ENVIRONMENTAL IMPACT DETERMINATION

Based on

The State Energy Conservation Plan and
Environmental Assessment

Submitted to the FEA by

The State of Montana 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, Montana is eligible for an award of $159,000. 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.
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> 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.
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> 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

A review of Montana'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 are expected to result which substantially outweigh adverse impacts, but which are themselves not considered to be "significant" in the NEPA sense.
- o The nature of the process by which Montana'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:

- o 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. The 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 impact of the Montana plan, as a whole, will be--if successful--to reduce the State's 1980 energy consumption by 19.502 trillion BTU; of this 12.512 trillion BTU will be non-electrical and 6.99 trillion BTU will come from fuels used to generate electricity. This, measured against the FEA 1980 baseline projection for Montana of 370.54 trillion BTU, equals savings of about 5.3 percent. Montana's projected 1980 consumption and SECP savings represent about 0.5 percent of the national total.

The State's 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 Montana's projected fuel savings with a set of residuals calculated (by sector, by fuel) against the baseline consumption forecast. A summary of these calculations is appended. The reductions range from a high of about 14 percent for occupational man-days lost, to about 2 percent for aldehydes. These reductions accurately reflect the fuel mix of the proposed savings.

B. Fuel Mix and Changes in Environmental Residuals

Where percent changes in residuals are highest, this reflects disproportionate savings of particular fuels in particular sectors, specifically:

- 6.99 trillion BTU are saved in coal used for electrical generation. This amounts to about 36 percent of all fuels saved in all sectors. The result is to skew the program's environmental benefits toward higher reductions in the residuals typical of coal burning and lesser drops in those associated with other fuels;

- The electrical utilities account for about one third of all fuels consumed in Montana but 28 percent of the fuel input into this sector is non-fossil and 50 percent is coal; thus

- While only about 17 percent of all fuel burned in the State is coal and this is reflected in the baseline residuals case (see appended residuals tables), energy consumption patterns and conservation opportunities are structured in such a way as to result in disproportionate savings of this fuel. Environmental benefits (in the form of reduced environmental residuals) will, therefore, be skewed in this direction.

It should be noted further that Montana's electrical purchases come from power generated both in and out of State. While Montana's computation of the residuals change (percent and absolute) is based on total fuel mix for all electricity purchased in-State, some environmental benefits will be felt by the exporting States or, put another way, the reductions will not all be in-State.

In terms of specific fuels saved, the second (to coal) largest contributor will be natural gas. These savings will come from space heat in the residential and commercial buildings sectors. This reduction reflects State-specific consumption patterns (and savings opportunities) as well as national priorities.

Table I, below illustrates the fuel mix of Montana's projected savings under the SECP.

TABLE I

Montana Fuel Savings Targets for 1980

Sector	Fuel	Savings	
		10^{12}BTU	%
Transportation	Gasoline	5.560	28.5
Space Heat, Commercial	N. Gas	2.289	11.7
	Dist.Oil	0.596	3.1
	Resid.Oil	0.299	1.5
Space Heat, Residential	N. Gas	3.416	17.5
	Resid.Oil	0.352	1.8
Electrical Generation	Coal(Steam)	6.990	35.8
Total		19.502	99.9

C. Impacts by Sector and Program Measure

Reference to Part IV-B of the Montana plan (appended) will show that:

- The required program measures account for 15.33 trillion BTU or 64 percent of total savings and the five additional program measures for 8.603 trillion BTU; and
- The five additional measures are all extensions or reinforcements of the five required ones; so that
- For purposes of analysis all can be grouped under their relevant energy use sector headings.

TABLE II

Montana Energy Consumption and Savings (1980)

Sector	Consumption %	Savings %
Buildings	19.9	35.6
Industrial	20.1	*
Transportation	27.1	28.5
Elect. Utilities	32.9	35.8

* Only program measures 7,8,9, and 10 (Conservation Loans, Renewable Energy Tax Credit, Public Utilities and Energy Conservation Education), which are cross-sectoral, will have an impact on the industrial sector. Savings are included in those attributed to buildings and utilities.

1. Utilities

Montana's energy savings opportunities are constrained by fuel use patterns and program measures reflect accurately a wise response to those existing opportunities. Electric utilities are the State's largest single consumer of primary fuels and coal represents half the fuel used in this sector. On the average, one BTU of electrical consumption saved translates into 3 + BTU of generating fuel. In Montana's case, where 28 percent of electricity (baseline case), in 1980, will be supplied by non-fossil fuels which would not be affected by the program, the savings in fossil fuels is greater than 3 to 1.

Savings within the utilities sector are expected to result from:

- o Changes in utility rate structures and
- o Commercial and industrial energy audits.

The rate structure changes are, as yet, unspecified and initial funding has been requested for studies. Whatever the changes, their impact on this sector is indirect, i.e., they encourage changes in consumption habits and patterns in other sectors. No significant environmental impacts can be identified.

Energy audits will result in cost beneficial investment in conservation measures. A fuller discussion will be found under the "Buildings" heading.

2. Buildings

The buildings and industrial sectors, combined, account for about 40 percent of Montana's end use energy consumption and (exclusive of electrical) about 36 percent of savings. The industrial sector is combined, here, with residential and commercial buildings because the major savings in this sector will come from the commercial and industrial buildings audit measure. Natural gas accounts for about 5.71 of the 6.95 trillion BTU savings in these sectors. In addition to the residuals changes discussed elsewhere, improvements in lighting and thermal efficiency involve some additional potential impacts as discussed below.

(a) Manufacture and Installation of Weatherization Materials

The impacts 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 accrue 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, 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) period, these measures are extremely cost beneficial, i.e., the investment is more than offset by reduced fuel bills.

(b) Other Conservation Devices and Materials

The manufacture of devices such as clock thermostats may result in minor, but unquantifiable, emissions which, however, will be more than offset by the reduced emissions attributable to their use.

(c) 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 0.01 percent)

in CO as a result of increased heating needed in some buildings to offset heat loss when lighting levels are reduced.

Montana'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 expected to be 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.

3. Transportation

Several measures such as bikeway construction, the public transit and railway assistance fund and enforcement of the 55 m.p.h. speed limit, may involve some initial start-up investment with spread out (5 to 10 year) payback periods. This is not judged to be significant. The long range impact should be mildly deflationary and job producing.

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. Residuals from increased operation of diesel buses have been subtracted from the reductions attributed to reduced automobile travel.

D. Economic Impacts (cross-sectoral)

Montana's program consists of measures designed to increase the efficiency of energy use, i.e., to obtain more useful work or heat per BTU invested. It will require some small increase in initial capital investment in all sectors which will be more than offset over a very short period by decreased fuel costs and, probably, by reduced need for investment in capital intensive electric generation and distribution facilities. It is expected to be mildly deflationary and to result in a small net increase in employment.

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An inflationary impact statement for the program was prepared and filed, in June 1976, with the Council of 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.

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 Montana'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

Montana has provided evidence that potential environmental impacts were given careful consideration throughout the development of its plan.

In summary, it is the determination of the FEA that Montana'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 Montana'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.

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

STATE NAME MONTANA

Sector	Acids	Bases	Dissolved Solids	Suspended Solids	Non-Deg. Organics	B.O.D.	C.O.D.
Transportation	-	-	3.62E01	6.94E01	2.19E02	6.94E01	4.24E02
Industrial	-	8.90E(01)	3.36E01	2.53E01	5.89E01	1.83E01	1.12E02
Commercial	-	-	2.66E00	5.10E00	1.66E01	5.10E00	3.11E01
Residential	-	1.14E(01)	5.78E00	5.85E00	1.71E01	5.19E00	3.17E01
Utilities	7.55E02	5.70E01	3.82E03	5.33E02	9.22E01	5.27E00	3.22E01
Total Baseline Residuals	7.55E02	5.8E01	3.89E03	6.3865E02			
Reduction	84.6	7.0	439.6	68.1	25.6	5.2	31.7
% Reduction	11.2%	12.1%	11.3%	10.7%			

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 MONTANA

Sector	Particulates	NO_x	SO_x	HC	CO	Aldehydes	CO_2
Transportation	6.02E03	5.54E04	5.74E03	1.99E04	1.54E05	9.75E02	7.06E06
Industrial	3.13E03	1.77E04	9.31E03	2.49E03	1.65E04	2.56E02	5.35E06
Commercial	6.64E02	5.40E03	2.18E03	3.36E02	5.00E02	1.76E02	1.96E06
Residential	6.26E02	4.74E03	1.08E03	3.91E02	4.89E02	2.40E02	2.63E06
Utilities	1.21E04	9.60E04	4.09E04	2.21E04	1.56E05	1.67E05	2.03E07
Total Baseline Residuals	2.254E04	1.7888E05	5.921E04	4.5217E04	3.275E05	3.317E03	3.73E07
Reduction	538.1	5,241.3	1,624.7	1,277.0	12,060.0	68.421	1,594,330
% Reduction	2.4%	2.9%	2.7%	2.8%	3.7%	2.1%	4.3%

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

(OTHER)

STATE NAME MONTANA

Sector	Thermal Rejection	Solid Waste	Occupation Deaths	Injuries	Man-Days Lost		
Transportation	-	4.37E03	6.37E(02)	4.44E00	2.29E02		
Industrial	4.73E10	5.54E03	9.48E(02)	3.86E00	1.91E02		
Commercial	2.03E10	3.21E02	9.24E(03)	1.01E00	3.73E01		
Residential	2.97E10	8.89E02	2.01E(02)	1.47E00	5.77E01		
Utilities	1.44E13	8.03E05	4.40E00	7.87E01	5.65E03		
Total Baseline Residuals	1.450E13	8.14E05	4.59E00	8.948E01	1.165E03		
Reduction	1,745.5E01	97,767.3	.54	9.71	905.4		
% Reduction	12.0%	12.%	11.8%	10.9%	14.7%		

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.

Table IV-B
Plan Summary

Program Measures	1980 Estimated Energy Savings (In Trillion BTUs)	Estimated Cost of Implementation (in $000's) 1977	1978	1979	1980
1. State Building Code and Thermal Efficiency Standards	3.63	90.0	20.0	20.0	20.0
2. Lighting Standards for Public Buildings	1.36	costs of implementation are included in Program Measure 1			
3. Procurement: Life Cycle Cost Analysis and Vehicle Fuel Efficiency Standards	.32	35.0	0	0	0
3a. Energy Managing, Auditing, and Retrofitting State Buildings	.75	200.0	500.0	250.0	250.0
3b. Renewable Energy Demonstration Project	Uncertain		Uncertain		
4. Right Turn on Red (Already in Force)	No Savings	0	0	0	0
5. Car Pool/Van Pool: Increase in Transit Level of Service	.05	1,226.0	206.0	6.0	6.0
5a. Public Transportation and Railroad Assistance Fund	1.50	12.5	25.5	50.0	50.0
5b. Bikeway Construction	.003	202.26	58.46	58.46	58.46
5c. Enforcement of 55 m.p.h. Speed Limit	2.23	0	0	0	0
6. Weatherization	.29	600.0	600.0	600.0	600.0
7. Conservation Loan Programs	1.80	50.0	50.0	55.0	55.0
8. Renewable Energy Tax Credit	.25	0	0	0	0
9. Public Utility Measures	6.99	100.0	50.0	100.0	100.0
10. Energy Conservation Education	4.29	204.0	172.0	230.0	230.0
Crude Oil Saving	.47				
TOTALS	23.933	2,719.76	1,681.96	1,369.46	1,369.46