ENVIRONMENTAL IMPACT DETERMINATION

Based on

The State Energy Conservation Plan and
Environmental Assessment

Submitted to the FEA by

The State of New Jersey for Approval and
Funding under the Provisions

of

Title III, Part C of the Energy Policy and Conservation Act;
State Energy Conservation Program

Prepared by

The Office of Energy Conservation
Federal Energy Administration

I. Introduction

Title III, Part C of the Energy Policy and Conservation Act (EPCA) establishes the State Energy Conservation Program (SECP). The SECP will provide up to $22.5 million to the States and Territories in FY 1977 and up to $50 million in FY 1978 for implementation of State developed and State administered programs. Under the FY 1977 funding formula, New Jersey is eligible for an award of $685,000. The objective of the SECP is to promote the conservation of energy and to reduce the rate of growth of energy demand.

An Environmental Assessment (EA) of the probable nationwide impacts of the SECP was undertaken by FEA. On the basis of said EA, a Determination was published in the Federal Register, Vol. 41. No. 117 (June 16, 1976) as follows:

> In accordance with FEA's obligations under the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.), an evaluation of the potential environmental impacts of the program for State energy conservation plans has been prepared by FEA. While certain adverse environmental impacts have been identified, they were found not to be "significant" as that term is used under NEPA. The overall impacts of the various program measures taken either separately or in combination are clearly beneficial.
>
> The nature and degree of environmental benefit will vary, however, among State energy conservation plans and from program measure to program measure. In the final analysis, the content of any particular State energy conservation plan will be determined by many factors peculiar to that individual State; these include local economic, employment, environmental, social, geographic and climatic conditions.
>
> The FEA evaluation, therefore, in addition to describing the environment to be affected by the plans, the impact of alternative measures likely to be included in the various State plans, and the maximum probable environmental impacts from the implementation of plans in all States, provides formulas for the use of the States which will allow them to compute the environmental residuals likely to flow from measures they propose. This information will be included in the plan reports submitted by the Governors. Prior to approving any plan or making any grants, FEA will review each State's submission of environmental data to determine whether it entails any significant effects on the quality of the human environment. In any case in which

FEA discovers significant effects, based on the information submitted and any supplemental information needed to make an informed judgment, an environmental impact statement will be undertaken by FEA. In cases where there are determined to be no significant effects, FEA will issue a negative determination of environmental impact, citing the State's submission in lieu of a formal environmental assessment pursuant to 10 CFR 203.4.

II. Findings

New Jersey has provided a detailed breakdown of the environmental residuals changes associated with each of its proposed program measures. A review of New Jersey's proposed conservation plan has been completed, by FEA, with the following results and observations:

- o No significant adverse environmental impacts are expected to result from plan implementation;

- o Beneficial environmental impacts from plan implementation are expected to have results that substantially outweigh any adverse impacts - but which are themselves not considered to be "significant" in the NEPA sense;

- o The nature of the process by which New Jersey's plan has been developed has been such that the environmental factors have been identified and considered at each stage of development for each program measure.

III. Program Description

The objective of the SECP is the wise and efficient use of energy. That is:

- To conserve energy - especially non-renewable fossil fuels;
- To increase the number of output units per BTU of energy input, e.g., miles per gallon of gasoline, square feet of building space illuminated, heated or cooled per kilowatt hour, therm or gallon, etc.; and, in general
- To eliminate waste and inefficiency and, thereby, to promote economic, social, environmental and other benefits.

The program presently does not encompass, provide funding for, or otherwise encourage such actions as:

- Fuels switching;
- Changes in pollution control efforts, air or water quality standards, etc.

In other words, the program is designed primarily to operate within existing social, economic, environmental, political, legal, etc. constraints. The most tangible environmental effects, therefore, are likely to be the changes in environmental residuals which result from the changes in specific fuel consumption. These changes in all cases are net reductions in fuel use and are calculated by subtracting any small increase in energy use that may be occasioned by a program measure from the larger savings. For example:

- Increased use of commuter vanpools, carpools, or mass transit will reduce vehicle miles travelled by removing a number of commuter automobiles from the road. Additional fuel consumed by vans, buses, remaining commuter autos with higher occupancy rates and by autos freed for uses other than commuting as a result of the program must be subtracted in order to arrive at a net savings estimate.
- Reduced lighting levels in some buildings will, during the heating season in some climates, slightly increase fuel requirements for heating and decrease them for cooling. These changes have been shown to be insignificant in terms of environmental impact. The net impact is beneficial.

Because the most tangible environmental effects are the residuals changes resulting from the reductions in fuel use, the most reasonable approach to an environmental analysis, here, is to stress these first order (residuals) changes. This is best done by specific fuel use within each energy use sector.

IV. Impacts

A. General

The target of the New Jersey plan, as a whole, is to reduce the State's 1980 energy consumption by 139.25 trillion BTU. This, measured against the 1980 baseline projection for New Jersey of 1946.44 trillion equals a 7.15 percent savings. 51.35 trillion BTU (36.9 percent) of New Jersey's savings come from the five required program measures.

These savings, measured across end use sectors, result in an absolute decrease in every environmental residual measured from each fuel consumed within each sector. The method of assessing the reduction in residuals was to compare the changes resulting from New Jersey's projected fuel savings with a set of residuals calculated (by sector, by fuel) against FEA's baseline consumption forecast. A summary of these calculations is appended. The reductions range from a high of 8.0 percent for SOx to 2.4 percent for reduced biological oxygen demand.

Changes in the State's energy related environmental residuals patterns fall almost exclusively into a 4 to 6 percent range. All changes are beneficial; none are judged to be significant.

Over the life of the SECP (through 1980) the annual public and private costs of implementation for every program measure are less than the annual dollar savings.

While New Jersey has proposed 20 distinct program measures (see Section IV-B of the plan, appended) which can be broken down into "required" and "other" measures, the plan is, in fact organized on the basis of energy use sectors and measures are grouped according to the sector where they have their primary impact.

The tables below illustrate New Jersey's energy consumption and projected savings by sector and program measure.

Table I

1980 Projected Consumption by Major Sector (%)

Sector	Direct Fuel-(Minus Electricity)	Net (Incl. Elect.)
Residential	16.9	26.8
Industrial	10.1	22.1
Commercial	13.5	20.5
Transportation	30.6	30.6
Utilities	28.9	

TABLE II

1980 Projected Savings

Sector	Program Measure No.	Program Measure Name	Savings 10^{12}BTU	Savings %
Res.&Com.Bldgs	1.	Thermal Efficiency Stds.	10.7	
	2.	Lighting Efficiency Stds.	32.4	
	6.	Therm.Eff.Certification	18.1	
	7.	Furnace Inspection	15.4	
	8.	Metering	0.05	
	9.	Pilot Light Replacement	6.85	
	10.	Water Conservation	3.0	
	11.	Weatherization	0.2	
	-	Subtotal	86.7	62.3
Industrial	12.	Boiler Efficiency	22.7	
	13.	Waste Oil	0.8	
	14.	Fuel Tank Evap. Limits	8.6	
	-	Subtotal	32.1	23.1
Transportation	4.	Carpool/Vanpool/Mass.Trans.	7.3	
	5.	Right-Turn-on-Red	0.6	
	15.	55mph Enforcement	2.0	
	16.	Expand.Emission Stds.	3.1	
	17.	Bus Replacement	0.2	
	18.	Drag Reduction	1.0	
	-	Subtotal	14.2	10.2
Utilities	19.	Utility Financing	0.5	
	20.	Utility Programs	5.4	
	-	Subtotal	5.9	4.2
General	3.	Procurement Practices	0.35	0.3
Total			139.25	100.1

From these tables, it can be seen that

- The residential and commercial sectors account for about 47.3 percent of New Jersey's total energy consumption and (through lighting and thermal efficiency programs) about 62.3 percent of projected savings;
- The industrial sector is responsible for 22.1 percent of total consumption and about 23.1 percent of savings; while
- Transportation uses about 30.6 percent of the total consumption and accounts for about 10.2 percent of total savings; and
- About 29 percent of fuels consumed are for the purpose of generating electricity purchased by the residential, commercial and industrial sectors.

It has been a common feature of all State plans reviewed to date that savings projected for transportation measures are low compared to other sectors and when compared to transportations's share of total consumption.

It must be kept in mind, here, that the SECP is a State program designed to impact in-State energy use over a relatively short time. Energy use within the transportation sector reflects:

- Long term national policy and investment, e.g., national emphasis, and investment in, highways as opposed to other transportation;
- The mix of vehicles currently on the road; and
- Land use patterns, infrastructure, and capital investments, in place, etc.

Opportunities - within the scope of the SECP - are limited within this sector, principally because major energy savings will involve a timeframe and level of investment outside the SECP limits and/or action at the national level.

Given the transportation constraints and the fact that savings in the buildings and industrial sectors will produce substantial indirect savings in utilities generation fuels (a total of 44.25 trillion BTU will be saved in these fuels), New Jersey's plan reflects its fuel mix over the SECP timeframe.

New Jersey's major emphasis has been on space heating, industrial programs and, indirectly, on electrical generation. The projected savings mix is wise from both the energy

conservation and environmental standpoints. An emphasis on reduced electrical consumption is particularly wise:

- Each end use BTU saved translates into three BTU of fuel input; and

- Capital investment and capital/energy/labor ratios in this sector are such that reductions, here, are most likely to produce favorable inflationary, economic, and employment impacts.

As in the case of most (if not all) States, New Jersey's electrical purchases come from power generated both in and out of State. While the residuals change is based on total fuel mix for all electricity purchased, the reductions will not all be in-State but will be, at least somewhat, regional in nature.

As a general statement, then, the residuals changes as well as the economic and employment impacts of New Jersey's plan are expected to be beneficial, but not significant when viewed from the standpoint of :

- the plan as a whole;

- each individual program measure; or

- sectoral impact.

While certain potential adverse impacts can be postulated, none are expected to be significant.

- Where quantification has been attempted of some adverse impacts (as with CO emissions incident to new lighting standards in the nationwide case), it has been found that residuals changes are well within the margin of error associated with the projections against which they are measured and the impacts are insignificant.

- In some cases, small adverse impacts have been accounted for and subtracted out in the process of computing the benefit, e.g., fuels used by vans and cars freed for uses other than commuting (as a result of carpooling and vanpooling) are subtracted from fuels saved prior to computing residuals changes.

- An inflationary impact statement for the program was prepared and filed, in June 1976, with the Council on Wage and Price Stability. It stated that certain program measures, e.g., buildings insulation, vans, etc., may have an initial adverse economic impact in that the costs are front-end loaded (borne entirely at the time of purchase/installation) and the benefits are spread

over a period of years. Over the life span of the improvement, however, all such investments identified were expected to produce beneficial economic impacts.

B. Specific Impacts

Allowing for the fact (as discussed below) that transportation program measures offer the least opportunity for savings within the SECP constraints, then New Jersey's planned savings (and, therefore, the reduction in environmental residuals) correspond closely with its energy consumption patterns.

The major energy impacts, therefore, have been grouped into four categories (buildings, industry, transportation and utilities) for purposes of describing potential environmental impacts. The quantifiable impacts are listed in the appended residuals tables and are, in all cases, beneficial. These are the result of reduced extraction, transport, processing, and burning of fossil fuels.

Additonal, less tangible and less quantifiable, benefits which can be expected are reduced fuel bills resulting from lighting and thermal efficiency improvements in buildings, reduced capital investment in the utilities and fuels producing sectors as a result of all measures as well as reductions in employment related commutation costs. These impacts, on the whole, are expected to be mildly anti-inflationary. Reductions in highway congestion will be insignificant.

1. Residential and Commercial Buildings

New Jersey's major potential for energy savings under the SECP is through program measures impacting the residential and commercial buildings and the industrial sector. The residential and commercial sectors combined account (directly or indirectly) for about 47 percent of all fuels burned and about 30 percent of direct fuels input. Industry accounts (directly or indirectly) for about 22 percent of the State's energy use.

In addition to those impacts discussed above, improvements in lighting and thermal efficiency involve some potential impacts as discussed below.

o Manufacture and installation of Weatherization Materials

The impact of the actual installation of improvements and repair work will be insignificant. The aggregate environmental impacts can be divided into two major effects: environmental benefits associated with reduced fuel consumption, and small but possibly adverse environmental effects associated with the

production of materials to retrofit the structures specified. The important consideration here is that while any adverse environmental effects will terminate when the program expenditures terminate, the environmental benefits will continue to accure as long as the subject buildings are consuming heating fuel at a rate below their pre-retrofit levels.

Increased costs to building owners - either residential or commercial - resulting from increased insulation, more energy efficient equipment, fenestration, etc., whether in the case of new construction or retrofit, appear to be negligible. In fact, all information, to date, indicates that, over a very short (5 to 10 year) payback period, these measures are extremely cost beneficial, i.e., the investment is more than offset by reduced fuel bills.

o Other Conservation Devices and Materials

The manufacture of devices such as clock thermostats may result in minor, but unquantifiable, emissions, but certainly far less than the reduced emissions attributable to their use.

o Reduced Levels of Lighting and Heating

The nationwide case (Programmatic EA) referenced above makes note of the potential for minor, seasonal, increases (on the order of 0.1 percent) in CO as a result of increased heating needed in some buildings to offset heat loss when lighting levels are reduced. However, New Jersey's method of assessment was to account for net fuel changes resulting from all program measures (and their interactions) within this area (lighting and heating). The environmental residual calculations which followed - based on these net fuel use changes - showed no quantifiable adverse impacts.

Health effects from reduced heating and cooling levels are negligible - and presumed to be, on the whole, beneficial, i.e., in most cases heating, cooling, and lighting levels with the proposed standards are thought to be more healthful than existing levels; in addition, the reduction in pollutants is beneficial.

2. Industrial

In New Jersey, opportunities for conservation in the industrial sector are substantial. Expected impacts include the residuals changes (appended) which are beneficial but judged not to be significant. Impacts on the efficiency of industrial processes are diverse and industry and site specific; they include health benefits, e.g., improved air and water quality, reduced injuries, deaths, days lost, etc., in the production of fuels and economic benefits as well as improvements in buildings efficiency (discussed elsewhere).

To the extent that the industrial sector may experience adverse environmental impacts as an indirect result of increased demand, for example, for insulation materials or for vans attributable to other program measures, these impacts are discussed in the sector where these program measures have their direct impact. The economic impact of such factors, of course, is beneficial to industry.

3. Transportation

While a significant amount of energy is consumed in the transportation sector in New Jersey (see Table I), major changes in transportation fuels use will occur only with infrastructure and vehicle efficiency changes which are (compared to other savings opportunities) slower, more capital intensive, and or inter-rather than intrastate in character and therefore outside the scope of the SECP.

From the implementation of the required transportation program measures, New Jersey expects to realize an energy savings of 14.2 trillion BTU's in 1980, about 10.2 percent of the total savings expected from plan implementation. While comparatively small, this reduction in fuel consumption and thus in environmental residuals will have a beneficial impact.

The promotion of vans and carpools in New Jersey may have small adverse secondary impacts:

- The fuel used by vans, as well as the increased consumption per auto when the number of occupants is increased, has been subtracted from fuel savings prior to estimating residuals changes. The net change is, in all cases, beneficial, but not significant.

- The increased emissions from the manufacture of the vans have not been determined but are judged to be negligible when compared to reduced operating emissions from autos. This impact is likely as well to be offset by reduced auto manufacture.

Savings in the utilities sector are the result, primarily of improvements in boiler efficiency and reductions in fuel tank evaportation. These measures are expected to have the same general beneficial residuals and economic impacts discussed in the previous section (IV A).

V. Alternatives

Under EPCA, there are no alternatives to the five mandatory program measures other than a State's non-participation in the SECP. The "no-participation" alternative, in all cases, is adverse when compared to the implementation of any mix of these five measures.

There is little room within the SECP timeframe for major structural changes affecting the way energy is used. Nor does an individual state have much say over the energy intensity or efficiency of many products used within its borders but produced and sold on a national basis. Rather, the emphasis of the SECP is on greater efficiency of energy use within the short term constraints imposed by presently in place infrastructure, capital investment, land-use patterns, buildings, motor vehicle stock, and the like. Given this situation as well as current State-specific fuel distribution and use patterns, the reduction in residuals for any State program, including New Jersey's, will not be uniform across all residuals but will tend to be skewed in such fashion as to conform to current fuel uses and specific savings opportunities and the particular characteristics of the fuels affected. In all cases the net result will be beneficial.

VI. Conclusions

In summary, it is the determination of the FEA that New Jersey's Environmental Assessment of this program complies with the requirements of both NEPA and the SECP Guidelines as promulgated by FEA.

Based upon our review of this EA, the FEA has determined that actions now required to be taken to implement New Jersey's proposed energy conservation plan under Title III, Part C of the EPCA will not be "major Federal actions significantly affecting the quality of the human environment." (Section 102(2)(C), National Environmental Policy Act, 42 U.S.C. 4332 (2)(C)). Consequently, no EIS preparation is contemplated for this action.

Appendices

I. Baseline Residuals Case and Residuals Changes

II. Abstracts from the New Jersey Plan

STATE ENERGY CONSERVATION PROGRAM (SECP)
ENVIRONMENTAL REVIEW
RESIDUALS TALLY SHEET
(OTHER)

STATE NAME New Jersey

Sector	Thermal Rejection	Solid Waste	Occupation Deaths	Injuries	Man-Days Lost		
Transportation	0	3.21E+04	4.68E-01	3.26E+01	1.69+E03		
Industrial	7.18E+10	1.05E+05	1.68+E00	3.44E+01	2.69E+03		
Commercial	6.41E+10	1.75E+04	2.29E-01	1.40E+01	7.00E+02		
Residential	1.59E+11	1.55E+04	2.66E-01	1.62E-01	7.60E+02		
Utilities	6.96E+13	3.89E+06	2.14E+01	3.88E+02	2.77E+04		
Total Baseline Residuals	6.99E+13	4.06E+06	2.40E+01	4.85E+02	3.36E+04		
Reduction	3.33E+12	2.56E+05	1.12E+00	2.55E+01	2.18E+03		
% Reduction	.047	.063	.046	.052	.065		

Footnotes:
Entries given in scientific notation, e.g., 3.86 E04 equals 3.86×10^4 or 38,600; ( ) denotes minus value.
Unit values are:
- For Air, Water, and Solid Waste: tons per year;
- For Thermal Rejection: BTU per year; and
- For Deaths, Injuries, and Man-Days Lost: individual (single) occurrences.

STATE ENERGY CONSERVATION PROGRAM (SECP)

ENVIRONMENTAL REVIEW

RESIDUALS TALLY SHEET

(AIR)

STATE NAME New Jersey

Sector	Particulates	NO_x	SO_x	HC	CO	Aldehydes	CO_2
Transportation	4.59E+04	3.16E+05	3.53E+04	1.51E+05	1.22E+06	5.37E+03	5.10E+07
Industrial	1.37E+04	4.49E+04	5.50E+04	7.00E+03	1.23E+04	1.11E+03	1.55E+07
Commercial	1.57E+04	6.41E+04	6.40E+04	8.57E+03	1.18E+04	2.59E+03	2.35E+07
Residential	9.70E+03	3.60E+04	2.77E+04	7.87E+03	5.96E+03	3.03E+03	2.72E+07
Utilities	2.37E+04	1.64E+05	2.09E+05	8.15E+03	6.93E+03	1.49E+03	4.39E+07
Total Baseline Residuals	1.09E+05	6.25E+05	3.91E+05	1.82E+05	1.26E+06	1.36E+04	1.61E+08
Reduction	5.40E+03	3.67E+04	3.13E+04	6.63E+03	3.53E+04	8.91E+02	1.12E+07
% Reduction	.050	.060	.080	.036	.028	.065	.069

Footnotes:

Entries given in scientific notation, e.g., 3.86 E04 equals 3.86×10^4 or 38,600; ( ) denotes minus value.

Unit values are:

- For Air, Water, and Solid Waste: tons per year;
- For Thermal Rejection: BTU per year; and
- For Deaths, Injuries, and Man-Days Lost: individual (single) occurrences.

STATE ENERGY CONSERVATION PROGRAM (SECP)
ENVIRONMENTAL REVIEW
RESIDUALS TALLY SHEET
(WATER)

STATE NAME New Jersey

Sector	Acids	Bases	Dissolved Solids	Suspended Solids	Non-Deg. Organics	B.O.D.	C.O.D.
Transportation	0	0	2.66E+02	5.10E+02	1.61E+03	5.10E+02	3.12E+03
Industrial	0	2.00E+01	6.55E+02	2.09E+02	2.95E+02	3.22E+02	5.68E+02
Commercial	0	7.68E-01	1.10E+02	1.75E+02	5.40E+02	1.71E+02	1.04E+03
Residential	0	1.28E+00	1.11E+02	1.53E+02	4.63E+02	1.46E+02	8.89E+02
Utilities	0	0	1.72E+02	0	1.53E-01	1.31E+02	7.97E+02
Total Baseline Residuals	3.65E+03	2.98E+02	1.98E+04	3.75E+04	3.69E+03	1.28E+03	6.41E+03
Reduction	1.59E+02	1.36E+01	8.50E+02	1.52E+02	1.17E+02	3.13E+01	1.92E+02
% Reduction	.043	.045	.043	.040	.032	.024	.030

Footnotes:
Entries given in scientific notation, e.g., 3.86 E04 equals 3.86×10^4 or 38,600; ( ) denotes minus value.
Unit values are:
- For Air, Water, and Solid Waste: tons per year;
- For Thermal Rejection: BTU per year; and
- For Deaths, Injuries, and Man-Days Lost: individual (single) occurrences.

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PART IV-B - PLAN SUMMARY

STATE OF NEW JERSEY

DATE March 28, 1977

PROGRAM MEASURES	1980 ESTIMATED ENERGY Savings (in BTU's) *	ESTIMATED COST OF IMPLEMENTATION (in $000's) **			
		1977	1978	1979	1980
1. Thermal Efficiency Standards	10.7	2,700	11,000	11,000	11,000
2. Lighting Efficiency Standards and Thermal Standards	32.4	187	6,225	6,115	315
3. Energy Efficiency Procurement Standards for State & Local Government	0.35	34	51	51	51
4. Carpool, Vanpool, Public transportation measures	7.3	Not Estimated			
5. Right-turn-on-red	0.6	Negligible			
6. Certification of Thermal Efficiency- Existing Homes	18.1	314	82,200	82,200	82,200
7. Annual Furnace Inspection	15.4	68	38,950	10,750	10,750
8. Individual Metering in Residences	.05	680	Continued in Thermal efficiency standard		
TOTAL (Continued)					

List all other program measures included in the proposed State Energy Conservation Plan.

Savings listed in trillion BTU's

** State Government cost not included in measures where State is already implementing program. Estimates include private sector costs.

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PART IV-B - PLAN SUMMARY

STATE _____

DATE _____

PROGRAM MEASURES	1980 ESTIMATED ENERGY Savings (In BTU's)	ESTIMATED COST OF IMPLEMENTATION (In $000's) 1977	1978	1979	1980
9. Replacement of Gas Pilot Light	6.85	0	26,700	26,700	18,600
10. Water Conservation Code	3	Cost found in Building Code			
11. Weatherization	.2	Financed by Existing Federal Program			
12. Improved Boiler Efficiency	22.7	52	4,700	3,500	3,500
13. Waste Oil Recycling	.8	21	3	3	3
14. Fuel Tank Evaporation Limits	8.6		Not Estimated		
15. Enforcement of 55 MPH	2.0		Not Estimated		
16. Expanded Auto Emission Standards	3.1	10,900	11,800	12,700	13,600
TOTAL (Continued)					

List all other program measures included in the proposed State Energy Conservation Plan.

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PART IV-B - PLAN SUMMARY

STATE _____

DATE _____

PROGRAM MEASURES	1980 ESTIMATED ENERGY Savings (in BTU's)	ESTIMATED COST OF IMPLEMENTATION (in $000's) 1977	1978	1979	1980
17 Bus Replacement	.2	No Estimated			
18 Use of Drag Reduction Devices	1.0	0	4,000	0	0
19 Utility Financing (Option 1)	.5	0	8,790	8,090	8,090
20 Utility Programs	5.4		No Estimate		
TOTAL	139.25	14,956	194,419	161,109	148,109

List all other program measures included in the proposed State Energy Conservation Plan.

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