severe impact on low-income consumers who use natural gas for heating. In recent months,.5 million consumers have applied for federal and state assistance to pay their heating bills—an increase of 1 million consumers over last year.

The projected rise in domestic natural gas production—from 19.3 trillion cubic feet in 2000 to 29.0 trillion cubic feet in 2020—may not be high enough to meet projected demand. In the near term, incremental production of natural gas is expected to come primarily from unconventional sources in the Rocky Mountain, Gulf Coast, and mid-continent regions; the North Slope of Alaska; and the offshore Gulf of Mexico. Onshore federal lands currently contribute about 10 percent of U.S. production, and federal offshore production contributes about 26 percent.

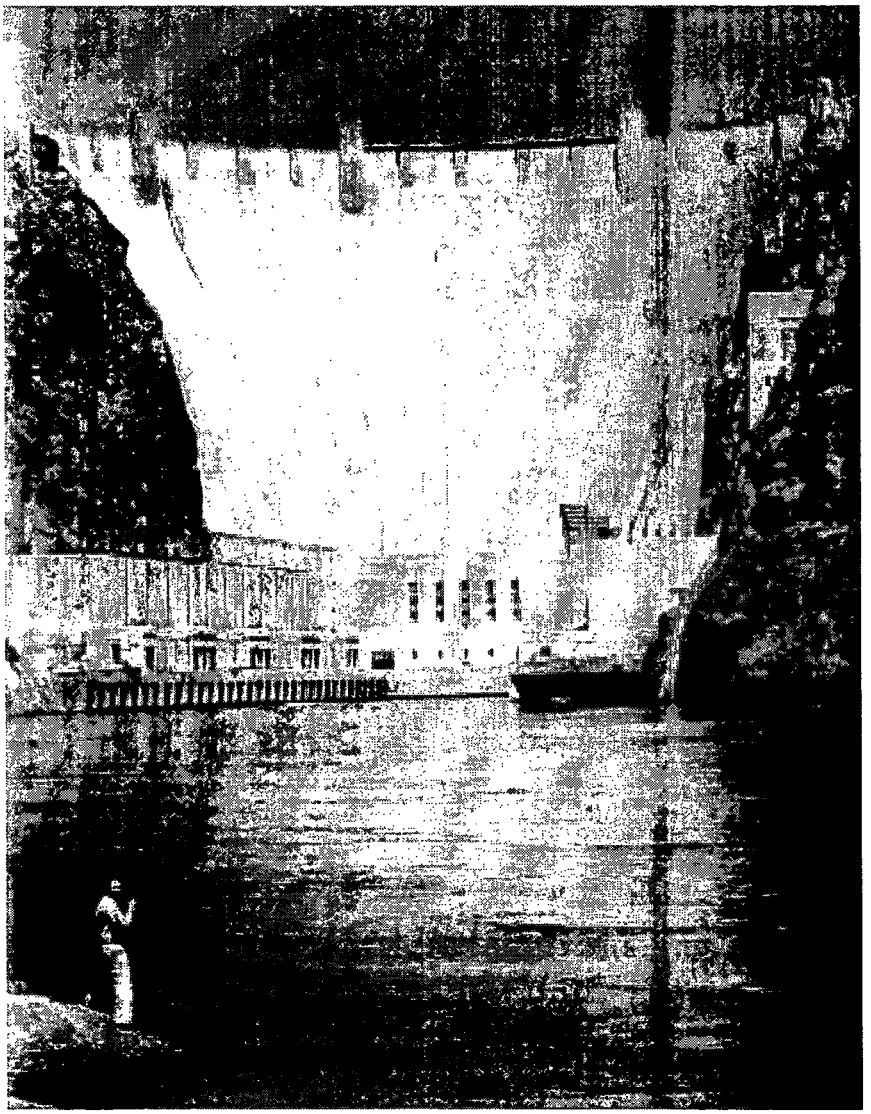
The most significant long-term challenge relating to natural gas is whether adequate supplies can be provided to meet sharply increased projected demand at reasonable prices. If supplies are not adequate, the high natural gas prices experienced over the past year could become a continuing problem, with consequent impacts on electricity prices, home heating bills, and the cost of industrial production. These concerns will redouble if policy decisions sharply reduce electricity generation by any other source, since it is doubtful that natural gas electricity generation could expand to the extent necessary to compensate for that loss of generation.

To meet this long-term challenge, the United States not only needs to boost production, but also must ensure that the natural gas pipeline network is expanded to the extent necessary. For example, although natural gas electricity generation in New England is projected to increase by 16,000 MW through 2000, bottlenecks may block the transmission of necessary supplies. Unless pipeline constraints are eliminated, they will contribute to supply shortages and high prices, and will impede growth in electricity generation.

Hydropower

Hydropower is the fourth-largest source of U.S. electricity generation, accounting for about 7 percent of total generation in 2000. In some regions of the country, such as the Northwest and New York, hydropower makes a much bigger contribution to electricity generation. Although the United States is second only to Canada in hydropower generation, hydropower generation has remained relatively flat in the United States for years.

Hydropower has significant environmental benefits. It is a form of low-cost electricity generation that produces no emissions, and it will continue to be an important source of U.S. energy for the future. Given the potential impacts on fish and wildlife, however, it is important to ef-



Hydropower is the fourth-largest source of U.S. electricity generation. The most significant challenge confronting this source of energy is regulatory uncertainty regarding the federal licensing process.

ficiently and effectively integrate national interests in both natural resource preservation and environmental protection with energy needs.

There are two categories of hydropower projects in the United States: (1) those operated by federal electric utilities, such as the federal power marketing administrations (Bonneville, Western, Southwestern, and Southeastern); and (2) the approximately 2,600 non-federal hydropower dams licensed or exempted by the Federal Energy Regulatory Commission (FERC). The federal utilities have large hydropower systems operated by the Bureau of Reclamation and Army Corps of Engineers, and play an important role meeting electricity demand, especially in the Northwest and the West. Hydropower projects operate with multiple purposes, such as electricity generation, flood control, navigation, and irrigation.

Although most potential for hydropower has already been developed, there is some undeveloped hydropower capacity in the United States. Much of this capacity could be expanded without constructing a new dam.

The most significant challenge confronting hydropower is regulatory uncertainty regarding the federal licensing process. The process is long and burdensome, and decision-making authority is spread across a range of federal and state agencies charged with promoting different public policy goals. Reforms can improve the hydropower licensing process, ensuring better public participation, ensuring that effective fish and wildlife conditions are adopted, and providing interagency resolution before conflicting mandatory license conditions are presented. The licensing process needs both administrative and legislative reforms. In addition, FERC should be encouraged to adopt appropriate deadlines for its own actions during the process.

Oil

Oil accounts for approximately 3 percent of electricity generation. Oil is used as a primary source to fire electricity generation plants in some regions. Specifically, oil is an important source of electricity in Hawaii, Florida, and some northeastern states. Oil can also be used an additional source of fuel for electricity generation in plants that can use either natural gas or oil. However, electricity generation from oil is projected to decline to about one-half of one percent of total electricity generation by 2020.

Renewable Energy: A Growing Resource

Renewable energy technologies tap natural flows of energy—such as water, wind, solar, geological, and biomass sources—to produce electricity, fuels, and heat. Non-hydropower renewable electricity generation is projected to grow at a faster rate

than all other generation sources, except natural gas. These sources of energy are continuously renewable, can be very clean, are domestically produced, and can generate income for farmers, landowners, and others. Although its production costs generally remain higher than other sources, renewable energy has not experienced the price volatility of other energy resources.

Non-hydropower renewable energy sources currently account for only about 4 percent of total energy consumption and 2 percent of total electricity generation. The sources of non-hydropower renewable electricity generation are biomass (the direct combustion of plant matter and organic residues, such as municipal solid waste use); geothermal (use of naturally occurring steam and hot water); wind; and solar. Biomass and geothermal account for most renewable electricity generation.

The most important long-term challenge facing renewable energy remains economic. Renewable energy costs are often greater than those of other energy sources. However, these costs have declined sharply in recent years, due to improved technology. If this trend continues, renewable energy growth will accelerate. By 2020, non-hydropower renewable energy is expected to account for 2.8 percent of total electricity generation.

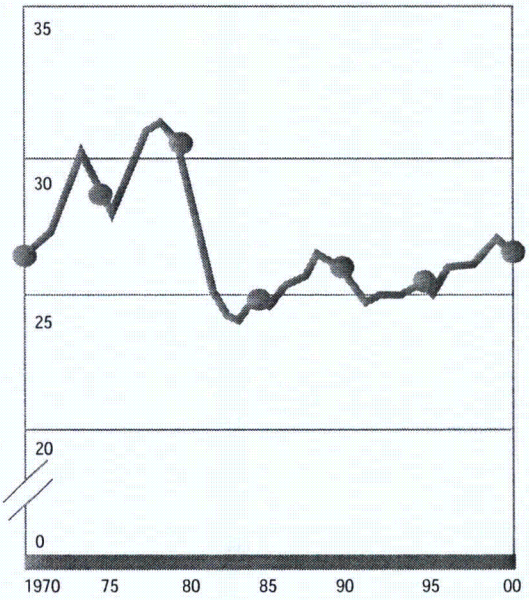
Transportation Energy Needs

Oil is the nation's largest source of primary energy, serving almost 40 percent of U.S. energy needs. In 2000, the United States consumed an average of 19.5 million barrels of oil every day. Transportation fuels account for about two-thirds of our oil consumption, and the industrial sector for 25 percent. Residential and commercial uses, such as heating oil and propane—important fuels in the Northeast and Midwest—account for most of the rest.

The share of oil in U.S. energy supply has declined since the early 1970s, the result of growth in other fuels, particularly coal and nuclear. Per capita oil consumption, which reached a peak in 1978, has fallen by 20 percent from that level (Figure 1-4).

Figure 1-4
U.S. Per Capita Oil Consumption: 1970–2000

(Barrels per Year)



Per capita oil consumption reached a peak in 1978 of 31 barrels. it has fallen by 20 percent since then to 26 barrels per capita.

Source: U.S. Department of Energy, Energy Information Administration

Renewable energy technologies tap natural flows of energy to produce electricity, fuels, and heat.
U.S. Department of Energy, National Renewable Energy Laboratory

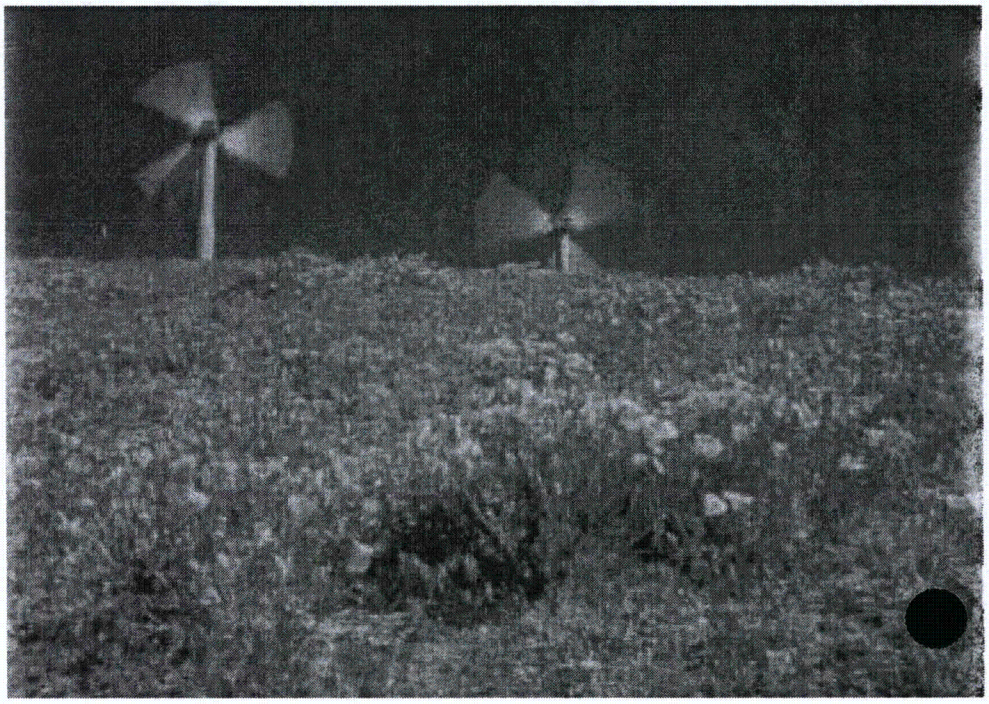
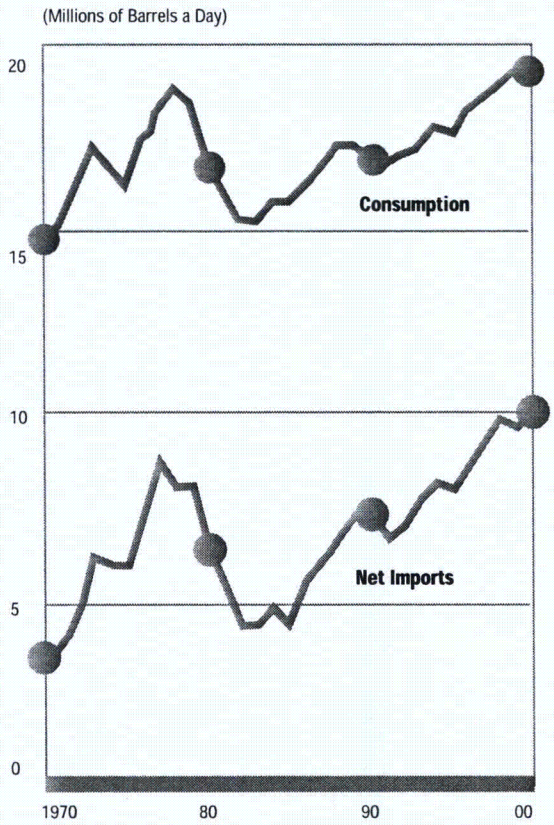


Figure 1-5
Dependence on Foreign Sources of Oil



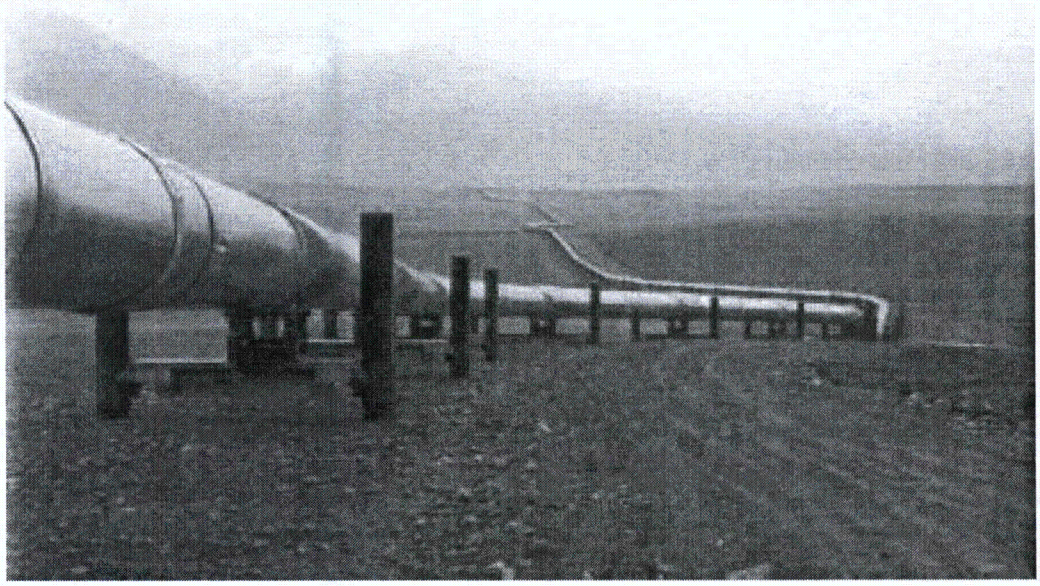
U.S. dependence on oil imports is a serious long-term challenge. The economic security of our nation and our trading partners will remain closely tied to global oil market developments.

Source: U.S. Department of Energy, Energy Information Administration.

In 2020, oil is projected to account for roughly the same share of U.S. energy consumption as it does today.

The United States has been a net importer of energy since the 1950s, and U.S. dependence on imports has grown sharply since 1985 (Figure 1-5). Today, oil accounts for 89 percent of net U.S. energy imports. Net oil imports account for most of the rise in energy imports since the mid-1980s, and have grown from about 4.3 million barrels per day (bpd) in 1985 to 10 million bpd in 2000.

World oil prices have been marked by notable price volatility over the past several years. For example, the average initial purchase price of crude oil rose from $8.03 a barrel in December 1998 to $30.30 a barrel in November 2000. Spot prices rose even higher. This dramatic price swing was the product of several events. A series of production cuts by the Organization of Petroleum Exporting Countries (OPEC) in 1998 and 1999 sharply curtailed global oil supplies. At the same time, rebounding demand for oil in Asia following roughly two years of economic weakness, and rapid economic growth in the United States boosted oil consumption and squeezed supplies even further. By September 2000, oil prices peaked as markets faced limited supply of crude and petroleum products



U.S. Department of Transportation

Domestic oil supply cannot be increased unless several access and infrastructure challenges are addressed. For example, U.S. refining and pipeline capacity has not kept pace with increasing demand for petroleum products.

ahead of the winter season, when demand is typically higher. In December 2000, oil prices fell after the market absorbed the impact of a series of OPEC production increases.

This recent price volatility illustrates the effect of intermittent market power exerted by cartel behavior in a global petroleum market. Moreover, prices are set in a market where supply is geographically concentrated. Almost two-thirds of world proven reserves are in the Middle East. Elsewhere, Central and South America account for 9 percent; Africa, 7 percent; North America, 5 percent; Eastern Europe and the former Soviet Union, 5 percent; the rest of Asia, 4 percent; and Western Europe, 2 percent. OPEC's huge oil reserves and production capacity and its periodic efforts to influence prices add to volatility in the market.

Oil prices are expected to remain high through 2002, affecting the cost of transportation, heating, electricity generation, and industrial production. High oil prices mean high prices for petroleum products, such as gasoline, diesel fuel, heating oil, propane, and jet fuel. The summer 2001 base case average gasoline price from the Department of Energy *Short-Term Energy Outlook* is $1.49 per gallon. However, prices have risen more rapidly than anticipated since the report's release, and a much higher summer average in the range of $1.50 to $1.65 per gallon is likely. Some areas have already experienced gasoline prices above $2.00 per gallon. Gasoline inventories going into the driving season are projected to be lower than last year, which could set the stage for regional supply problems that once again create significant price volatility in gasoline markets.

Because the United States is a mature oil-producing region, production costs are often higher than in foreign countries.

Price Volatility in Gasoline Markets

During the early summer of 2000, low inventories set the stage for a gasoline price run-up in the Midwest. Several pipeline and refinery problems sent marketers scrambling for limited supplies of both reformulated gasoline (RFG) and conventional gasoline, driving prices up rapidly. In Chicago, the spot price for blend stock for RFG, excluding ethanol, doubled in about six weeks, from 83 cents per gallon on April 25 to $1.65 on June 7. Spot prices then fell back over the next five weeks to 84 cents on July 12 as extra supply began arriving. Retail regular-grade RFG prices in the Midwest rose from $1.47 on April 24 to just over $2.00 per gallon on June 19, before falling back to $1.43 by July 24, showing the typical tendency of

retail prices to lag spot price changes.

Refiners face additional challenges as a result of various state and local clean fuel requirements for distinct gasoline blends ("boutique fuels"). These different requirements sometimes make it difficult, if not impossible, to draw on gasoline supplies from nearby areas or states to meet local needs when the normal supply is disrupted.

In 2000, very low inventories of gasoline and other refined products on the U.S. East and Gulf coasts increased the market's susceptibility to external shocks, such as operating problems in refineries or pipelines, or short-term surges in demand. Last winter, heating oil prices were at near-record levels. During 2000, the federal government reduced the vulnerability of the Northeast to heating oil shortages, such as those experienced in January 2000, by creating a 2-million-barrel heating oil reserve in New Jersey and Connecticut.

Because the United States is a mature oil-producing region, production costs are often higher than in foreign countries, particularly OPEC countries. In addition, access to promising domestic oil reserves is limited. U.S. oil production in the lower 48 states reached its peak in 1970 at 9.4 million bpd. A surge in Alaskan North Slope oil production beginning in the late 1970s helped postpone the decline in overall U.S. production, but Alaska's production peaked in 1988 at 2 million bpd, and fell to 1 million bpd by 2000. By then, U.S. total oil output had fallen to 5.8 million bpd, 39 percent below its peak.

By 2020, U.S. oil production is projected to decline from 5.8 to 5.1 million bpd under current policy. However, oil consumption is expected to rise to 25.8 million bpd by 2020, primarily due to growth in consumption of transportation fuels. Given existing law, production from offshore sources, particularly the Gulf of Mexico, is predicted to play an increasingly important role in the future, accounting for a projected high of 40 percent of domestic oil production by 2010, up from 27 percent today. Technological advances can mitigate the decline in U.S. oil production by enhancing recovery from domestic oil reserves and lowering production costs.

Our projected growing dependence on oil imports is a serious long-term challenge. U.S. economic security and that of our trading partners will remain closely tied to global oil market developments. Without a change in current policy, the share of U.S. oil demand met by net imports is projected to increase from 52 percent in 2000 to 64 percent in 2020. By 2020, the oil for nearly two of every three gallons of our gasoline and heating oil could come from foreign countries. The sources of this imported oil have changed considerably over the last thirty years, with more of our imports coming from the Western Hemisphere. Despite progress in diversifying our oil suppliers over the past two decades, the U.S. and global economies remain vulnerable to a major disruption of oil supplies.

The Strategic Petroleum Reserve (SPR), the federal government's major tool for responding to oil supply disruptions, has not kept pace with the growth in imports. The number of days of net oil import protection provided by the Reserve declined from 83 days of imports in 1992 to 54 days of imports today. Net domestic oil imports have increased significantly since 1992, while the SPR's oil inventory actually decreased.

Domestic oil supply cannot be increased unless several access and infrastructure challenges are addressed. U.S. refining and pipeline capacity has not kept pace with increasing demand for petroleum products. Unless changes take place, the net effect will likely be increased imports, regionally tight markets, and circumstances in which prices for gasoline, heating oil, and other products rise independently of oil prices.

Greater price volatility for gasoline, diesel fuel, heating oil, propane, and jet fuel is likely to become a larger problem over time, unless additional refining capacity and expanded distribution infrastructure can be developed at the same time cleaner products are required. Increasing domestic oil production and reducing demand, particularly for transportation fuels, will re-

quire adoption of a comprehensive national energy policy.

Alternative Transportation Fuels

Development of alternative fuels such as ethanol and other biofuels (liquid fuels derived from organic matter, such as crops), natural gas, and electricity, can help diversify the transportation sector that is so reliant on oil.

Ethanol, a biofuel based on starch crops such as corn, is already making a significant contribution to U.S. energy security, displacing more oil than any other alternative fuel. Other biofuels, such as biodiesel, which can be made from soybean, canola oils, animal fats, and vegetable oils, are making an increasingly important contribution

The success of the federal alternative fuels program has been limited, however. The program focuses on mandating that certain fleet operators purchase alternative fueled vehicles. The hope was that this vehicle purchase mandate would lead to expanded use of alternative fuels. That expectation has not been realized, since most fleet operators purchase dual-fueled vehicles that operate on petroleum motor fuels. Reforms to the federal alternative fuels program could promote alternative fuels use, such as expanding the development of an alternative fuels infrastructure.

Summary of Recommendations

Taking Stock: Energy Challenges Facing the United States

★ The NEPD Group recommends that the President issue an Executive Order to direct all federal agencies to include in any regulatory action that could significantly and adversely affect energy supplies, distribution, or use, a detailed statement on: (1) the energy impact of the proposed action, (2) any adverse energy effects that cannot be avoided should the proposal be implemented, and (3) alternatives to the proposed action. The agencies would be directed to include this statement in all submissions to the Office of Management and Budget of proposed regulations covered by Executive Order 12866, as well as in all notices of proposed regulations published in the Federal Register.

★ The NEPD Group recommends that the President direct the executive agencies to work closely with Congress to implement the legislative components of a national energy policy.

★ The NEPD Group recommends to the President that the NEPD Group continue to work and meet on the implementation of the National Energy Policy, and to explore other ways to advance dependable, affordable, and environmentally responsible production and distribution of energy.

Note: All recommendations in this report are subject to execution in accordance with applicable law. Legislation would be sought where needed. Also, any recommendations that involve foreign countries would be executed in accordance with the customs of international relations, including appropriate diplomatic consultation.

Regional U.S. Energy Challenges

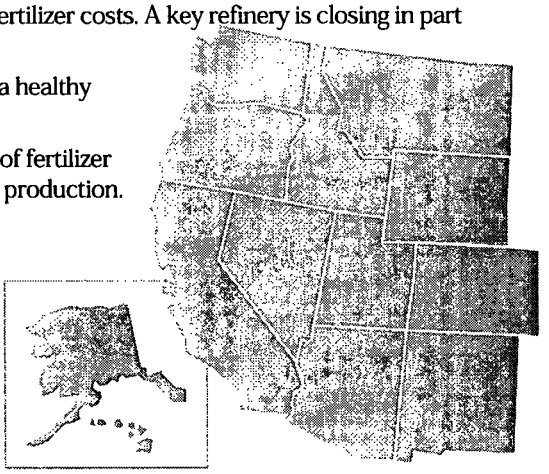
Midwest

Energy consumption in the Midwest is dominated by the industrial sector, the sector with the fastest-growing consumption rate through 2020. The transportation sector has the second-fastest consumption growth rate through 2020. States are affected by higher prices for natural gas, propane, and gasoline, and they expect gasoline price spikes this summer. Electricity supplies in some parts of the region may be tight during peak summer demand. High energy prices will drive up farm operating costs, particularly for fertilizer, irrigation, grain drying, and fuel for tractors.

Illinois consumers are reeling from high heating and cooling costs. Landlords are forced to pass on these costs in the form of higher rents. Farmers face low commodity prices, high fuel costs, and dramatically higher fertilizer costs. A key refinery is closing in part because of the cost of meeting cleaner-burning gasoline requirements.

Minnesota's residential electricity use has increased due to population growth and a healthy economy.

Iowa imports over 90 percent of its energy. Farmers are paying twice the 1999 price of fertilizer because of higher prices for natural gas, which is a major component in the fertilizer production.



West

Energy consumption in the West is dominated by the transportation sector, which is followed closely by the industrial sector. The region's drought emergency is exacerbating an already challenging energy picture. California is likely to experience more severe electricity blackouts this summer. The Pacific Northwest faces a major shortage of hydropower generation due to low water levels. Electricity prices will remain high in the West until more supply is added. Gasoline could be in short supply this summer in California and other states.

California's energy consumption has grown by about 7 percent a year, while production has remained flat. The point has been reached where demand is occasionally exceeding supply, which has caused rolling blackouts. The situation is likely to worsen this summer when demand will peak.

Oregon's lowest snow pack in history will result in the most severe short-term electricity problem in decades. The state will face high spot market prices and reports the highest gasoline prices in the country.

Washington businesses are closing down or cutting back on production. Electricity costs of $400 per unit compared to $35 a year ago contributed to the closure of a major paper plant employing 800 employees.

Colorado small business are suffering as well. A 169 percent jump in natural gas prices in one year may force small businesses to close.

Idaho utilities are offering to pay their irrigation customers to not farm portions of their fields to reduce electricity demand and make that saved power available for other local customers. The low snow pack has reduced water in river systems needed for hydropower generation.

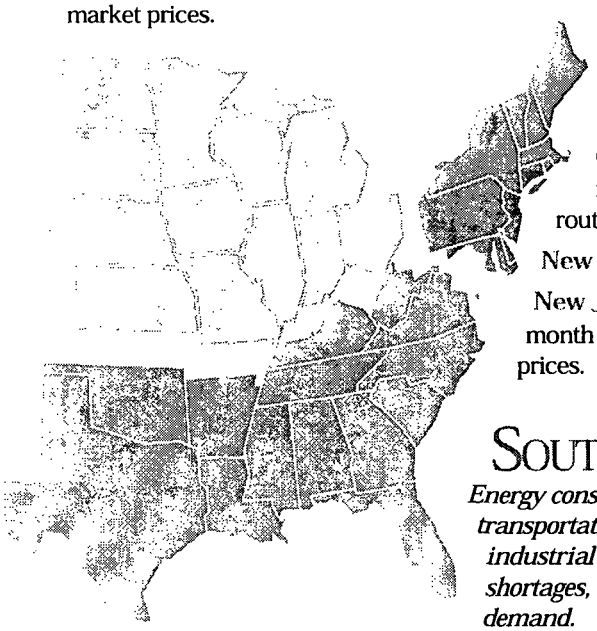
Hawaii's geographic isolation contributes to its many energy issues, such as importing 100 percent of its energy, its disproportionately high consumption of jet fuel and heavy reliance on tourism, and its dependence on imported oil for over 90 percent of its primary energy, the majority from sources in the Asia-Pacific region. Electricity is produced mainly from oil, including residuals and distillates from refineries and coal. Because the Islands' electric grids are not interconnected, electric utilities must operate with high reserve margins.

Nevada is covered in large part by federal lands that require federal approval for permitting new transmission and generation facilities. The permitting process can be protracted and cumbersome, despite efforts by federal agencies to streamline and coordinate. The desert climate requires both heating and cooling, the cost of which can be burdensome. While the desert climate is also conducive to geothermal, wind, and solar technologies, additional work is needed to make these technologies economically competitive.

NORTHEAST

Energy consumption in the Northeast is dominated by the transportation sector. Forecasts developed by the Energy Information Administration indicate that the transportation sector will also remain the dominant sector with the fastest-growing consumption rate through 2020. Northeast states' energy challenges include reducing vehicle pollution and interstate transport of power plant emissions. Heavy dependence on heating oil results in disproportionate impacts during cycles of high prices. Energy supplies in the region are limited by electric transmission and gas pipeline bottlenecks.

New York is rushing to complete 11 small natural gas turbines to avoid blackouts in New York City this summer, where customers pay market prices.



Delaware needs upgraded transmission lines to handle increasing loads. Traditional distributed generation using diesel generators may address these shortfalls, but could raise environmental problems.

Connecticut expects no power shortages this summer, but brownouts are possible if there is a prolonged spike in energy use while power plants are shut down for routine maintenance.

New Hampshire must conserve power on hot days to avoid summer blackouts.

New Jersey regulators have had to allow utilities to raise natural gas rates by 2 percent a month through July 2001 to make up for money lost during the winter due to high fuel prices.

SOUTH

Energy consumption in the South is dominated by the industrial sector, followed by the transportation sector. The transportation sector, however, is expected to grow faster than the industrial sector through 2020. While no state in the region anticipates summer power shortages, electricity supplies in parts of the region may be tight during peak summer demand.

Arkansas' costs of natural gas and propane have doubled and then tripled, contributing to employee layoffs.

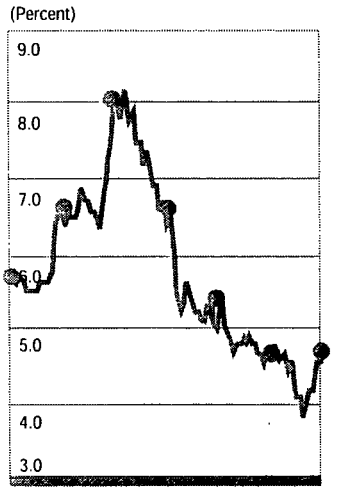
Oklahoma's second-largest industry is the oil and gas industry. The volatility of oil and gas markets can severely affect Oklahomans and the state's economy.

Striking Home

The Impacts of High Energy Prices on Families, Communities, and Businesses

American families, communities, and businesses all depend on reliable and affordable energy for their health, safety, and livelihood. Energy is a critical component of nearly everything that affects our daily lives, from transportation to communication, from food production to medical services, and from air conditioning to heating. Americans expect these services to enhance our lives, and are keenly aware that each additional, unanticipated energy expense is a decrease in funds available for other needs.

Figure 2-1
Income Spent on Energy



Until recently, the share of disposable household income spent on energy steadily declined, falling to a low of 3.8 percent at the end of 1998. Higher prices for oil and other energy products and record cold temperatures in late 2000 bumped this share up to 4.8 percent in the fourth quarter.

Note: Plotted quarterly through the fourth quarter of 2000.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Recommendation:

★ The NEPD Group recommends that the President direct the Secretary of Energy to explore potential opportunities to develop educational programs related to energy development and use. This should include possible legislation to create public education awareness programs about energy. Such programs should be long-term in nature, should be funded and managed by the respective energy industries, and should include information on energy's compatibility with a clean environment.

Impacts of High Energy Prices on the Daily Lives of Americans

Many American families and businesses have already felt the strain of rising prices and unreliable energy supplies. Every time energy prices rise, American families have fewer dollars available to meet their needs. Low-income households, energy-intensive industries, and farmers generally find it difficult to make rapid adjustments to energy price increases.

Rising oil prices act like a tax by foreign oil exporters on Americans. Changing energy prices impose economic costs, such as forcing plants to change schedules, replace machinery, or even shut down. These costs can eventually impact economic growth. So far, increased capital investment by domestic energy producers has offset only a small part of the dampening effects of higher energy costs on consumer spending.

Families

Energy bills for the 74 million middle-class American households consist primarily of home and transportation related expenses. Heating and cooling expenses represent about 40 percent of household energy costs. Other energy expenses include costs for lighting, hot water, appliances, and transportation.

For almost twenty years, the share of household income that Americans spent on their energy needs steadily declined. However, between 1998 and the end of last year, family spending on energy rose by more than 26 percent, from 3.8 to 4.8 percent of after-tax income (Figure 2-1).

Last winter, heating bills for many families tripled. Roughly 50 percent of American families heat their homes with natural gas. Because the last two months of 2000 were particularly cold in some parts of the country, heating bills increased significantly relative to the previous winter. Last winter, average natural gas heating costs in the Midwest increased by 73 percent, from $540 to $933. New Englanders' heating bills rose by 27 percent, from $760 to $967.

Higher energy prices have forced some energy-intensive manufacturing industries to halt or scale back production and lay off workers.

Many working households can usually accommodate such increases in energy by cutting back on other needs. However, low-income households often have more difficult choices to make. Energy costs for an average low-income household could total 14 percent of family income during the winter of 2000–01, up from about 11 percent for the previous winter. In contrast, energy costs typically represent only about 4 percent of a middle-class family's household budget.

The Low Income Home Energy Assistance Program (LIHEAP) is a federal block grant program that helps low-income consumers pay their energy bills. Last winter, 1.2 million more American families applied for LIHEAP assistance to pay their heating bills, bringing the total close to 5 million American families—up by 26 percent over last year's 3.9 million applicants. As many as 3.6 million families in eighteen states and the District of Columbia risk being unable to pay their bills and having their energy cut off because of the effects of rapidly increasing energy costs.

Recommendations:

★ The NEPD Group recommends that the President take steps to mitigate impacts of high energy costs on low-income consumers. These steps would include:

- Strengthening the Low Income Home Energy Assistance Pro gram by making $1.7 billion available annually. This is an increase of $300 million over the regular FY 2001 appropriation.
- Directing the Secretaries of Interior and Health and Human Services to propose legislation to bolster LIHEAP funding by using a portion of oil and gas royalty payments.
- Redirecting royalties above a set trigger price to LIHEAP, whenever crude oil and natural gas prices exceed that trigger price, as determined by the responsible agencies.

★ The NEPD Group recommends that the President increase funding for the Weatherization Assistance Program by $1.2 billion over ten years. This will roughly double the spending during that period on weatherization. Consistent with that commitment, the FY 2002 Budget includes a $120 million increase over 2001. The Department of Energy will have the option of using a portion of those funds to test improved implementation approaches for the weatherization program.

★ The NEPD Group recommends that the President support legislation to allow funds dedicated for the Weatherization and State Energy Programs to be transferred to LIHEAP if the Department of Energy deems it appropriate.

The low-income elderly are particularly vulnerable to disruptions in energy supply. If they keep their homes at a reasonable temperature, the high cost of electricity may make it difficult for them to pay their higher electricity bills. This could further result in an elimination of service. Another summer of very hot weather and high energy bills could cause serious health problems for some Americans, particularly those sensitive to high temperatures.

The Department of Energy's Weatherization Assistance Program has reduced the heating and cooling costs of low-income households by weatherizing more than 5 million homes since its inception in 1976. The President has requested $1.2 billion in additional funding for this program over ten years, roughly double the current level of spending. Consistent with that commitment, the 2002 budget will include a $120 million increase over 2001.

The Department of Energy's Weatherization Assistance Program

The energy burden on low-income households, as a proportion of income, is four times greater than for other American households. The Weatherization Program provides grant funding for a network of all states and some 970 local weatherization agencies to provide insulation, duct system improvements, furnace upgrades, and other cost-effective, energy-saving improvements based on the energy needs of each home weatherized. Currently, each dollar spent on home weatherization generates $2.10 worth of energy savings over the life of the home; with additional economic, environmental, health, and safety benefits associated with the installations and resulting home improvements. Typical savings in heating bills, for a natural gas heated home, grew from about 18 percent in 1989 to 33 percent today.

Businesses

For businesses, higher energy prices and disruptions in energy supply may increase inflation and reduce profits, production, investment, and employment. The im-

pact of higher energy prices takes two forms: the higher costs of paying for the energy to run the business, and the higher costs when raw fuel sources are used in manufacturing.

In some energy-intensive industries, rising energy prices have had a significant effect on product prices and operations. For instance, while nonenergy producer prices at the intermediate stage of processing have risen by only 3.6 percent since December 1998, prices of industrial materials and plastic resins, which use petroleum inputs, are up 14 and 23 percent, respectively. DuPont, the leading U.S. producer of plastics, chemicals, and fibers derived from oil and natural gas, faced an increase of $1.3 billion in raw material costs last year, the largest increase in the industry in a decade. The company expects further disruptions this year due to high energy costs.

The Federal Reserve has reported that businesses have experienced higher energy costs for a number of months, but have been unable to pass these increases on to customers due to intense foreign and domestic competition and slowing demand. On March 7, 2001, the Federal Reserve reported that businesses across the country experienced higher fuel and other energy costs in February 2001, but most businesses were unwilling or unable to pass these costs on to consumers.

This absorption of much of the higher costs of energy has deteriorated the profit margins of many businesses. About one-quarter of the increase in total unit costs of nonfinancial, nonenergy corporations in the final quarter of last year reflected a rise in energy costs. A more moderate pace of consumer spending, due in part to higher energy prices (natural gas in particular) also contributed to the margin squeeze. The reduction in businesses' purchasing power has also constrained outlays for plants and equipment and most likely intensified the slowdown in business investment that occurred in the last half of 2000.

Energy-intensive manufacturing industries are very sensitive to changes in energy prices, and adjust their production accordingly. Some companies have been forced to halt or scale back production and lay off workers. Others have deemed it more profitable to sell their energy than to produce their products. In the Pacific Northwest, Georgia-Pacific's paper mill closed down and laid off 800 workers until diesel generators could be installed. In recent months, the company's average power costs soared from $1.2 million to $10 million.

For other industries, such as computer-driven service industries, energy is not an important component of the total cost. However, many such businesses require a high-quality, reliable source of power. Even a brief loss of power can impose significant costs on high-technology firms.

Energy supply disruptions also impose costs on firms when products or prod-

Disruptions in the supply of energy impose hardships on businesses when products or product inputs are damaged or destroyed, or when production runs are interrupted.

Many companies have been unable to pass higher energy costs on to their customers, which has sharply reduced their profit margins.

Farmers have been hit especially hard by higher fuel and oil prices, which accounted for over a third of the rise in the cost of running their farms.

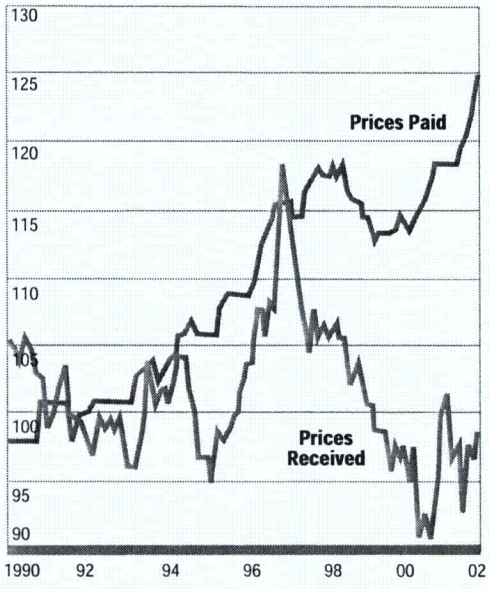
uct inputs are damaged or destroyed, or when production runs are interrupted. For example, a survey of small businesses conducted by the National Federation of Independent Business in February, 2001, found that more than half of the firms surveyed that had experienced blackouts this year in California were forced to reduce or shut down business operations altogether during the blackouts. About one-third lost sales, almost 21 percent said materials were damaged or destroyed, and nearly 40 percent had to absorb wage costs for work that was not completed.

For businesses that seek to mitigate energy price volatility, an important factor is access to derivatives markets. Both exchange-traded futures and over-the-counter derivative contracts allow firms to substantially reduce their exposure to changes in energy prices. A wide variety of highly liquid futures contracts on energy products such as oil, natural gas, and electricity allow energy users and market participants to reduce or add financial exposure to energy prices. More sophisticated and customizable products are available in the over-the-counter derivative markets. As these markets become increasingly liquid and efficient, more firms will take advantage of these products, reducing the economy's sensitivity to shifts in energy prices. However, most small businesses currently lack the resources or sophistication to take advantage of these products, and will therefore remain vulnerable to rising energy costs. The U.S. government should continue to support the development of efficient derivatives markets.

Figure 2-2

Farmers Are Being Squeezed by Energy Prices

(Index: 1990–92 = 100)



Costs for fuel, fertilizer, and electricity have boosted total prices paid by farmers, while prices farmers receive for their products have remained weak.

Note: Prices paid are for goods, services, interest, taxes, and wages; prices received are for all farm products.

Source: U.S. Department of Agriculture.

Agriculture

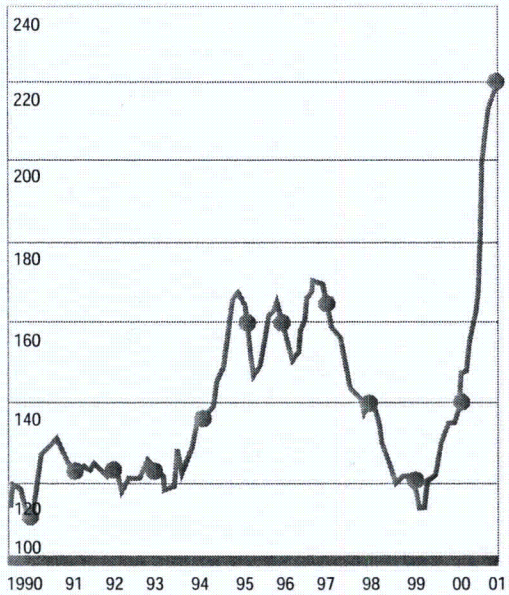
Farmers need ample, affordable energy to run their machinery and equipment. Today, farm production costs are rising sharply, while farm income remains low. Increasing oil prices and interest rates, along with higher prices for other production inputs (including hired labor), boosted farmers' production expenses by 4 percent, or $7.6 billion, in 2000. The rise in farm production expenses has occurred at a time of continued weakness in the prices farmers receive for their products (Figure 2-2).

Higher fuel and oil prices accounted for over one-third of the increase in farm

Figure 2-3

Farm Costs Are Increasing

(Index: December 1979 = 100)



Rising energy prices had a significant effect on product prices in some industries that are heavily dependent on energy inputs. The most dramatic example is the 90 percent increase in the price of nitrogenous fertilizer since December 1998.

Source: U.S. Department of Labor.

production costs. Retail diesel prices this past winter were $1.60 a gallon, compared to about $1.40 a year ago and only $1.00 two years ago. Propane prices were over $1.60 a gallon this winter, compared to $1.10 a year ago. And, natural gas prices hit $10.00 per million Btus in January, after averaging about $2.50 for most of 1998–99. Although natural gas prices have declined, they remain much higher than earlier levels.

Natural gas is an important component of farm production costs. For example, it is used to dry grain, heat farm buildings, and run food-processing equipment. Heating costs for poultry producers soared last winter, sharply reducing earnings.

Natural gas also is a major component in the production of fertilizers, pesticides, and other farm chemicals. It accounts for 70 to 90 percent of the cost of producing anhydrous ammonia, a key source of nitrogen fertilizer. Surging natural gas prices have boosted the price of nitrogenous fertilizer by 90 percent since 1998 (Figure 2-3). During last December and January, several nitrogen production plants shut down, and capacity utilization fell to 50 percent. Anhydrous ammonia recently sold for $330 a ton in the Midwest, compared to $210 a ton for all of 2000 and $160 to $170 a ton at the start of 2000.

Depending on the region of the country and type of farming enterprises, energy-related expenses range from 10 to 30 percent of operating costs for producing major crops. Farm operating costs are highest where fertilizer use is heaviest and natural gas is used for irrigation pumps, such as wheat, cotton, and corn farms in the West and southwestern plains states. Costs are high for greenhouse and nursery crops that use natural gas for heating. Perishable crops also face problems, as energy costs in processing are markedly higher.

Most of California's 9.5 million irrigated acres use electricity to pump water. In addition to higher bills, California farmers will likly face rolling blackouts this summer, which may disrupt farming and processing operations. Low stream flows in the West this year may lead to more pumping of ground water, which will add to irrigation costs in the West. As a result, the costs of California's agricultural products may rise significantly.

In 2001, farmers' total cash production expenses are forecast to increase by an additional $1.5 billion to a record $179.5 billion.

Farm production costs are rising sharply, while farmers' incomes remain low. Depending on the region of the country and type of farming enterprises, energy-related expenses range from 10 to 30 percent of operating costs for producing major crops

Even though total planted acreage is expected to fall this year, higher natural gas prices will raise expenses for nitrogen fertilizer. At the same time, net cash farm income is projected to decline from $56.4 billion in 2000 to under $51 billion in 2001, as production expenses continue to rise.

Taken together, fertilizer, fuel, and electricity costs for farmers are forecast to reach $24 billion for 2001, up by about 28 percent from $18.7 billion in 1999. This increase is about 9 percent of U.S. net cash farm income, and that share could be much higher for many individual commodities.

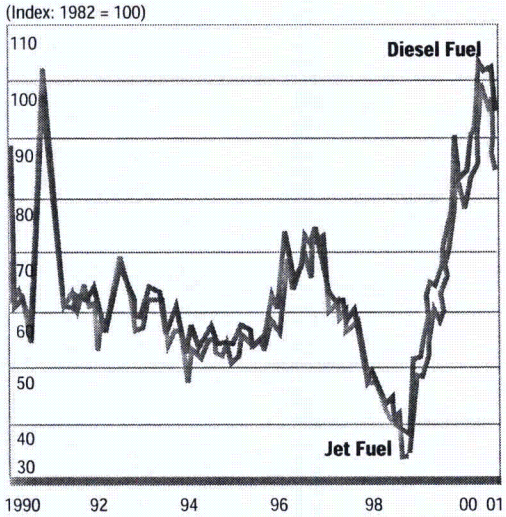
Transportation

The transportation sector accounts for nearly 30 percent of total U.S. energy consumption. The major transportation fuel sources are petroleum-based gasoline and diesel, jet, and marine-mode bunker fuels. Natural gas pipelines are used for product distribution, and electricity is the primary source of power for rail transit and liquid pipeline transmission and distribution.

During 2000, oil prices surged to a nine-year high, and gasoline prices skyrocketed. On average, fuel prices rose by 30 to 40 cents a gallon from 1999 prices, resulting in sharp increases for most modes of transportation, with nearly a 60 percent increase in railroad diesel fuel prices.

A recent study by a San Francisco Bay business group concluded that blackouts could cost California as much as $16 billion annually, and $5 billion in the Bay area alone.

Figure 2-4
Transportation Costs Are on the Rise



The recent 140 percent rise in producer prices for intermediate diesel and airline fuels has affected the price of passenger and freight transport.

Note: Plotted through February 2001.
Source: U.S. Department of Labor.

Price spikes have hit the travel and trucking industries particularly hard and have led to the closure of some operations. Trucking bankruptcies are currently at an all-time high. Over 3,500 motor carrier operations failed in 2000, a dramatic increase over the previous record high of 2,700 motor carrier failures in 1997. Producer prices for intermediate diesel fuel and aviation fuel each rose by about 140 percent from a low in December 1998, affecting passenger and freight transport in the highway, airline, rail, and other transportation sectors (Figure 2-4).

For most transport operations, energy-related expenses were 7 to 14 percent of total operating costs in 1998–99. This share was expected to jump to 10 to 25 percent in 2000. Excluding private auto travel, U.S. passenger and freight operations in 1999 generated about $600 billion in annual revenue and paid approximately $60 billion for fuel and power. If the volume stayed the same in 2000, the various increases in fuel costs for each mode of transportation would yield a fuel bill of

about $80 billion—an increase of one-third over the prior year's bill.

Economic Impacts of California's Energy Crunch

In California, 43 percent of small businesses surveyed in February, 2001, said the power problem had dimmed their views about California as an attractive place for doing business. When asked whether they agreed with the statement, "The electricity problem has forced me to take concrete steps exploring the possibility of moving my business out of California," 18.3 percent of small business respondents said they either agreed or strongly agreed with the statement. More than 31 percent said they will probably or definitely cut back on planned business investment, and almost 20 percent are exploring a move to another state. Half of these small businesses concluded that blackouts would reduce their earnings.

The Silicon Valley Manufacturing Group recently estimated that its nearly 200 members lost over $100 million dollars because of one day of rolling blackouts in June 2000. Countless more millions of dollars have been lost by interruptible commercial power users. Fontana-based California Steel Industries estimates it lost $2.4 million in a single day after its interruptible power was cut off twice for a total of about 12 hours. A recent study by a San Francisco Bay business group concluded that blackouts could cost California as much as $16 billion annually, and $5 billion in the Bay area alone.

The example of California's utilities illustrates the potentially severe negative effects on companies whose business is highly sensitive to energy prices. In this instance, rising energy costs coupled with an inability to pass those costs along to customers has created a sharp increase in short-term liabilities. Pacific Gas & Electric has been forced to file for bankruptcy as a result, and Southern California Edison, while avoiding bankruptcy for the time being, has seen its access to credit markets disappear and the value of its financial assets plummet. Resulting concerns about solvency have led to a withdrawal of bank-lending facilities and supplier credit.

The situation in California is of particular concern because of the major role the state plays in the regional and national economies. California's economy is equivalent to about 13 percent of U.S. gross domestic product (GDP), and it has accounted for an even larger share of U.S. GDP growth in recent years. Some businesses and consumers have been affected by production losses, lost wages, and higher energy bills resulting from rolling blackouts and higher natural gas prices.

The power supply crunch in California and the West could affect the region's economy, as energy supply uncertainty could reduce investment in the region. California's troubles could also spill over to the national economy:

- California accounted for 11 percent of U.S. manufacturing output in 1998. Sectors in other regions that rely on those products, or that supply inputs to California manufacturers, may share any pain caused by the energy squeeze.
- Disruptions to California's economy could have negative impacts on our international trade. California accounts for over 16 percent of total U.S. commodity exports; nearly 25 percent of industrial equipment and computers, electronics, and instruments exports; and over 15 percent of farm commodity and food product exports.
- The credit problems of the California utilities have boosted commercial paper rates for all lower-rated borrowers, and liquidity in the commercial paper market has fallen. This will push some firms to seek other sources of financing, which can be more costly than commercial paper.

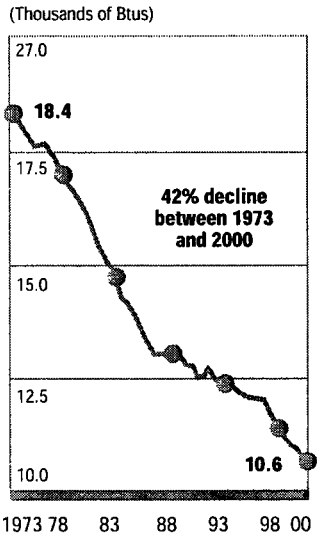
American consumers and businesses are best served when markets function freely. Free markets allow prices to reflect changes in demand and supply, and avoid subsidies, price caps, and other constraints.

Improvements in Energy Efficiency Can Help

Improved energy efficiency strengthens energy security. The 42 percent decline in the intensity of U.S. energy use since the energy crisis in 1973 reflects a combination of technological advances, conservation ef-

The Silicon Valley Manufacturing Group recently estimated that its nearly 200 members lost over $100 million dollars because of only one day of rolling blackouts in California.

Figure 2-5
Conservation Through Higher Efficiency
Energy Consumption per Dollar of Real GDP



Energy intensity is the amount of energy used to produce a dollar's worth of gross domestic product (GDP). As a result of the 42 percent decline in energy intensity since the first energy crisis in 1973, the U.S. economy is far better prepared today than it was in the 1970s to adjust to energy price or supply shocks.

Note: Real GDP in 1996 chained dollars.
Source: U.S. Department of Energy, Energy Information Administration.

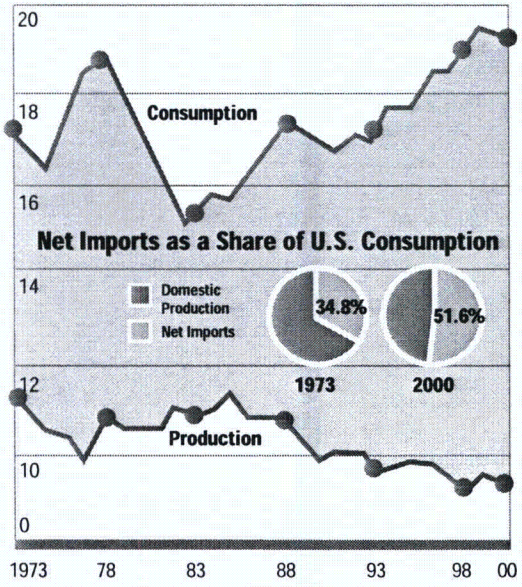
forts, regulatory action, market response, and a shift toward a service economy (Figure 2-5). Our improvements in energy efficiency have prevented our current energy problems from becoming worse.

The macroeconomic effects of a substantial rise in energy prices take two forms. First, to the extent that energy resources are imported, more U.S. dollars must be sent abroad to finance energy consumption, thus reducing funds available for investing in our own country. Second, higher prices cause dislocations among certain sectors of the economy, which could ultimately feed through to lower GDP growth and higher inflation.

Reliance on Foreign Energy

Between 1973 and 2000, U.S. dependence on foreign oil rose from about 35 percent to more than 52 percent of U.S. consumption (Figure 2-6). During the same period, the import share of natural gas consumption climbed from less than 5 percent to more than 15 percent and continues to rise.

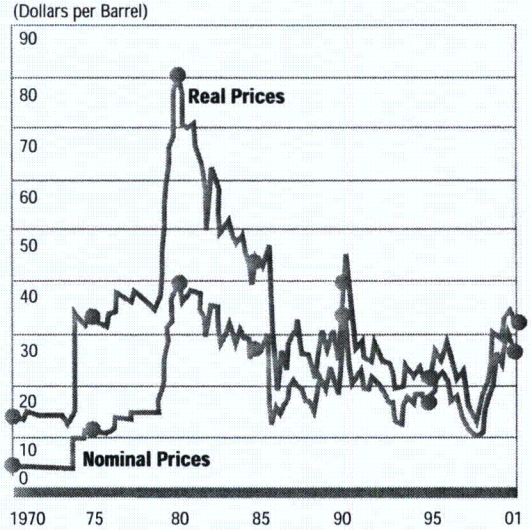
Figure 2-6
Dependence on Oil Imports Is Rising
(Millions of Barrels per Day)



Over the past few decades, U.S. consumption of oil and petroleum products has increasingly outpaced domestic production. Today the United States imports over half of the oil it consumes—up from about 35 percent in the early 1970s.

Note: Petroleum includes both crude oil and petroleum products.
Source: U.S. Department of Energy, Energy Information Administration.

Figure 2-7
Oil Prices Have Risen Sharply
Monthly Spot Price of West Texas Intermediate Crude Oil
(Dollars per Barrel)



Despite the sharp rise in crude oil prices since late 1998, real prices still remain lower than at any time from 1974 to 1985.

Note: Real prices in 2000 dollars. Prices deflated using the Consumer Price Index–Urban (CPI–U) Research Series for all items linked to CPI–U–X1 prior to December 1977.
Sources: Wall Street Journal; U.S. Department of Labor, Bureau of Labor Statistics.

Imports of energy products make up nearly 11 percent of all U.S. imports. By contrast, U.S. energy exports are relatively small. The energy trade deficit relative to our GDP represents the share of U.S. income that must be exported to purchase foreign fuel to meet domestic energy needs. The U.S. energy trade deficit in 2000 was about $120 billion, most of which was spent on oil imports.

As a share of GDP, the energy trade deficit had fallen to as low as 0.4 percent at the beginning of 1999, when prices for imported crude oil were less than $10 a barrel. However, by the end of 2000, these prices had tripled to more than $30 a barrel (Figure 2-7). As a result of both the oil price spike and growing U.S. demand, the energy deficit deteriorated significantly to 1.3 percent of GDP by the fourth quarter of last year—the largest deficit relative to GDP since the mid-1980s (Figure 2-8). The rise in oil prices alone has added about 0.7 percent of GDP to the U.S. trade deficit, compared to 0.9 percent in the euro currency area, and 0.8 percent in Japan.

Financial markets react to energy costs and the effect those energy costs have on both individual firms and sectors of the market.

Figure 2-8

The U.S. Energy Trade Deficit Has Worsened

(Percent)

The energy trade deficit relative to GDP represents the share of domestic income that must be exported to support domestic energy needs. For the past several years, the United States has been a net importer of energy products. As a consequence, our energy trade balance has been in deficit. By the fourth quarter of 2000, the energy deficit had deteriorated significantly to 1.3 percent of GDP—the largest since the mid-1980s.

Note: Plotted quarterly through the fourth quarter of 2000.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Net U.S. oil imports are 4 billion barrels a year, which means that each $1 increase in the price of imported crude oil boosts U.S. expenditures by about $4 billion. Given these guidelines, the $20 per barrel increase from early 1999 to late 2000 translates into an export of roughly $80 billion a year (0.9 percent of GDP) when measured from the low price prevailing at the end of 1998.

Impacts of Energy Prices on Financial Markets

An analysis of the financial impacts of higher energy prices can be divided into two parts: the effects on individual firms whose securities comprise the financial markets, and the macroeconomic impact on inflation and interest rates. Rising energy costs and greater volatility in energy prices can have a negative effect on both individual firms and the broader financial environment, generally producing lower asset prices and higher interest rates. The financial market impact to date of rising energy prices has been limited to firms with high sensitivity to energy costs and to those with significant exposure to the California crisis. The second broad effect of rising energy costs is an increase both in measured inflation

and in expectations for future inflation. Both factors have considerable impact on interest rates and, therefore, on the borrowing costs for businesses and consumers throughout the economy.

Inflation Expectations and Interest Rates

Measurable inflation, for both producers and consumers, is a primary concern of the Federal Reserve in conducting monetary policy. Energy costs represent roughly 16 percent of the producer price index for finished goods and 8 percent of the consumer price index. This means that sharply rising energy costs can have a substantial impact on the Federal Reserve's decision-making process. Additional impacts will come from the market's anticipating Federal Reserve actions and pushing short-term interest rates higher than they otherwise would have been. Higher short-term interest rates raise the nominal cost of borrowing for firms and individuals and can slow economic growth.

Rising energy prices can also raise the inflation expectations of lenders, which can result in higher interest rates for borrowing at longer maturities. Rising long-term interest rates can reduce long-term investment, limiting future economic growth and productivity gains. Such an outcome would carry negative consequences for growth-sensitive financial sectors, such as equity and high-yield debt markets.

More broadly, declining credit fundamentals for certain business sectors could raise borrowing costs for firms not directly affected by higher energy prices. For example, commercial paper rates for all lower-rated borrowers have been affected by the credit problems of the California utilities, and liquidity in the market has fallen. As a result, firms may need to seek other sources of financing, such as bank loans (if obtainable) or asset-backed loans, that can be more costly than traditional commercial paper issuance.

Global Financial Markets

The upward pressure on interest rates that may result from higher U.S. energy costs also affects markets beyond our borders. U.S. monetary policy and related movements in short-term interest rates can have a significant impact on other countries. While the effect varies from region to region, many emerging market economies, particularly in Latin America, are vulnerable to upward moves in U.S. interest rates.

Higher nominal interest rates in the developed countries tend to reduce the amount of capital flowing to emerging markets. To the extent that this reduces investment, economic activity may be further reduced. In addition, borrowing in dollars is a significant source of funding for sovereign and private-sector entities worldwide, particularly in the emerging markets. Rising U.S. interest rates will increase the interest expenses for these borrowers, diverting funds from more productive uses and reducing overall credit quality.

The global market for energy is highly fragmented and region-specific, with the exception of oil. Nevertheless, certain nations and regions are net importers of energy and are highly sensitive to changing prices. Japan, a major importer of oil and natural gas, is particularly vulnerable. Europe is a net importer of energy, with certain exceptions, while emerging market nations vary widely in their dependence on foreign energy sources.

At the macroeconomic level, rising energy prices will increase the current account deficit of energy-importing nations. Since current account deficits must be financed, these nations will most likely need to pay higher interest rates to attract the necessary capital. As noted, this will tend to reduce domestic investment and lower long-term growth. In some countries, such as the United States or Japan, changes in interest rates and growth expectations can have substantial global impact.

Central banks and monetary authorities vary in the degree to which they focus on inflation in setting monetary policy, making some countries more or less likely than others to raise interest rates in an environment of rising energy prices.

Although Japan maintains a current account surplus due to manufacturing exports, its role as an international creditor could diminish. This may have additional impacts on the global financial markets, since Japanese financial institutions are generally suppliers of global credit.

The impact of rising energy costs on the dollar is likely to be mixed. While slower U.S. growth generally reduces demand for dollars, rising oil prices are likely to increase demand, since oil contracts are usually denominated in dollars.

Summary of Recommendations

★ The NEPD Group recommends that the President direct the Secretary of Energy to explore potential opportunities to develop educational programs related to energy development and use. This should include possible legislation to create public education awareness programs about energy. Such programs should be long-term in nature, should be funded and managed by the respective energy industries, and should include information on energy's compatibility with a clean environment.

★ The NEPD Group recommends that the President take steps to mitigate impacts of high energy costs on low-income consumers. These steps would include:

- Strengthening the Low Income Home Energy Assistance Program by making $1.7 billion available annually. This is an increase of $300 million over the regular FY 2001 appropriation.
- Directing the Secretaries of Interior and Health and Human Services to propose legislation to bolster LIHEAP funding by using a portion of oil and gas royalty payments.
- Redirecting royalties above a set trigger price to LIHEAP, whenever crude oil and natural gas prices exceed that trigger price, as determined by the responsible agencies.

★ The NEPD Group recommends that the President increase funding for the Weatherization Assistance Program by $1.2 billion over ten years. This will roughly double the spending during that period on weatherization. Consistent with that commitment, the FY 2002 Budget includes a $120 million increase over 2001. The Department of Energy will have the option of using a portion of those funds to test improved implementation approaches for the weatherization program.

★ The NEPD Group recommends that the President support legislation to allow funds dedicated for the Weatherization and State Energy Programs to be transferred to LIHEAP if the Department of Energy deems it appropriate.

★ The NEPD Group recommends the President recognize unique regional energy concerns by working with the National Governors Association and regional governor associations to determine how to better serve the needs of diverse areas of the country.

★ The NEPD Group recommends the President direct FEMA to prepare for potential energy emergencies.

- FEMA should work with states' Offices of Emergency Management as they expand existing emergency operations plans to identify potential problems and address consequences of the power shortages. FEMA should use its current Regional Incident Reporting System to identify any situations that might demand immediate attention.
- Using the structure of the already existing Federal Response Plan, FEMA should conduct Regional Interagency Steering Committee (RISC) meetings for states affected by the energy shortfalls. The RISC is a FEMA-led interagency committee comprised of agencies and departments that support the Federal Response Plan. Either an upcoming, scheduled RISC meeting or a special-focus RISC meeting can be held to identify the short-term energy outlook, as well as any expected consequences, in each of the states during the peak summer season.