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ABSTRACT

In four sections this report examines the effects of rising energy costs on New York State's public elementary and secondary schools and makes recommendations to ameliorate problems. Section 1 gives overviews of both total energy use and energy use in education at the national and state levels, and observes that energy cost increases have forced districts to either cut programs or reduce energy consumption. The second section of the report measures the effectiveness of federal and state efforts at energy conservation in education, and then analyzes the extent of energy conservation in New York State schools from 1972 to 1979, noting the effects of such factors as district wealth, tax effort, size, and urban or rural location. Section 3 reports on a survey of 28 other state education agencies' methods of handling energy problems. It also describes successful energy management programs in two regions and one district of New York State. Twelve recommendations are presented in section 4 concerning a state energy management plan, statewide training in energy management, state incentives for energy conservation, school district energy management activities, and state support for continuation of federal energy programs. Four appendices provide further data on energy consumption and costs. (RW)

Task Force on Critical Problems
Senate Research Service-Albany, New York

E+S=$

Energy in schools costs too much

A Report on the Impact of Energy Costs on New York State Schools

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New York State Senate Research Service

Task Force on Critical Problems

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Albany, New York
June 1982

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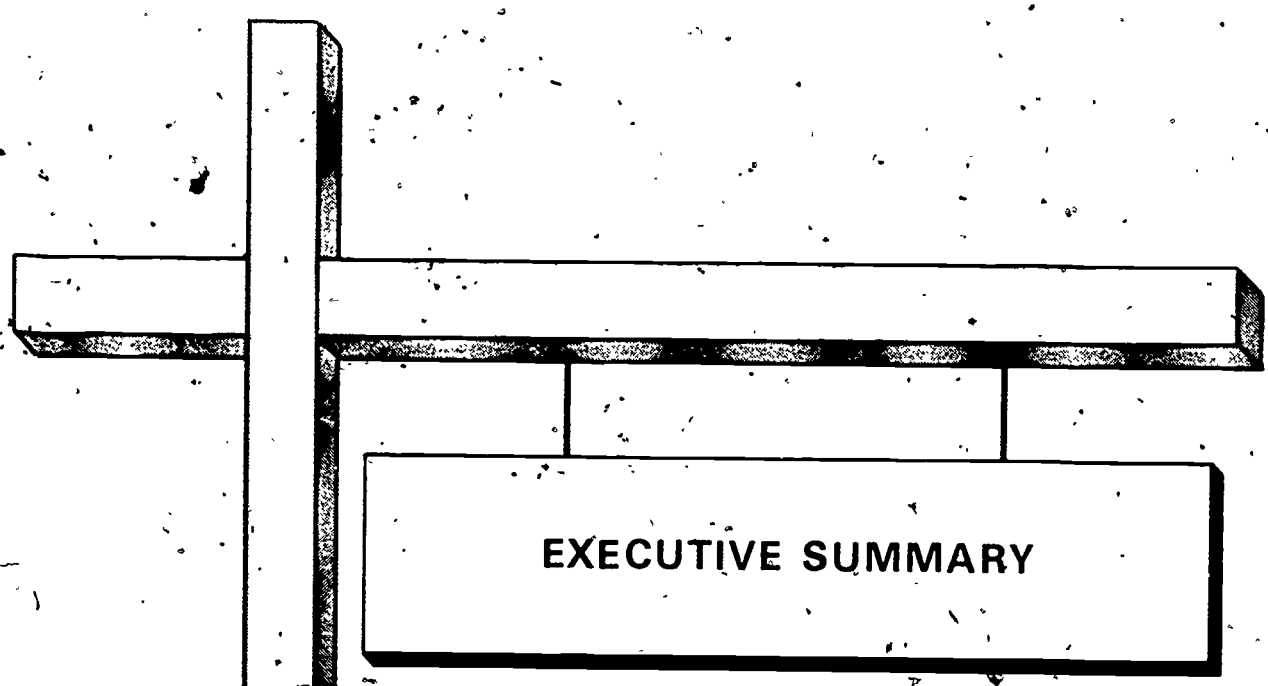

EXECUTIVE SUMMARY

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A CRITICAL CHOICE: CUT ENERGY COSTS OR CUT EDUCATIONAL PROGRAMS

Energy costs in New York State public schools have risen at unprecedented rates during the past decade. This growth has resulted in two trends detrimental to instructional programming in a State traditionally committed to educational excellence. First, because the growth of energy costs has far outstripped the overall school budget increases allowed by voters, school administrators have been compelled to divert funds from instructional programs to pay for energy. Second, the pressure placed on budgets by dramatically escalating energy costs during a time of fiscal conservatism has been one of the primary reasons for the increased number of school budget defeats. These defeats often have forced a growing number of schools to operate under restrictive contingency or austerity budgets.

Uncontrolled energy costs and the unpredictable nature of energy supplies continue to threaten instructional programs and further disrupt the quality of New York's educational system. Energy in schools costs too much, and trying to keep up with energy costs has been a "no win" proposition for the State. New York schools, therefore, face a critical choice limited to two options:

- continuously seeking additional monies either by cutting existing education programs or by increasing local revenues (including local assistance funds from the State) in order to pay for rising energy costs; or
- reducing the amount of energy consumed through an energy management program.

The latter choice is the most responsible way to meet this challenge. Energy management causes less disruption to the quality of education and provides long-term remedies to the never ending problem of energy costs.

WHAT GRADE DO NEW YORK'S SCHOOLS DESERVE FOR CONSERVING ENERGY?

This study utilized two separate approaches to measure the responsiveness of New York's public primary and secondary schools toward energy conservation.

- An examination of the federal and State responses to the energy crisis in schools was undertaken to measure their effectiveness in promoting energy conservation.
- An analysis of the actual amounts of energy consumed by the schools between 1972-73 and 1978-79 was employed to verify State conservation claims and to explore school energy use in greater depth than the methodology used by the State Education Department (SED).

Federal Response Limited to the Schools and Hospitals Program

The entire educational sector has been omitted from any role in the development and implementation of a comprehensive national energy policy. The federal effort to promote energy conservation in schools has been limited to the Schools, Hospitals, Local Government and Public Care Institutions Program initiated in 1978. This program, however, is scheduled to expire in 1982.

In the first two rounds of funding, New York State received only $4.8 million to dispense to its 734 eligible school districts. Because New York chose to distribute its funds to as many institutions as possible (268 districts received funds), the program's impact in any particular district was limited. Much of the grant money was earmarked for technical assistance projects to fund studies detailing needed energy conservation measures. Out of the 220 districts submitting technical assistance grant applications, 173 districts received $2.2 million. Only a handful of projects were aimed at implementing proposed energy conservation measures, and of these, too few were approved. Only 65 out of 230 applications for energy conservation measures were approved for a total of $2.6 million. Unless schools continue to seek and receive the funds necessary to implement these often expensive projects, the Schools and Hospitals Program may only have highlighted the energy problem while providing few fundamental, long-term remedies.

Weaknesses Apparent in the State's Response

A detailed year-by-year assessment of SED actions relating to energy management and conservation from 1973 to 1982 revealed a number of inadequacies and weaknesses. The most obvious has been the omission of any clear, consistent agency policy regarding energy management and conservation. Except for times of impending crises, energy problems received low priority within SED. Even during crises, the Department set forth only a series of band-aid proposals aimed at addressing immediate, short-term fuel shortages. This crisis management approach provided no long-term framework upon which schools could build an effective and continuing energy management system. Other weaknesses in SED's responsiveness include:

- the failure to adequately provide energy conservation leadership for local districts by maintaining and making use of personnel within SED to assist schools in energy management;
- the failure to allocate monies from the State's School Building Aid Program for energy conservation assistance to schools;
- the failure to collect complete and consistent energy data from all school districts or to adequately analyze the available data for purposes of formulating energy management and conservation policies; and
- the failure to institute even minimal levels of official interagency collaboration between SED and the State Energy Office (SEO) in order to create, implement and coordinate energy management initiatives.

These weaknesses have left local school districts to fend for themselves. Unfortunately, local districts often lack the sophisticated technical knowledge, the

fiscal capacity or the interest fundamental to the development and implementation of successful energy conservation programs.

A Closer Look at Energy Figures Yields Surprising Findings

Using the district energy data collected by SED, school energy use was explored from 1972-73 to 1978-79 (the latest available at the beginning of the study). A wealth of interesting findings resulted, some of which are summarized in the table below.

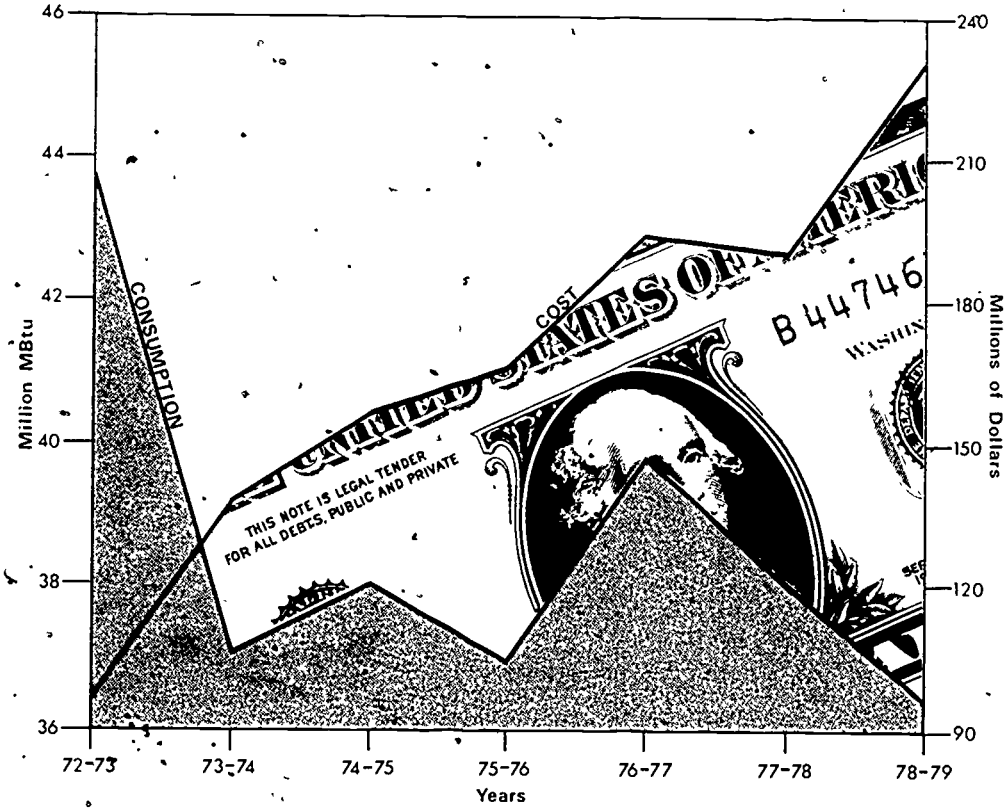
ENERGY IN NEW YORK SCHOOLS

	1972-73	1978-79	Percent Change
Energy Consumed by Schools (millions of MBtu's)	43.7	36.6	Decreased 16.2%
Total Energy Cost (millions of dollars)	95	229	Increased 141.1%
Energy Costs per Student ($/student)	27.70	76.00	Increased 174.4%
Energy Costs as a Percent of School Operations and Maintenance Budgets	21.4%	32.3%	Increased 51%
Energy Costs as a Percent of Total School Budgets	1.7%	2.8%	Increased 65%
Cost Savings due to Decline in Energy Consumption		$16.5 million	
Federal Schools and Hospitals Funds Spent in NYS on Public K-12 Schools (first two rounds only)		$4.8 million	

New York State schools reduced their actual energy consumption during these years by 16.2 percent. However, most of this decline occurred in the one year spanning the oil embargo of 1973-74. School energy consumption plummeted by 14.7 percent in that one year, while decreasing only 1.8 percent over the next six years.

The graph below illustrates that even though consumption declined from 1972-73 to 1978-79, energy costs escalated by 141 percent, from $95 million to $229 million. Costs per student jumped 174 percent from $27.70 to $76.00. However, the most important finding was that the portion of school budgets expended on energy grew dramatically in the years studied. The portion of operations and maintenance budgets and school general funds spent on energy increased by 51 percent and 61 percent, respectively, in only seven years.

EVEN THOUGH CONSUMPTION DECLINED, COSTS ROSE DRAMATICALLY



Several important findings surfaced from an analysis of district level energy conservation. Districts with the highest conservation rates had lower energy costs. In addition, these districts managed to control the impact of energy costs on their school budgets better than districts with low conservation rates.

School districts were analyzed further by selected factors, such as wealth, tax effort, enrollment size, location (upstate or downstate) and rural or urban designation. Singularly, wealth and size appeared to be minimally related to energy conservation. However, there did appear to be some indirect relationship when combined with other factors. For example, districts with higher tax rates did experience greater energy consumption reductions. Energy costs affected upstate districts, often the poorest and smallest in enrollment size, far more than they did downstate districts. Upstate schools spent proportionately more on energy and had to expend a greater portion of their budgets on this noninstructional budget item. Rural districts, also among the poorer and smaller districts in New York, were less successful at conserving energy than their urban counterparts.

Finally, district response to the federal Schools and Hospitals Program was examined. The State distributed $4.8 million in federal funds to public K-12 schools under the program. Apparently district energy conservation records had little to do with participation in or receipt of federal monies. The analysis indicated, however, that wealth, size, tax effort, location and rural or urban designation all seemed to play a role in determining whether a district took part in or received funding from the program. Wealthy, large, downstate and urban districts, and districts with high tax rates, all were more likely to submit funding applications and have their grant proposals approved.

Piecing Together the Energy Puzzle

In contrast to the weaknesses apparent in SED's response to the energy problem in schools and the inadequacies evident in their treatment of energy data, the Task Force analysis clearly delineated what the State's schools had accomplished. It also generated new information concerning energy consumption patterns. A comparison of the old energy picture with the new picture that emerged as a result of the Task Force analysis showed that:

- while SED claimed that schools had conserved 25.2 percent of their energy consumption between 1972-73 and 1978-79, the data examined by the Task Force only revealed an 18.9 percent reduction;
- at the present rate of energy conservation, the Regents' 1985 goal for achieving a 40 percent reduction in energy consumption will not be reached until the year 2000;
- school budgets have not kept pace with rapidly escalating energy costs, forcing a larger portion of education funds to be drawn away from instructional and maintenance programs to pay for energy, thereby jeopardizing educational excellence; and
- energy conservation is a two-pronged process, including both the coordination of statewide energy conservation efforts and the involvement of committed local school district personnel.

This study's findings provide a framework upon which further examinations might occur and serve as guidelines for developing successful remedial actions aimed at improving the energy conservation response of schools in New York State.

HOW DO SCHOOLS SPELL ENERGY RELIEF? C..O..N..S..E..R..V..A..T..I..O..N

The study pinpointed the need for a comprehensive energy management plan for schools due to the current lack of any such plan in New York. In order to determine where successful management models exist, the Task Force scrutinized how other states managed their energy problems in schools as well as examined successful regional and local approaches within New York. This examination included the following.

- A national mail survey was undertaken of the 49 state education agencies outside New York to find out how other states were confronting the issue of energy in schools. Several interesting programs and innovative approaches to managing energy use in

schools were uncovered.

.Maine and North Carolina have implemented statewide energy management systems for their schools.

.Ohio and Massachusetts have provided their schools with detailed energy management handbooks.

.California administers a $10 million loan program from which schools can borrow the funds needed for local match requirements under the Schools and Hospitals Program.

.Ohio has required the teaching of energy conservation in its classrooms.

Other state actions, like those in New York, were limited to participation in the federal Schools and Hospitals Program.

- Two regional approaches to energy management in New York State schools administered by Boards of Cooperative Educational Services (BOCES) were examined. These two successful programs presented a basis for the development of a statewide, regionally administered energy management program for schools.

- One school district's successful efforts to attack its energy problem were investigated. The commitment necessary at the local level to manage and conserve energy exemplified one of the important components in a comprehensive plan to control energy costs in the State's schools.

By evaluating programs at all three levels, the best components of each were used to formulate an effective statewide energy management concept that reflects a solid commitment towards energy conservation in schools.

ENERGY CONSERVATION: HOW MUCH IS ENOUGH?

Four important points were stressed throughout this report. These points were used as the basis for the major recommendations set forth in this study (pages 139-156).

- There is an ever present energy problem in New York State which carries with it a potentially debilitating power, especially for the State's public school system.

- Energy conservation is a proven method for relieving the overdependence schools have had on energy, particularly fuel oil.

- Although the State's schools have accomplished a minimal level of energy conservation since 1972-73, most of which occurred in the first year following the 1973 Arab oil embargo, more can be done.

- Two vital ingredients are necessary in order to attain effective energy conservation: a firm commitment to resolve inefficient

use of energy and a coordinated statewide energy conservation plan for schools which establishes a solid framework for reaching identified goals.

Legislative Considerations

At the State level, this study proposes the implementation of a coordinated statewide energy conservation program composed of several important components, including:

- a New York State Energy Management Plan for Schools;
- a statewide Regional BOCES Energy Conservation Task Force to develop, implement and administer the Management Plan;
- a statewide energy monitoring system;
- statewide technical training of local school personnel in energy management techniques;
- State sponsored incentives and fiscal support for energy conservation through the School Building Aid Program and an Innovative Energy Conservation Project Loan Fund;
- broadbased public recognition of schools which achieve applaudable energy conservation records; and
- energy education in schools.

State Energy Management Plan for Schools.--New York State has gone too long without a clear, consistent, statewide energy management plan for its schools. As a result, the record shows that school efforts to conserve energy have been erratic. A statewide energy management plan for schools would set into motion a coordinated, comprehensive long-term strategy for gaining more control over energy costs and supplies in schools. In addition, it would signal the beginning of a serious commitment by the State to improve energy conservation throughout the educational sector. The State plan would set forth the goals and objectives to be used in designing a decentralized management plan under the coordination of the State's 14 regional Boards of Cooperative Educational Services (BOCES).

Regional BOCES Energy Conservation Task Force.--A statewide Regional BOCES Energy Conservation Task Force, composed of an Energy Coordinator from each of the 14 regional BOCES and one representative each from SEO and SED, is proposed to develop, implement and administer the New York State Energy Management Plan for Schools. A regional approach, in conjunction with SEO and SED, would eliminate much of the confusion and duplication of effort experienced under the existing energy conservation approach. The SEO representative would chair the Task Force, and SEO and SED would provide staff as needed.

Statewide Energy Monitoring System.--The State currently lacks a centralized clearinghouse for collecting, analyzing and disseminating energy data for the schools. SEO collected data at the school building level in 1979-80, as part of the federal Schools and Hospitals Program. Unfortunately, that data is

now, obsolete. The quality of energy data collected by SED has been poor. Therefore, a statewide energy monitoring program is proposed to collect and analyze more complete energy data, to identify where energy problems exist and to prescribe improved energy management methods for remedying the problems. SEO and the Regional BOCES Energy Conservation Task Force would administer the program.

Statewide Technical Training in Energy Management.--Effective energy management requires that individuals at the local level be technically competent to monitor energy consumption and to institute energy management efforts in their respective schools. In order to accomplish this, three separate actions are proposed.

- Energy training manuals should be developed collaboratively by the Task Force, SED and SEO and distributed to all local school plant operators.

- Regional BOCES energy coordinators should develop on-site training programs for their schools requiring energy management training.

- The Regional BOCES Energy Conservation Task Force should examine the need for a high school curriculum designed to train energy technicians through the regular BOCES program. The Task Force would submit such a curriculum to SED for approval.

Incentives and Support for Energy Conservation.--A major roadblock in energy conservation development has been the lack of an effective mechanism to fund local school district initiatives. As the amount of federal assistance for energy conservation in schools shrinks, the burden for financing projects will rest on the shoulders of the State and local school districts. In an era of increased local school district budget defeats, taxpayers are hesitant to approve additional expenditures for schools even if they are for cost effective energy conservation projects. Two approaches to resolve this problem are suggested.

- The existing School Building Aid Program should be expanded to include funding exclusively for projects targeted for energy conservation. The cost for approved projects would be borne by locally initiated funds (50 percent) and a matching grant from the expanded Building Aid Program (50 percent).

- A low interest loan program could be created for school districts interested in developing innovative projects for energy conservation improvement. Under the auspices of SEO and the Energy Conservation Task Force, the program would provide the funding necessary for schools to develop innovative energy conservation technologies.

Energy Conservation Recognition.--Individual schools and school districts in the State which succeed in improving their energy conservation records should be recognized. To date, schools which have shown exemplary efforts have not received the recognition they deserve. In addition, other school districts could learn valuable information about energy conservation adaptation if they were appraised of the successes in other disticts. The study proposes to remedy this situation by:

- requesting SED and SEO to publicize successful school district energy conservation efforts in any conferences that they conduct;

- commending successful districts through SED, SEO and Energy Conservation Task Force publications;

- having successful districts receive letters of commendation jointly written by SED, SEO and the Energy Conservation Task Force; and

- compiling information about successful energy conservation projects in the State's school system into a compendium for distribution to all school districts.

Energy Education.--Educating the citizens of New York to recognize the need to conserve energy is imperative. Schools serve as the natural vehicle for such education. Therefore, in accordance with the 1980 announcement of a joint SED/SEO Energy Education Program, curricular programs should be designed and implemented for all K-12 school programs across the State.

Local School District Proposals

No energy management plan can succeed without the cooperation and commitment of local school administrators and personnel. They must perceive energy conservation as a necessary and beneficial program for their schools. The proposed Energy Management Plan for Schools was constructed to provide that type of justification. Any costs incurred at the local level would be offset through energy cost savings. As part of the State Energy Management Plan for Schools, the study recommends that local districts facilitate energy conservation initiatives by:

- designing and implementing local district energy managment plans which will be approved by the Regional BOCES Energy Conservation Task Force;

- designating one employee in the district to serve as the district's Energy Coordinator, whose major function would be to act as a liaison between the regional management system and local school buildings; and

- providing information to local voters explaining energy expenditures and consumption on a one-, five- and ten-year basis. In addition, recommended energy conservation projects should be explained to the public and discussions held on proposed energy-related projects.

Action on Schools and Hospitals Program

Finally, at the federal level, the State must make its voice heard regarding the continuation of the federal Schools and Hospitals Program. The State spent, in the first two rounds of program funding, $9.6 million in federal and local match monies. These monies have assisted New York's school districts in instituting energy conservation measures. The program faces termination in 1982. The continuation of the program is important for the State, and therefore

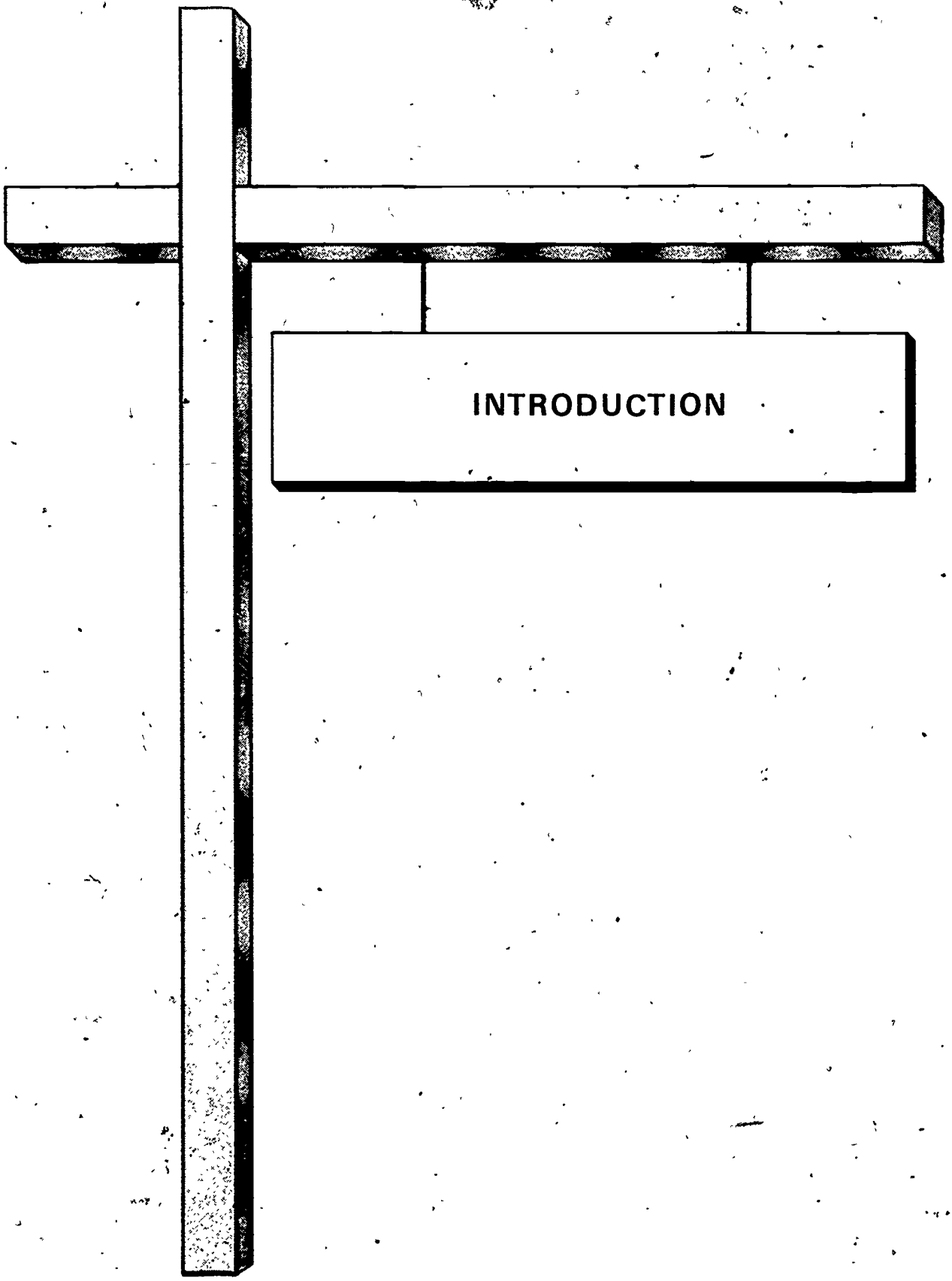
two actions are recommended.

- SEO, as the designated State administrator of the program, should submit to the Legislature and the Board of Regents a comprehensive analysis of the impact of the Schools and Hospitals Program on New York schools; and

- a strong message should be sent to the New York Congressional delegation, by way of a joint resolution from the Legislature, urging that the program remain a separate, categorical grant so that monies targeted for schools will not be lost within a larger block grant energy program.

Implications of Recommended Actions

The policy implications of these recommendations mean that New York State will take an active leadership role in defining, designing and implementing a statewide, long-term energy management system for its schools. The State cannot afford to wait for the next energy crisis to explode. The damages already inflicted by such crises have endangered school programs. The opportunity to provide concrete remedies rests on the ability of the State to move quickly and firmly. No longer should the State be forced to make a critical choice between paying for energy costs or jeopardizing educational programming.


INTRODUCTION

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Does the energy needed to operate schools in New York State cost too much? Have energy conservation measures been implemented to their fullest extent to control these costs? The answer to the first question is an emphatic yes. The second question rates a resounding no. Any temporary stabilization of energy prices may cloud the fact that energy continues to represent an aggregation of problems for New York schools. School buildings tend to be older, energy-inefficient and too heavily reliant on fuel oil. Compounding the energy problem is the general statewide decline in student enrollment which exaggerates per pupil expenditures for energy. Encasing all of these factors has been the serious economic problem created by inflation. Local schools struggle to keep pace with inflation in their budgetary allocations for all educational programs and services. Higher energy costs only exacerbate the problem of trying to keep up with inflation.

Local taxpayers across the State have run out of patience. School boards are finding it more difficult to receive voter approval of their proposed school budgets. Recent voter trends indicate that passing school budgets is becoming increasingly more difficult with a projected voter rejection rate of nearly 30 percent expected for 1982. The uncontrolled costs of energy have only made their task that much harder. Even in a period of more stabilized energy prices, schools cannot escape high energy costs. Any realistic expectation for relief in the future amounts to misplaced hope. As has been learned time and again, energy costs and supplies can fluctuate rapidly and create havoc in schools.

Efforts to alleviate the energy problem in the State's public school system date back to the Arab oil embargo of 1973. Unfortunately, these efforts have been, at best, sporadic and uncoordinated. An "ebb and flow" style of response has resulted in an energy conservation record for the State's schools which falls short of its potential level of accomplishment.

This report is intended to illustrate the State's energy conservation record between 1972 and 1979. Because experience shows that energy conservation

programs in schools can result in dramatic and immediate savings in tax dollars, this report thoroughly examines the degree to which New York's schools have attempted to save tax dollars. After all, the schools have had ten years to get their "energy act" together. More importantly, the main question addressed is: Have New York schools achieved their maximum level of energy reduction, thereby assuring the utmost in tax dollar savings? The report also raises a series of other very serious questions. Have New York schools done a commendable job in energy conservation? What have been the obstacles obstructing their progress? What can the State do to assist the schools in maximizing their energy reduction efforts?

Undoubtedly, all New Yorkers are concerned with the overbearing costs of energy. More can be done to assure them that schools are attempting to go the "last mile" in energy conservation. New York State Education Commissioner Gordon Ambach, in a speech before the New York Technology Fair on February 10, 1981, expressed it most succinctly: "We must continue to search for ways to combat the energy crisis by using our resources to their best advantage." Has New York State used its resources to its best advantage? The answer to this question rests in the following pages of this report.

WHAT ARE THE ENERGY PROBLEMS CONFRONTING NEW YORK STATE SCHOOLS?

A CRITICAL CHOICE: CUT ENERGY COSTS OR CUT EDUCATIONAL PROGRAMS

It is an unfortunate fact that energy costs for operating schools in New York continue to rise at unprecedented rates. As a result of these escalating costs, many school districts in the State face substantial budget increases each school year in order to maintain the same level of services. Since the Arab oil embargo of 1973, the cost per gallon of home heating fuel oil in New York State has increased from 23¢ to $1.24 in January, 1982, a jump of 440 percent (1). In that same time period, electricity, natural gas and coal prices all escalated by at least 200 percent (2). Unlike the private sector, the public school system cannot pass along additional energy costs to its customers, in this case, students. Therefore, school administrators have had to face a critical decision of chosing between two options. The first is to seek supplemental funds in order to cover the runaway costs of energy by using a combination of three approaches:

- transferring monies allocated for other budgetary items to pay for operations and maintenance of plant expenditures, often at the expense of necessary programs and services;
- increasing their reliance on revenues generated from local property taxes; and
- increasing their reliance on additional state aid.

Any of these can lead to the disruption of educational services due to the shifting of funds from various program areas to pay for fuel bills. It also can place an increasingly larger fiscal burden on local and State taxpayers who must come up with the revenues necessary to cover the costs of unreigned energy consumption.

The second option is to reduce the amount of energy consumed through planned energy management. This option entails the adoption of an integrated energy conservation and management program in school systems throughout the

State. The primary purpose of conservation is to mitigate the negative impacts created by the soaring costs of energy. In addition, energy reduction enables school administrators to present budgets to voters with smaller annual increases targeted for energy costs thereby increasing the chances for budget approval.

A false sense of security currently exists regarding the need to be concerned about energy costs and supplies. Whether or not the most recent energy crises have been permanently resolved, the fact remains that existing petroleum supplies can be quickly drained without continued importation from abroad. The point here: our liberal use of energy remains one of the country's unresolved and potentially devastating problems. The educational sector cannot escape from the hardships engendered by the lack of petroleum supplies and/or escalating energy costs. No one should be encouraged by an apparent abundance of gasoline and heating oil. It will not last very long.

To fully understand the critical nature of the choices confronting educational administrators, it is necessary both to realize the magnitude and complexity of the energy crisis as it affects schools and to comprehend the fact that other factors, such as older, energy-inefficient buildings, school closings and declining student enrollments, are compounding the energy problem in New York. The educational community, however, does not operate in a vacuum. It coordinates its energy-related activities with federal and State initiatives and with other private sector enterprises. Therefore, any analysis of the degree of impact on New York's schools must first recognize three distinct yet interrelated perspectives:

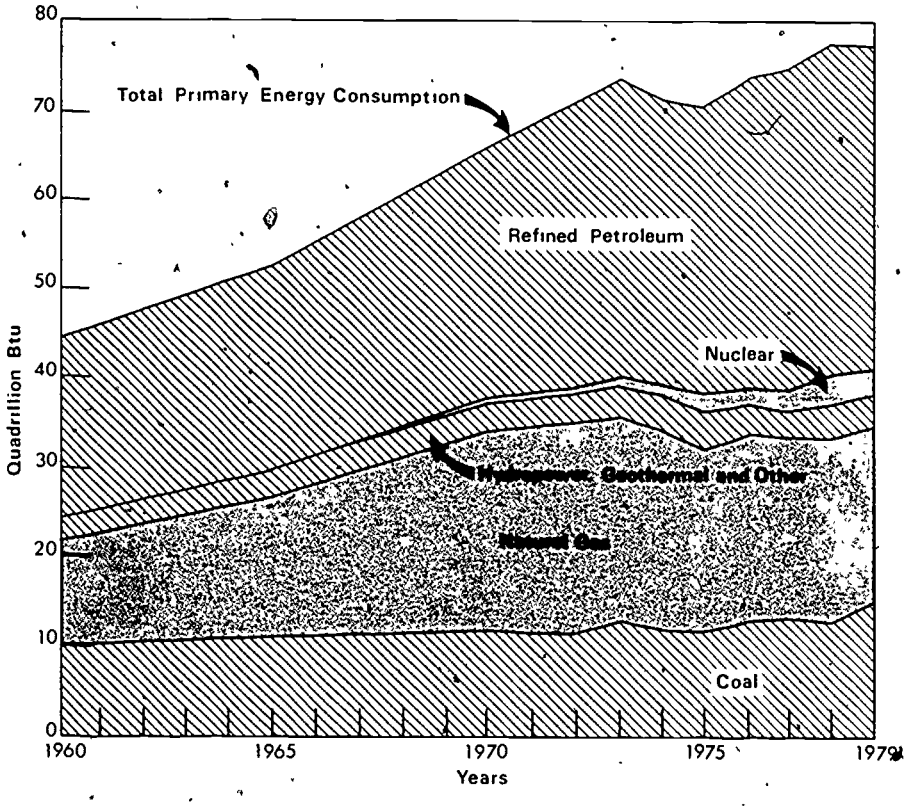
- the status of energy use at the national level;
- energy problems specific to New York State; and
- energy as it relates to the educational sector in general.

THE NATIONAL PICTURE: COSTLY DEPENDENCE ON FOREIGN OIL SUPPLIES

The energy picture in the United States has changed dramatically in the past two decades. From 1960 until 1973 an overabundant supply of inexpensive oil enticed the country into switching its energy use from other domestic sources, principally coal, to petroleum. At the same time, the seemingly inexhaustible supplies of cheap energy lured Americans into a pattern of profligate energy use which contributed to the near doubling of energy consumption. Figure 1 illustrates these historical trends.

FIGURE 1

U.S. Primary Consumption of Energy by Fuel: 1960-1979 (3)



During this period domestic energy production could no longer keep pace with the growing consumption. As depicted in Table 1, domestic oil production peaked in 1970 at 11.3 million barrels per day (mmbd). By 1980 production dropped to 10.2 mmbd while demand for oil grew from 14.4 mmbd in 1970 to 17.1 mmbd in 1980 (4). The easiest and least expensive way to meet the deficit was to import oil. Figure 2 demonstrates that this resulted in an increasing dependence on foreign oil. Table 2 points out that the Middle Eastern countries forming the Organization of Petroleum Exporting Countries (OPEC) were the principal suppliers.

This heavy dependence on foreign oil placed the nation in a precarious position, which was made evident by the Arab oil embargo of 1973-74. The major disruption in our oil supplies brought the era of secure and inexpensive energy in the United States to an abrupt end and had a staggering impact on the nation's economy. However, though the embargo slowed the country's consumption for two years, Figures 1 and 2 show that the effects were quickly forgotten. After 1975 energy consumption continued its rapid increase. The expansion of oil imports did not even slow down significantly, growing to the point where nearly one-half of our oil supplies were imported in 1979.

TABLE 1

Foreign Oil Consumption in the U.S.: 1960-80 (5)

Year	Consumption (millions of barrels a day)	Domestic Production (millions of barrels a day)	Imports (millions of barrels a day)	Imports (as a percentage of consumption)
1960	9.7	8.0	1.8	19
1962	10.2	8.4	2.1	21
1964	10.8	8.8	2.3	21
1966	11.9	9.6	2.6	22
1968	13.0	10.6	2.8	22
1970	14.4	11.3	3.4	24
1972	16.0	11.2	4.7	29
1974	16.2	10.5	6.1	38
1976	17.0	9.7	7.3	43
1978	18.9	10.3	8.4	44
1979	18.5	10.1	8.5	46
1980p	17.1	10.2	6.8	40

p=preliminary

Note: Numbers do not add because U.S. continued to export a small amount of oil throughout this period.

FIGURE 2

Growing U.S. Dependence on Imports (6)

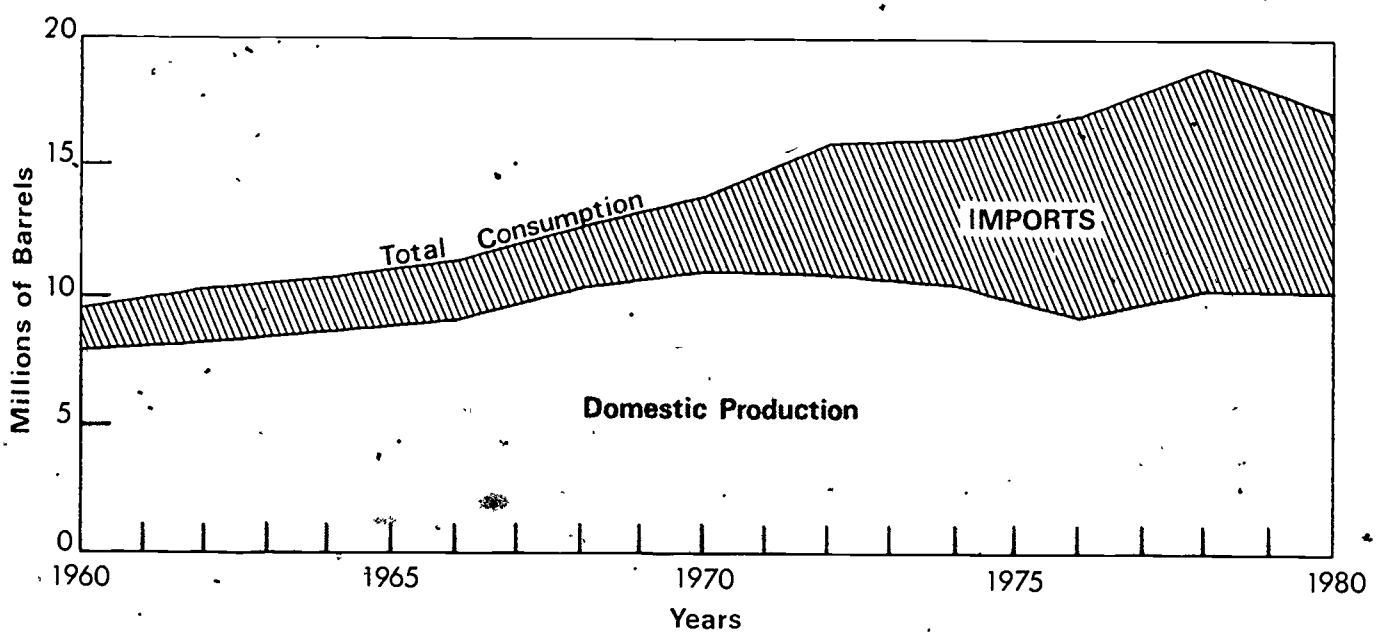


TABLE 2

Origins Of Imported Crude Oil: 1980-81 (7)

	Percent of U.S. imports:			
	Nov. 1981	Nov. 1980	11 Mos. 1981	11 Mos. 1980
Saudi Arabia**	32.9	22.8	24.5	23.1
Mexico	11.5	11.5	9.7	9.9
Indonesia*	10.7	5.6	7.4	6.0
Nigeria*	10.7	13.9	13.5	15.9
United Kingdom	5.3	3.3	7.7	2.8
Canada	3.8	4.2	3.2	3.8
Venezuela*	3.3	4.7	4.0	3.6
United Emirates**	3.1	2.6	3.0	3.5
Algeria**	3.1	8.9	5.6	8.2
Norway	2.6	4.3	2.7	3.2
Ecuador*	2.4	0.0	0.8	0.4
Libya	2.3	9.4	8.0	9.8
All Countries	100.0	100.0	100.0	100.0

*Member of OPEC Only.

**Member of OPEC, the Organization of Petroleum Exporting Countries, and of OAPEC, the Organization of Arab Petroleum Exporting Countries.

In 1979 oil supplies were disrupted again when the Shah of Iran was overthrown. The economy faltered, inflation rose and consumption was once more reduced. Yet, this time the nation seemed to respond by also realizing the need to cut imports, which dropped from 46 percent of the oil supply in 1979 to an estimated 40 percent in 1980. However, the nation's dependence on foreign suppliers continues to be dangerously high. The economic impact of this situation can be seen in the overwhelming increase in American dollars sent overseas, from $40 billion in 1978 to an estimated $85 billion in 1980 (8). This poses a direct threat to the country's economic well-being. The sudden, erratic increases in oil prices have fueled inflation, placed further strains on the international monetary system and made the possibility of a major recession a reality. The political consequences appear to be as serious. Slower economic growth and high inflation have intensified conflicts not only within Western nations but also among them. Even greater reliance on Middle East imports would certainly mean that United States foreign policy would be increasingly constrained by its oil suppliers (9).

THE PICTURE FROM THE STATE LEVEL

New York State is the fourth largest energy user among the 50 states, but has the heaviest dependence on petroleum-based products (10). Figure 3 illustrates how the various State fuel consumption levels compared to those at the national level in 1980, pointing out the extraordinarily high percentage of petroleum products consumed by New Yorkers. Primary energy consumption per capita in the State increased from 167.4 mmbtu's in 1960 to 223.6 in 1980, or an increase of 74 percent (11). The graph depicted in Figure 4 not only shows energy consumption by fuel type for the State, it also provides an historical picture of consumption levels for each type between 1960 and 1980. The State's total consumption record was very similar to that experienced by the nation in general until 1976. Since that time, according to New York State Energy Office figures, the State first slowed its energy consumption growth rate and then finally began to reduce its total usage. It also reduced the relative importance of oil from a high of almost 66 percent of all energy used in 1972 to 57 percent in 1980, nearly back to the 1960 level (12).

FIGURE 3

Primary Consumption by Fuel, NYS and U.S.: 1980 (13)

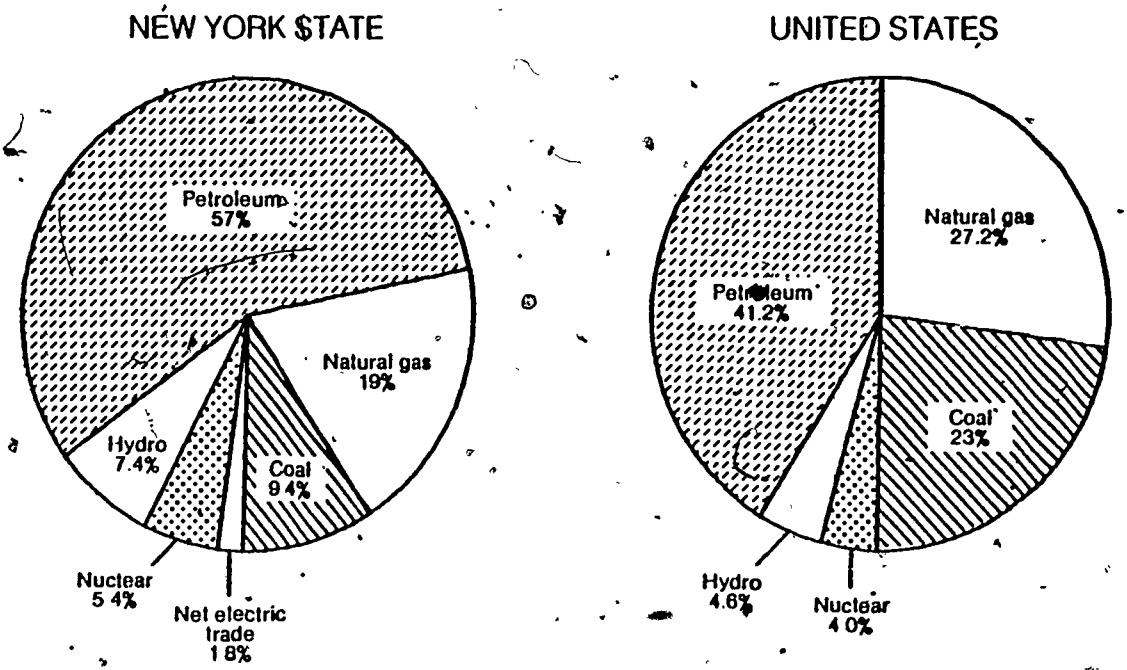
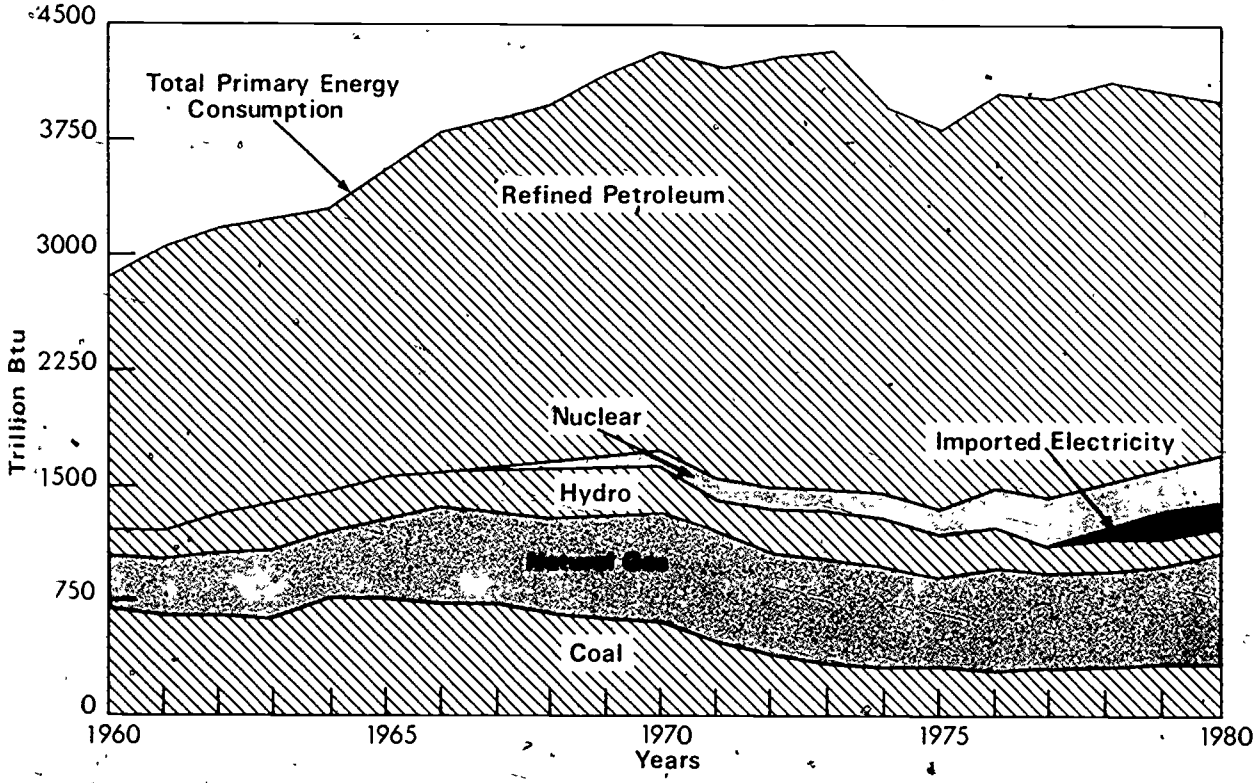


FIGURE 4

NYS Primary Consumption of Energy by Fuel: 1960-80 (14)



Though reductions have occurred, New York State remains too dependent on foreign sources for its energy supplies. Figure 5 indicates that the State relies on foreign sources for 70 percent of its oil. While the nation depended on foreign countries for about 24 percent of its total energy supply, fully 43 percent of the energy used in New York in 1980 came from foreign nations in the form of oil and imported electricity (15).

Fuel costs, like supplies, have become uncontrollable and unpredictable. Though total energy consumption increased in the State by only 10 percent from 1965 through 1980, energy costs rose 409 percent, from $4.6 billion to 23.4 billion. From 1978 to 1980 alone, energy costs rose $7.4 billion, or 46 percent, even though New Yorkers used five percent less energy. Fully 75 percent of this increase in cost, or $5.5 billion, was attributable to petroleum products (16). Figure 6 displays these escalating total costs of energy in New York by fuel type, while Table 4 provides a detailed look at how each of the

FIGURE 5

Sources of Petroleum Consumed, NYS and U.S.: 1980 (17)

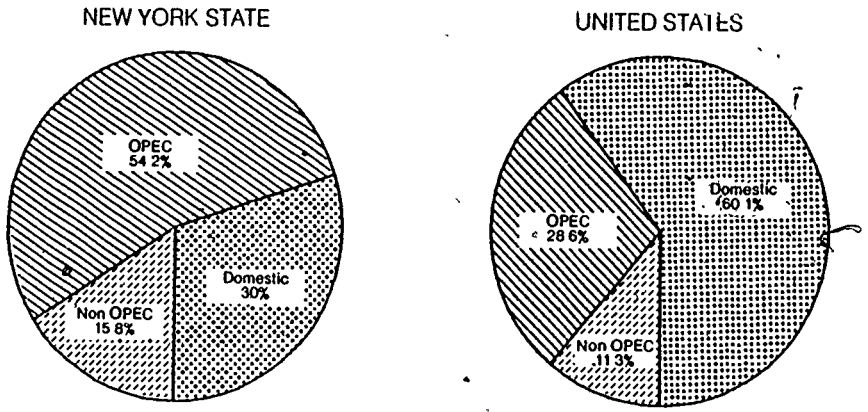


FIGURE 6

Net Energy Costs by Fuel Type, NYS: 1965-1980 (18)

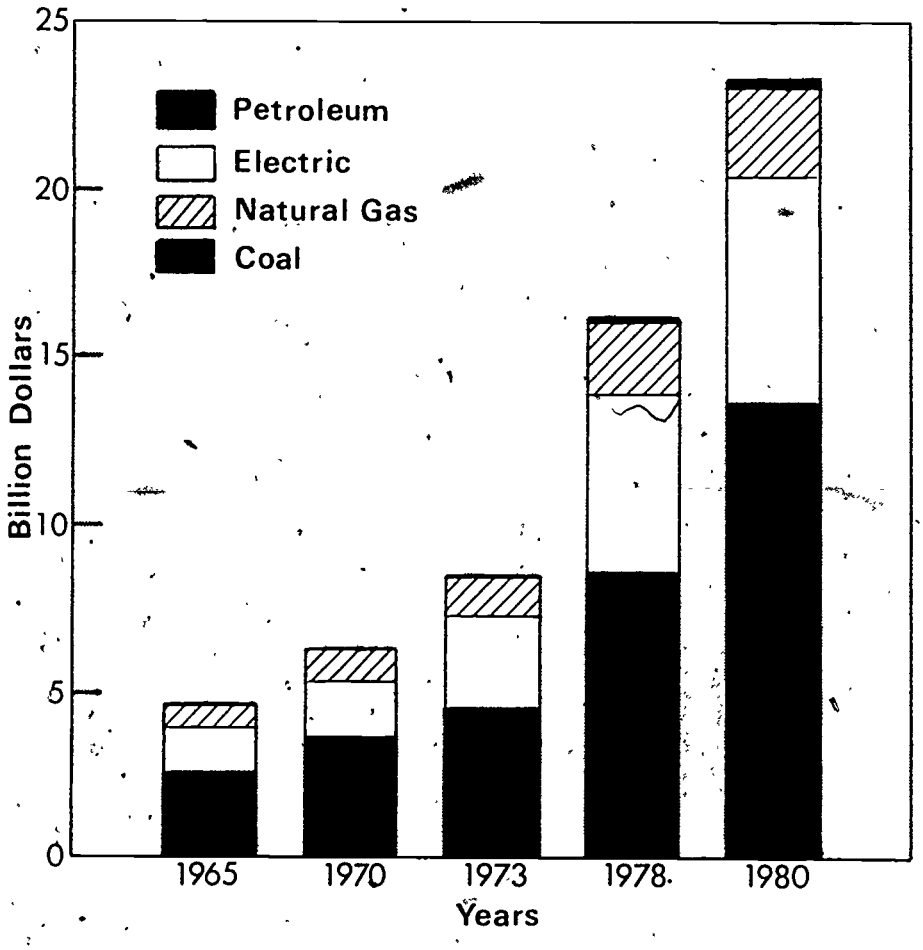


TABLE 4

Average NYS Energy Prices: 1973-80 (19)

Year	Electricity (¢/kwh*)	Natural Gas ($/1000 cu ft**)	No. 2 Fuel Oil ($/barrel [42 gal])	No. 4 Fuel Oil ($/barrel [42 gal])	No. 6 Fuel Oil ($/barrel [42 gal])	Bituminous Coal ($/ton)
1973	3.19	1.49	6.21	4.57	4.81	13.50
1974	4.04	1.74	11.61	10.84	12.31	29.00
1975	5.02	2.11	12.34	12.57	12.48	33.00
1976	5.34	2.56	13.14	12.20	12.30	30.75
1977	5.88	3.02	15.80	14.21	14.28	33.50
1978	6.26	3.29	19.61	14.06	13.14	33.90
1979	6.87	3.84	23.98	20.54	20.38	38.00
1980	7.71	4.61	38.14	31.81	25.58	38.00
Percent Increase	142	209	514	596	432	181

*At a 500 kwh monthly usage
**At a 30,000 cubic foot monthly usage

State's fuel prices soared between 1973 and 1980. Figure 7 illustrates how the home heating oil price has skyrocketed in recent years, both in terms of actual dollars and in constant 1972 dollars. Finally, due to the greater use of imported oil, Table 5 shows that New Yorkers have paid more for home heating oil than the average price paid in the country for most of the past two decades.

Since New York is so heavily dependent on oil and on foreign suppliers of energy, the State is in an even more precarious position than the country as a whole. A major portion of the $25 billion to $30 billion paid annually for energy is drained from the State's economy. This creates a huge financial deficit for New York's economy while bolstering out-of-state and foreign economies. Energy costs amount to over $1,600 for every person in the State. Long range forecasts indicate that energy prices will continue to rise with little hope for a leveling off. Should supplies become inaccessible, the impact on New York would be devastating.

The existing energy crunch places the State's residents, businesses, industries and, most importantly, schools in the position of having to pay for energy with funds that previously were allocated for other necessities, programs or services. For the educational sector the situation is serious and cannot be remedied quickly or easily.

FIGURE 7

NYS Average Home Heating Oil Retail Prices: 1960-1981 (20)

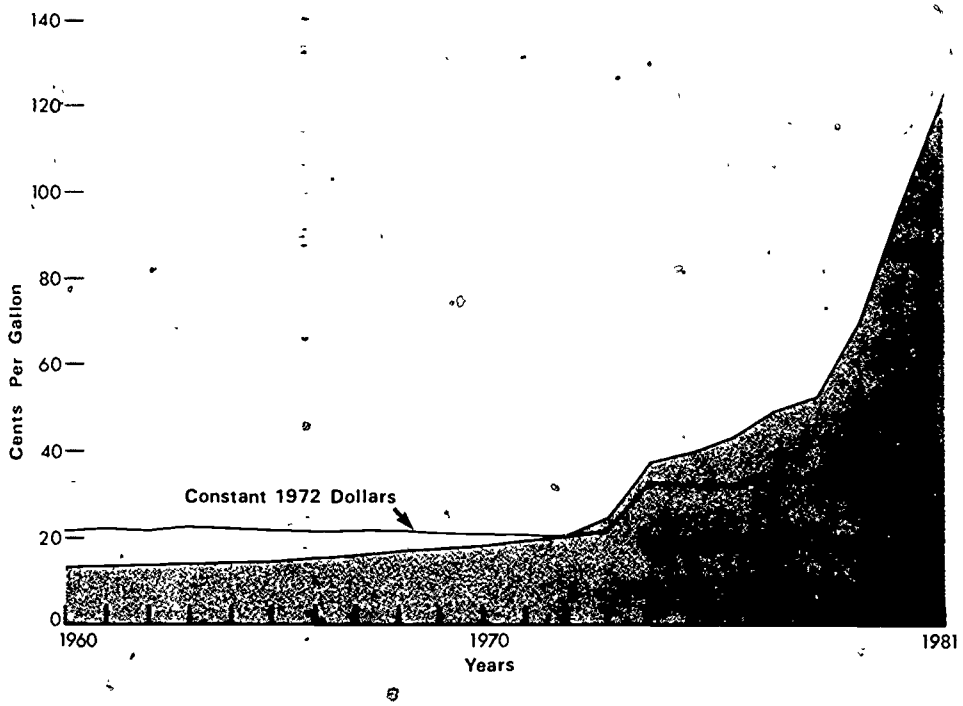


TABLE 5

Comparison of U.S. and NYS Wholesale Distillate Fuel Oil Prices: 1960-1980 (21)
($/barrel)

	#2 Fuel Oil			#2 Fuel Oil	
Year	U.S.	NYS	Year	U.S.	NYS
1960	4.25	4.20	1971	4.75	5.09
1961	4.34	4.52	1972	4.70	5.07
1962	4.40	4.38	1973	6.00	6.20
1963	4.28	4.22	1974	11.07	11.61
1964	3.89	3.99	1975	12.29	12.34
1965	4.01	4.10	1976	13.37	13.14
1966	4.05	4.30	1977	15.06	15.80
1967	4.21	4.60	1978	16.25	19.61
1968	4.32	4.72	1979	22.26	23.98
1969	4.47	4.72	1980	34.10	38.14
1970	4.60	4.79			

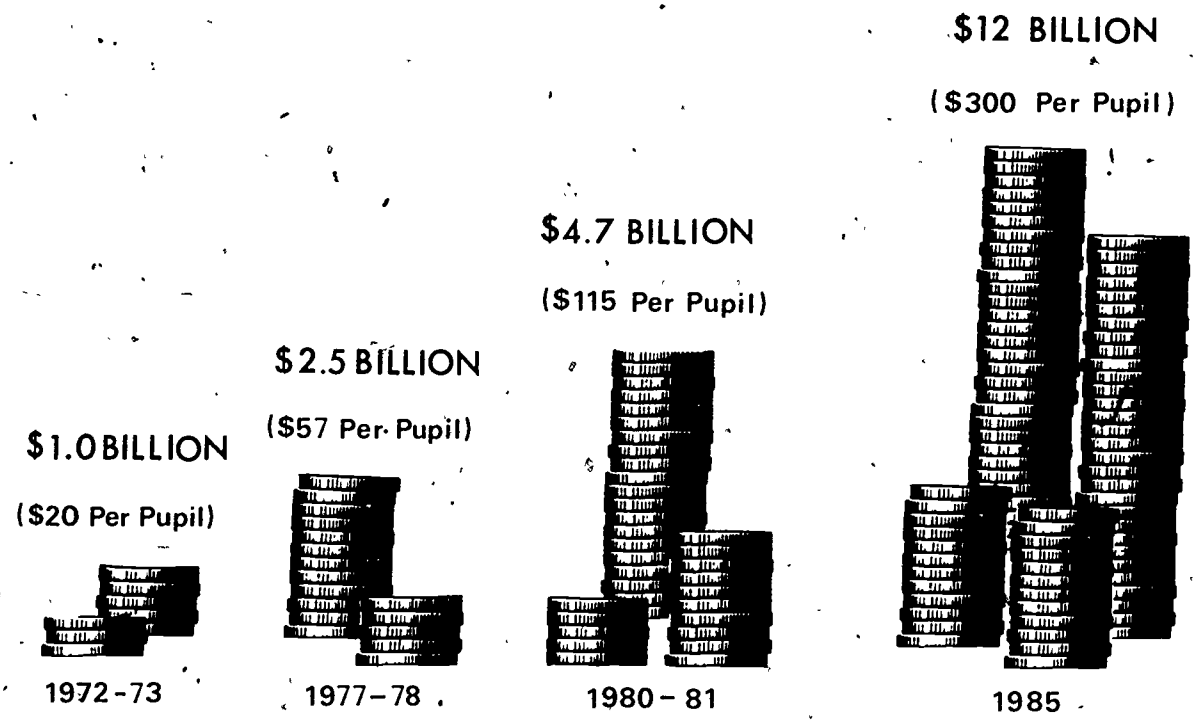
THE PICTURE FROM THE NATIONAL EDUCATIONAL SECTOR

The nation's schools are not immune to the energy problem. Energy expenditures, now accounting for up to 20 percent of a school's nonsalary operating budget, are the fastest rising expense facing schools (22). The Educational Facilities Laboratories (EFL), a nonprofit organization which provides information on the building and operation of public educational institutions, estimated in a 1979 study that public primary and secondary schools used nearly three percent of the total national energy consumption in 1977-78, including 10 percent of all fuel used for heating and cooling (23). While that may not seem excessive, EFL estimated the total energy cost to be about $2.5 billion or $57 per pupil (24). In contrast, total energy expenditures in 1972-73 were approximately $1 billion or $20 per student.

As Figure 8 illustrates, both total energy costs and per pupil expenditures are expected to continue their dramatic escalation in the near future. The American Association of School Administrators stated that per pupil energy costs in 1980-81 ranged from $100 to $130. Based on an estimated student

FIGURE 8

Escalating Energy Costs for the Nation's Schools (25)



population of 41 million (public K-12), this amounts to an incredible national energy bill of from $4.1 billion to $5.3 billion. By 1985 the Association projects a per pupil cost of $300; or a total cost of over $12 billion (26). These soaring energy costs are of immediate concern to both policymakers and educators across the country for four reasons.

Firstly, higher total energy expenditures by schools are occurring concurrently with energy conservation. According to the American Association of School Administrators, schools cut their energy consumption by 35 percent between 1972-73 and 1977-78, yet their energy bill rose by 140 percent (27). Each year a portion of the increase in energy costs has been offset by a decline in energy use through conservation. This is referred to as cost avoidance. Unfortunately, schools can conserve only so much of their energy use, and when that maximum point is reached, cost avoidance can no longer offset increased costs brought about by rapidly rising prices.

Secondly, energy costs are escalating in such an unpredictable way that projecting even short-term operating expenditures for schools can be an exercise in futility. The annual budgeting process is difficult enough, but when school administrators seek to set aside adequate funds for energy, they can do little more than guess. How can such factors as an oil embargo, the results of an OPEC oil pricing session, a natural gas shortage, a coal miners' strike or an extremely cold winter be factored into any rational budgeting process?

Thirdly, the overall energy picture for the nation's schools is still unclear, even though the awareness of the energy crisis began in 1973--almost a decade ago. A limited number of attempts have been made to collect and analyze the energy consumption records of the nation's schools. Recognizing that such a task is formidable, federal agencies have failed to produce substantive information upon which remedial action might have been based. There is currently no data base, housed in any federal agency, which can be used to accurately describe and monitor the energy situation in the nation's schools. This makes prescriptive action difficult for policymakers and educators at all levels of government and education.

Finally, rapidly escalating energy expenditures are competing directly with educational programs for their share of limited available fiscal resources. Any retrenchment on program funding in order to cover energy costs will have nothing but a deleterious effect on education. One example of how this competition hurts educational programming is the current situation in New Jersey, where schools are spending twice as much on heating and three times as much on

other utilities as they are on textbooks (28). Without a concerted effort to reduce energy costs, educational programming cannot escape the adverse effects of energy.

IMPACT OF THE ENERGY CRISIS ON THE STATE'S SCHOOLS

Like the rest of the nation's school systems and the other economic sectors of the State, New York schools are feeling the energy pinch. Questions of costs and supplies pose the same four immediate concerns in the State's schools as they do in schools all across the country. However, just as New York is in a more precarious position than the country as a whole due to its heavier dependence on oil and foreign energy suppliers, so is the potential greater in New York for these four factors to disrupt the quality of education.

Energy costs for the State's schools are rising at unprecedented rates. According to State Education Department (SED) figures, public schools spent approximately $120 million, almost $35 per pupil, for heating and lighting in 1972-73. The spending increased to $278 million in 1980-81, representing a per pupil cost of nearly $100. This 132 percent increase in costs occurred even though SED claims that during the same period schools cut their energy consumption by 26.7 percent (29).

The financial situation of the State's schools worsens with each incremental energy price increase. Many of the schools are facing serious problems and budget deficits in their attempts to keep pace with escalating fuel costs. However, the full impact of the runaway costs of energy on New York's schools cannot be extracted simply from an analysis of the magnitude and complexity of the energy crisis. Rapidly rising energy prices are exacerbated by other factors such as older, energy-inefficient school buildings, school closings and declining school enrollments, all of which magnify the problem of paying for energy expenditures.

Older, Energy-Inefficient School Buildings

Over 55 percent of the State's school buildings were constructed prior to 1950 with little consideration given to energy efficiency (30). Due to their age and architectural design, these schools consume extraordinarily large quantities of energy, especially fuel oil--the primary source of energy for heating these buildings. The design of facilities built after 1950 often reflected educational program trends and building standards that are not energy efficient.

Large open spaces, high ceilings, walls of windows and far too much lighting are just a few examples. What this translates into is the fact that the State's schools were careless in their consumption of energy when prices were low and supplies abundant.

A recent study published by the American Association of School Administrators (AASA) examines energy consumption in public schools nationwide. The study, based on a small sample of school districts, indicates that in 1979 schools consumed an average Energy Use Index (EUI) of 102,060 Btu/ft^2 (31). Preliminary indications from New York's Public School Energy Conservation Service data base suggest that New York public schools may have an average EUI as high as 160,000 Btu/ft^2 (32). This supports the contention that energy consumption in the State's schools is high compared to the national average. The prevalence of such a high number of energy-inefficient school buildings could be part of the reason.

School Closings

From 1972-73 to 1980-81, 536 school buildings closed operations across the State (33). The majority of these schools used oil as their primary fuel for heating (34). During this period 42 new schools opened. SED estimates that school closings resulted in a fuel reduction of nearly 5 percent, a result of overall square footage reduction estimated at 4.89 percent (35). Table 6 illustrates what has occurred in the State in terms of school building and square footage reductions. Although closing a facility should represent a near total conservation of energy, it is difficult to calculate the effect of these closings on consumption levels because:

- some of the closed buildings have been sold, leased or otherwise disposed of, but no records are kept at SED concerning disposition of closed buildings;
- many districts with closed schools have had to keep them heated to protect the empty building from the cold during the winter;
- the exact amount of energy used by closed buildings is unknown;
- the exact number of schools which have been closed and which are no longer heated by school districts is unknown;
- the square footage reduction due to partial school closings or the nonuse of parts of buildings is unknown; and
- the overall square footage figures for the State's public schools are only estimates and not totally reliable.

TABLE 6

Annual Public School Closings(36)

Year	New Buildings		Closed Buildings		Total Buildings		% Change Total Bldg. Area
	No.	Sq. Feet	No.	Sq. Feet	No.	Sq. Feet	
1972-73*	28	2,988,000	42	2,587,000	5019	419,081,000	-----
1973-74	15	1,812,000	49	2,319,000	4971	418,574,000	-0.12
1974-75	21	2,412,000	72	3,501,000	4920	417,485,000	-0.38
1975-76	8	1,067,000	38	2,148,000	4890	416,404,000	-0.64
1976-77	3	384,000	109	6,247,000	4784	410,541,000	-2.04
1977-78	2	52,000	41	2,772,000	4745	407,871,000	-2.67
1978-79	4	302,000	73	4,552,000	4667	403,621,000	-3.69
1979-80	4	343,000	88	4,680,000	4592	399,284,000	-4.67
1980-81	7	740,000	24	1,441,000	4575	398,583,000	-4.89

*Base Year

Declining Student Enrollments

School closings are a result both of the general decline of school age population and of the loss of population in New York State. Table 7 details this steady decline in enrollment since the 1972-73 school year. With the end of the post World War II baby boom has come the realization that schools must operate under an "era of diminishing returns." Declining enrollments mean that:

- schools, which receive state aid for education based on their attendance, may have to compensate for lost revenues; and
- heating the same facility today which ten years ago housed a larger number of students may not be cost effective, especially when the costs for heating that building have escalated so rapidly.

Per pupil expenditures for educating New York's students are increasing due to the combined effects of the declining student population and increased costs for personnel services and plant operations. Energy costs are a significant

TABLE 7

NYS Student Enrollment in Public Schools K-12 (37)

Year	Total Pupil Population	Percent Change in Pupil Population
1972-73*	3,474,000	----
1973-74	3,427,560	-1.4
1974-75	3,401,636	-2.2
1975-76	3,382,369	-2.7
1976-77	3,307,231	-4.9
1977-78	3,189,781	-8.3
1978-79	3,060,911	-12.0
1979-80	2,935,764	-15.5
1980-81	2,838,393	-18.3

*Base Year

portion of plant operations. Local newspaper accounts of the impact of declining enrollments in school districts across the State demonstrates the net effect of what is happening.

- Rockland.--The cost of educating Rockland's public school students will be higher this coming year. Higher utility and transportation bills will take a large bite out of the district's budget. And higher operating costs come as many districts face declining student enrollments. Per pupil costs will rise by an average of 10 percent while the number of students has declined 3.4 percent over the last two years (38).

- Utica.--The number of students in the Whitesboro School District will drop by about 279 next year while the cost of heating the schools will rise some $229,360 (39).

- Watertown.--The public school population of 4,703 students is the lowest enrollment figure since 1945 (40).

New York State Education Department projections show that the student enrollment decline will continue throughout the decade and result in an additional 23.3 percent decrease from 1979 levels (41). This forecast is ominous news for the State's schools as well as for the State's taxpayers who must shoulder much of the burden for the increasing costs of educating fewer students.

Soaring Fuel Costs Result in School Budget Increases

Escalating energy prices, ~~in~~ conjunction with older energy-inefficient school buildings, school closings and decreasing school enrollments, are raising havoc with most school district budgets. They also mean trouble for school administrators who must project into budgets their energy costs for the forthcoming year. Local taxpayers are being told that their taxes must increase in order to cover these higher costs for fewer and fewer students. Several examples taken from local newspapers across the State in Spring, 1980, the time when the 1980-81 school budgets were proposed, describe what happened to school budgets that year. The situation has not improved since then.

- Washingtonville.--Spending by the Washingtonville School District next year will rise by 11.1 percent. Fuel oil costs--which have upset school budgets throughout the region--have been pegged at $188,000 for 1980-81 which represents an increase of 90 percent (42).

- Bethlehem.--The 1980-81 budget increased by $656,000 with added fuel and gasoline costs making up about $264,000--or 40 percent--of the increase (43).

- Watertown.--The budget of $12,933,889 is up eight percent over last year. Superintendent Henry J. Henderson said that energy costs account for about $100,000 of the budget, up from $35,000 in 1979-80 (44).

- Condor School District, Ithaca.--As long as energy costs continue to spiral, there is no respite in sight for taxpayers. At least not in the Condor School District, where next year's expected energy costs will bloat the budget 8.7 percent (45).

- Rochester.--School tax bills are going up again this year. And the reasons are higher employee costs, transportation and energy-related expenses, administrators say (46).

- Mechanicville.--A good portion of the increase Cocozzo explained, is blamed on energy. Oil costs will increase from $120-$130 thousand over last year's projected figures (47).

- Rockland.--Most of the increases in the approved $30,496,336 budget reflect hikes in energy costs and the general tide of double-digit inflation. Oil costs jumped 70 percent in the new budget, from the current $165,300 to $280,300 for the next year, while heating costs alone rose from $46,875 to $59,725 (48).

- Syracuse.--With seven school districts in the county sustaining budget defeats in the past six weeks, three are submitting budgets to voters today and tomorrow. Liverpool is offering a $31.18 million spending plan, an increase of about eight percent over this year (49).

- Beacon School District, Poughkeepsie.--The budget represents a 10.5 percent increase over the 1979-80 budget. One of the largest budget increases for 1980-81 could be traced to the district's operation and maintenance category which jumped from $658,250 to $791,388 next year, an increase of $133,138. Utilities and fuel oil are included in that category (50).

- New Hartford School District, Utica.--Heating oil and energy costs will account for the major dollar increase in the New Hartford School District's tentative $9.9 million budget. Heating costs have increased from 33 cents a gallon last year to 88 cents a gallon this year, and projected next year's prices would be about $1.17 a gallon. School business manager, Terrence Schruers said, 'And please note that my projection for next year's costs is just that--a projection. Exactly how high oil prices will go is anybody's guess.' (51)

- Mohonasen School District, Rotterdam.--The proposed $8.5 million spending plan is 10.3 percent higher than last year's. The actual rise in costs is $795,468. But, because projected state and federal aid increases are not keeping pace with costs, the amount to be raised by taxes next year is tentatively set at $3,469,164--$842,961 more than in 1979-80. Major budget increases include a $523,887 hike in salaries and fringe benefits for district employees, $165,000 more for fuel oil costs, an increase of nearly $17,000 in electricity and a $62,000 increase in gasoline for school buses (52).

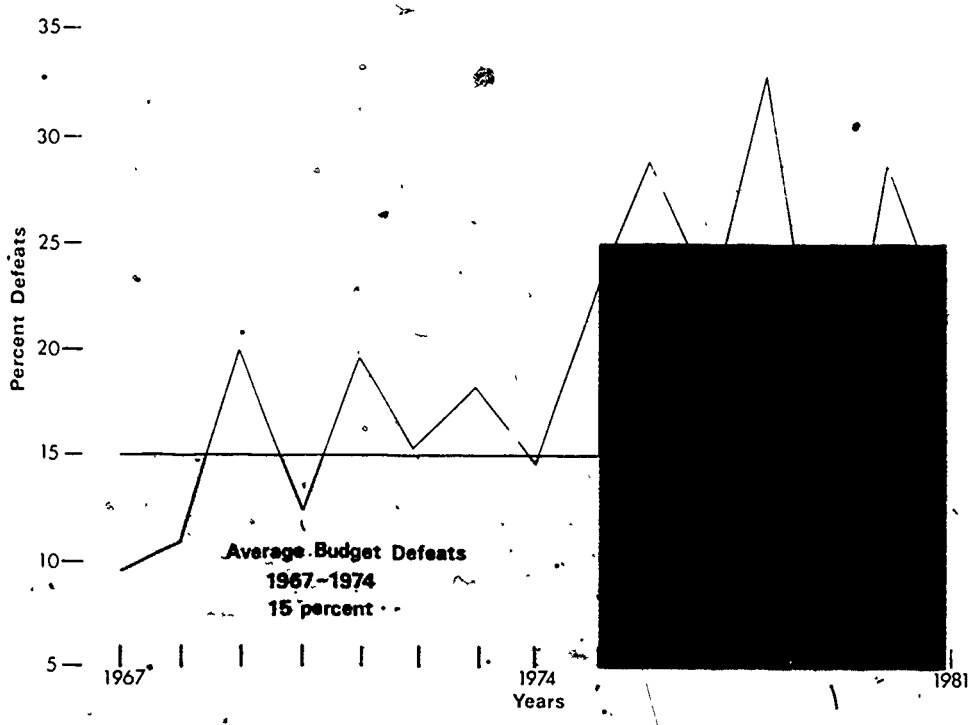
These represent but a few of the budgetary dilemma's experienced by school districts across the State. The message is clear. The burden for generating additional monies for energy expenditures rests with local district taxpayers.

School Budget Approvals Difficult

A significant indicator of the effect which soaring energy prices, along with rising education costs in general, have had on the State's schools is reflected in Figure 9, which demonstrates the generally upward trend of budget defeats from 1967-1981. Beginning with the budget year following the 1973-74 oil embargo, the percentage of school budget defeats has risen remarkably--from an average of less than 15 percent from 1967-1974 to nearly 25 percent from 1975-1981. In preparing budgets for the 1980-81 school year, school boards and school administrators wrestled with the fiscal problems created by escalating fuel costs in combination with factors such as runaway inflation and personnel costs. The State experienced one of the highest ever failure rates for passage of those budgets submitted to localities for voter approval. Almost one-third of the budgets were initially rejected.

FIGURE 9

NYS Budget Defeats: 1967-1981 (53)



An article in the State Education Department's Inside Education, which assessed the increasing trend toward budget defeats, stated that one of the three most frequently mentioned explanations for those defeats was:

> The 'energy cost pinch': Rapidly rising costs for heating oil and gasoline are putting great pressure, not only on operation and maintenance budgets, but also on program budgets (54).

Several quotes taken from local newspaper items across the State after the defeat of 1980-81 school budgets accurately describe what had occurred.

- Albany.--For the second time this year South Colonie Central School District voters have rejected the district's proposed $20 million 1980-81 school budget (55).
- Ithaca.--District voters defeated Dryden's proposed 1980-81 school budget by 80 votes Wednesday marking the first budget defeat in the district's history (56).
- Syracuse.--Liverpool School District voters last night for the second time defeated the district's proposed 1980-81 budget (57).
- Rockland.--Rockland's largest school district, East Ramapo, is now the only one without a voter-approved school budget (58).

•Rochester.--Two school budgets in Genesee County were defeated by voters yesterday, one for the second time (59).

•Plattsburgh.--The tentative new budget calls for an expenditure of $1,967,345, a $10,000 decrease from the first budget of $1,977,345. The budget was vetoed (60).

•Watertown.--Taxpayers in four of nine area school districts turned thumbs down to budget proposals during the biggest single day of voting this year. Observers feel the vote was a reflection of discontent with the 9.8 percent increase in taxes (61).

•Long Island.--Long Islanders turned down nine of 21 school budgets in Nassau and Suffolk Counties last night. The casualty rate in Suffolk was higher. Of the twelve budgets voted on six were rejected (62).

•Buffalo.--This year's near-record taxpayer resistance to school budgets, particularly in Erie County, points up once again the need to revise state rules governing the adoption of contingency budgets when regular budgets are rejected. Albany officials attribute the current results to such factors as inflation, job layoffs, the impact of rising energy costs on budgets, state aid curtailment in some wealthier districts and a venting of general taxpayer wrath (63).

Finally, the story can best be summed up by a newspaper editorial which succinctly describes the ramifications of increased school budgets across the State:

> It has almost become a cliche--but it's true nevertheless--that tax revolts begin with the local school budgets. Taxpayers have shown, time and time again, that when they are up to here with taxes, the school budgets are most likely to take it on the chin. According to the State Education Department, voters in New York have been rejecting school district budgets this Spring (1980) and Summer at a rate twice that of 1979. The department reported that of 636 school budgets offered for approval in May and June, 190 were voted down, a 29 percent rejection. Last year, 92 budgets--14 percent--were defeated at the polls (64).

For the 1981-82 school year, 148 district budget proposals were defeated resulting in a 22.6 percent rejection rate. The forecast for the 1982-83 school year is ominous, with a predicted rejection rate of 30 percent or above (65).

Austerity Budgets Jeopardize Quality Education

A school district has two options for resolving a budget defeat. Both significantly affect educational programs. The first is to reduce funding for educational programs in order to cut the size of the budget, thereby enhancing the chances for voter approval. If this process fails after one, or in some cases, several, attempts, then by law, a school board may levy taxes to pay for basic expenses--or an austerity budget--without voter approval. The district can levy taxes to pay for only those services required by law: teachers' salaries, textbooks for required courses, maintenance costs on school property, transportation of students living more than two miles away and legal fees. Austerity budgets include no funding for interscholastic sports, late buses or other special transportation services, new equipment, library books or capital improvements unless an emergency occurs. Also, community or other outside use of school property is forbidden unless it can be demonstrated that there will be no cost to the district. As of November 1981, 82 school districts in the State were operating under austerity or contingency budgets (66).

For New York State's schools, austerity budgets, or the threat of having to operate under one, can have considerable consequences. For a system which has long prided itself as one of the best in the nation offering educational excellence through diverse and comprehensive programming, austerity budgets mean disruption of programs for students. An example of the extent of the disruption comes from Liverpool, where a budget was finally passed last year on the fourth attempt.

> One of the problems we have here in Liverpool and New York State is a fear of budget defeats and contingency budgets....The sad thing is that we haven't been able to replace equipment the way it should be replaced....Today it is next to impossible to add a program. You just can't add to the budget. Next year we're going to have the same money we've got now and with inflation that means we'll have less....Anything new must come at the expense of something else. It is not a question of adding something. It is a question of priorities (67).

Schools must have energy to remain in operation. The question of priorities must be confronted: do educational programs have to be cut and educational quality adversely affected in order to pay for rising energy expenditures?

ENERGY OR EDUCATION: A DIFFICULT CHOICE

Soaring energy costs, older buildings, school closings and declining enrollments have resulted in the rapidly rising per pupil energy expenditures experienced by the State's schools over the past decade. These factors have played a significant role in forcing the adoption of austerity budgets by an increasing number of school districts and the cutting of educational programs to prepare an acceptable budget in many others. In an era of limited financial resources, school districts across the State need to make critical choices between maintaining the status quo in educational programming versus meeting the ever-increasing costs of building operation and maintenance requirements.

Making the critical choice between education and energy is of serious concern to school administrators at the local level, as was clearly illustrated in a recent national survey of 3,100 school board members (68). The 1980 survey, conducted by the National School Boards Association, identified the most prevalent concerns board members face in public education. The top five concerns of school board members were:

- declining enrollment;
- high cost of energy;
- collective bargaining with teachers;
- cutting programs to balance budgets; and
- steady or declining tax base.

All of these concerns center on financial support for schools. A further regional breakdown of the responses showed that 42.7 percent of those responding in the Northeast considered energy, second only to declining enrollment, as a major problem confronting education.

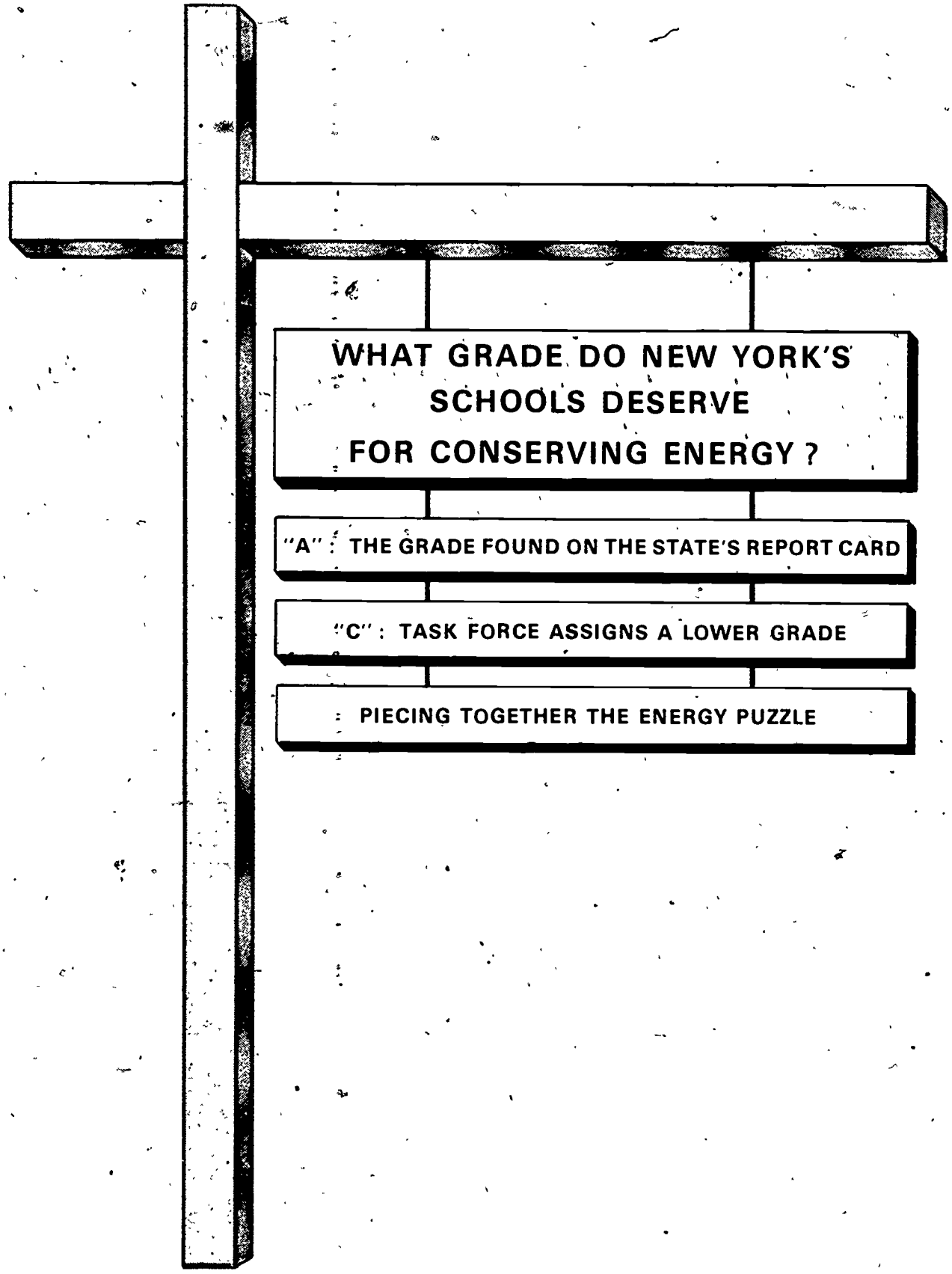
This survey accurately reflects the concerns faced by New York's local school administrators over the last several years. Trying to augment school budgets simply to account for the increases caused by inflation and to keep educational services at current levels has surfaced as the major priority for school managers and school board members. As evidenced in the preceding discussion, schools are constantly challenged to provide funds for escalating operation and maintenance expenditures without disrupting current educational

services. This is proving to be an increasingly difficult task.

How responsive have the public primary and secondary schools in New York State been in conserving energy? How well have these schools reacted to the energy crisis that developed nearly a decade ago? The Task Force undertook two separate approaches to answering these questions, including:

- a descriptive analysis of the actions federal and State agencies have undertaken in response to the energy crisis in schools along with internal agency assessments of how effective these actions have been in conserving energy; and
- a systematic and comprehensive statistical analysis of the actual amounts of energy consumed by the State's public schools between 1972-73 and 1978-79.

By using these two approaches, detailed in the following section, several interesting contradictions in performance ratings surfaced. These contradictions, discussed in the summary chapter to the next section entitled "Piecing Together the Energy Puzzle," partially explain why New York's schools have not achieved an applaudable energy conservation record. Rather than the "A" rating seemingly assigned by the State to New York schools' responsiveness toward energy conservation, a more accurate grade might be "C".


WHAT GRADE DO NEW YORK'S SCHOOLS DESERVE FOR CONSERVING ENERGY ?
"A" : THE GRADE FOUND ON THE STATE'S REPORT CARD
"C" : TASK FORCE ASSIGNS A LOWER GRADE
: PIECING TOGETHER THE ENERGY PUZZLE

"A": THE GRADE FOUND ON THE STATE'S REPORT CARD

Across New York State, school districts confront the sensitive issues responsible for escalating school budgets. The chances are now better than one in four that a school district's initial budget will go down in defeat. That rate is up from three out of every 100 experienced in the State twenty years ago. Voters appear to be demanding that education costs be controlled.

Curbing energy costs poses one of the greatest challenges to school administrators as they watch energy prices rise to unprecedented levels. School districts are not alone in their concern over energy costs, and the burden of the energy dilemma does not rest entirely on their shoulders. Technical and fiscal assistance from the federal and State levels have attempted to ensure a maximum conservation response. However, a cursory review of this responsiveness since 1973 depicts a somewhat sporadic, loosely organized pattern by the State, in general, and by the State Education Department (SED), in particular. This applies both to the development as well as to the implementation of State energy conservation programs using federal, State and local assistance.

Several SED energy conservation initiatives and other governmental energy conservation programs directed toward the State's schools have been instituted. These efforts provide insight into the degree of response shown by the State to its schools' energy problems. In each case, it is necessary to understand how and why the actions have been instigated and the net effects of these actions in overcoming the energy problems faced by the State's school system. A detailed analysis of governmental programs and SED-sponsored initiatives is presented here.

THE FEDERAL EFFORT: THE SCHOOLS AND HOSPITALS PROGRAM

The nation's energy objective, as stated in 1979 by the United States Department of Energy (DOE), was to cut the country's consumption of foreign oil by 50 percent in the next decade, while maintaining a strong economy (1). In order to accomplish this, DOE's fiscal 1980 budget provided direct funding of

over $800 million, and a proposed level of over $1 billion in fiscal year 1981, for five existing federal energy conservation programs. These funds were distributed to the states for energy conservation activities under the State Energy Conservation Program, the Energy Extension Service, the Weatherization Assistance Program, the Schools and Hospitals Energy Conservation Program and the Residential Conservation Service. Table 8 briefly describes each program and points out how much of these grant monies have been received by New York since the program's inception.

The federal effort to provide fiscal and technical assistance to aid schools in controlling energy costs has been limited primarily to one program--the federally-enacted, State-administered "Schools and Hospitals Energy Conservation Program." Authorized for three years, the $965 million program originally was designed to help schools, hospitals and local governments make energy-conserving improvements. This program is divided into three phases.

- Phase I requires that eligible institutions engage in an energy audit. Following the audit, written recommendations on low-cost ways to save energy are submitted to the institution.

TABLE 8

Federal Energy Conservation Programs Operating in NYS (2)

Program	Description	Enabling Legislation	Total Funds Received As of January, 1982
State Energy Conservation Program	Directs the states to draw up State Energy Conservation Plans consisting of eight mandated activities plus any additional activities selected by the state, with a program goal to reduce 1980 U S. energy consumption by 5 percent.	Energy Policy and Conservation Act of 1975 (P.L. 94-163) and Energy Conservation and Production Act of 1976 (P L. 94-385)	$15 million
Energy Extension Service (EES)	The EES offers information and technical assistance to small energy consumers regarding practical energy conservation and renewable resource opportunities.	National Energy Extension Act of 1977 (P L. 95-39)	$2.5 million
Weatherization Assistance Program	Subsidizes the weatherization of low-income households	ECPA of 1976	$53 million
Schools, Hospitals, Local Government and Public Care Institutions Program	Provides matching funds for states to conduct energy audits and perform retrofits of public buildings and non-profit institutions.	National Energy Conservation Policy Act of 1978 (P L 95-619)	$38.5 million
Residential Conservation Service (RCS)	Utilities are required under the RCS to offer residential customers energy audits information and assistance in purchasing, installing and financing conservation and renewable energy measures Not yet implemented.	NECPA of 1978	$0

- Phase II, or Technical Assistance, provides a 50-50 match on a competitive basis to institutions to fund energy conservation studies detailing needed architectural and engineering changes.

- Phase III, Energy Conservation Measures, provides 50 percent federal funding for schools and hospitals to implement the improvements recommended by the Technical Assistance studies.

States must have an acceptable state energy conservation plan before they are eligible to receive funds.

The federal commitment to conserving energy, however, is being challenged by the budget cutting of the Reagan Administration. Federal energy programs offering assistance to states have been severely reduced or eliminated in the Federal Fiscal Year 1982 budget, and the Administration is proposing even deeper cuts in its 1983 budget. State energy conservation grants under the Energy Policy and Conservation Act of 1975 (EPCA), the Energy Conservation and Production Act of 1976 (ECPA) and the National Energy Extension Service Act of 1977 (EES) were cut from the 1982 budget. The Weatherization Assistance Program likewise was targeted for no funding.

For Federal Fiscal Year 1981, DOE allocated over $141 million for the Schools and Hospitals Program to fund energy conservation projects. Approximately one-fourth of this appropriation went directly to public schools K-12 (3). The 1982 authorization of $48 million for conservation grant programs calls for a substantial reduction and restructuring of the present way in which DOE provides federal funds to state and local governments. The rationale for the cuts is as follows:

> The budget reductions are in response to the fact that, motivated by rising energy costs and substantial federal tax credits, individuals, businesses and other institutions are undertaking major conservation efforts. Decontrol of oil prices and continuation of tax credits can be expected to accelerate these trends. Current public awareness of energy conservation benefits and the high level of private investment in energy conservation clearly show that grants for State energy office and public outreach programs do not warrant federal support (4).

The program comes up for reauthorization by Congress in 1982. The 1983 proposed Reagan Administration budget entirely eliminates the Schools and Hospitals Program. However, according to one group of federal budget analysts, these grants have been fundamental in the successful financing of cost-effective conservation improvements in public facilities not eligible for tax incentives (5). This presents an obvious contradiction: program support

based upon observable program success, yet at the same time, the withdrawal of funds necessary to support the program.

Weaknesses of the Schools and Hospitals Program

The federal effort towards conserving energy in schools through the Schools and Hospitals Program has not been without its faults. States, like New York, charge that the program has a lopsided distribution formula for grant allocations which does not provide enough money for the number of schools seeking assistance. Under the current formula, monies are equally divided into thirds for each sector receiving funds: one-third to schools, one-third to hospitals, and one-third to local governments. The fact is that the number of school facilities requiring energy conservation far exceed the number of hospitals. Critics also point out that hospitals generate revenues differently from schools and in a manner which does not interfere with grant requirements. This is not the case with schools. For example, most school districts in New York must receive voter approval on any supplemental expenditures, such as energy conservation projects, before they can initiate such a program. Under the 50-50 match requirement, local school districts must come up with their share of the project cost only after voters approve of such an expenditure. Hospitals do not function under such constraints and therefore participation is easier.

There is no mechanism in the present funding formula which allows monies to be transferred from one sector, such as hospitals, to any other sector should the need arise. Therefore, states lack the option of determining where the need rests and adjusting the distribution formula to reflect such needs.

Distribution of funds is based upon a formula which allows for three separate implementation phases: energy audits, Technical Assistance and Energy Conservation Measures. The last phase is the costliest. Therefore, many schools do not receive funding for this phase as monies are redirected toward those schools interested in phases one and two. Spreading out the monies to reach as many as possible appears to be an influential factor in the overall distribution of grants. Therefore, schools' chances of receiving funds are far greater if the grants are to pay for audits and/or Technical Assistance.

In its initial phase, the Schools and Hospitals Program did not receive the level of response expected. Many states were ill-prepared for the program and consequently failed to submit proposals. Assessing the lack of response from many states as an indication of program disinterest, critics charged that monies were not being distributed equitably to all 50 states.

Different states were at various points in their efforts to reduce energy consumption in schools at the inception of the Schools and Hospitals Program. New York, for example, had in place a State Energy Master Plan. In addition, in 1978, it had mandated an energy audit program for schools similar to that required under Phase I of the federal program. Yet New York received no compensatory funds to reimburse the State's schools for their prior auditing expenditures, and no additional monies in recognition of its initiative. Also, since the State had already conducted most of the Phase I audits, New York directed its grants towards the last two phases of the program, Technical Assistance and Energy Conservation Measures. Because the proposals submitted under these two phases are usually far more expensive to implement, the State could distribute its limited grants to a relatively smaller number of schools.

Finally, the entire educational sector has been omitted from any role in a comprehensive national policy on energy conservation. If such an energy policy inclusive of the educational sector existed, it would greatly facilitate conservation in the nation's schools, making such an effort a high priority item rather than an addendum.

New York's Experience with the Schools and Hospitals Program

New York State received a total of $19.6 million (exclusive of the local government institutions' part of the program) during the first two funding cycles of the federal Schools and Hospitals Program. Public primary and secondary schools received $4.8 million, or nearly 25 percent of this money. This $4.8 million of federal monies, together with the required $4.8 million in local matching funds, have been used primarily for Technical Assistance and Energy Conservation Measures projects. Table 9 details the distribution of these funds to the various categories of educational institutions and hospitals of the State. Additional information concerning public school participation in the Schools and Hospitals Program are contained in Tables 10 and 11.

The State Energy Office (SEO) reported that in the first round of funding, in early 1980, 140 public K-12 institutions in the State received a total of $2.7 million or 25 percent of the total $10.8 million of grant money. For the same round of funding, 239 school districts submitted proposals for Technical Assistance and Energy Conservation Measures, while only 130 school districts received funds. This translates into approximately 33 percent of the State's 734 school districts submitting proposals with slightly more than half of these being approved for funding.

TABLE 9

New York State Energy Office Sector Distribution of Technical Assistance (TA) and Energy Conservation Measures (ECM) Grant Recommendations (6)

Institution	Cycle	No. of Institutions	TA Dollars (Percent of Total)	ECM Dollars (Percent of Total)	Total Dollars (Percent of Total)
Public K-12 Schools	1	140	$1,188,135 (40%)	$1,505,548 (19%)	$2,693,683 (25%)
	2	128	992,879 (75%)	1,123,948 (15%)	2,116,827 (24%)
Private K-12 Schools	1	69	184,366 (6%)	221,873 (3%)	406,239 (4%)
	2	16	41,932 (3%)	32,631 (0.4%)	74,563 (0.8%)
Public Colleges (SUNY, CC, CUNY)	1	33	532,899 (18%)	850,807 (11%)	1,383,706 (13%)
	2	10	119,923 (9%)	337,735 (4.7%)	457,658 (5%)
Private Colleges	1	30	173,241 (6%)	2,503,176 (32%)	2,676,417 (25%)
	2	20	76,733 (6%)	2,445,331 (32%)	2,522,064 (28%)
Total Schools	1	272	2,078,641 (70%)	5,081,404 (65%)	7,160,045 (67%)
	2	174	1,231,467 (93%)	3,939,645 (53%)	5,171,112 (58%)
Total Hospitals	1	77	892,430 (30%)	2,711,858 (35%)	3,604,288 (33%)
	2	83	98,210 (7%)	3,595,187 (47%)	3,693,397 (42%)
Total Funds Available	1	621	2,971,070	7,793,262	10,764,333
	2	431	1,329,677	7,534,832	8,864,509

TABLE 10

New York State Energy Office
Program Participation of Public K-12 Schools (7)

	Technical Assistance	Energy Conservation Measures
First Cycle		
Requested	$1,434,428	$17,409,490
Funded	$1,188,135	$1,505,548
Percent of Request	83%	8%
Second Cycle		
Requested	$1,387,209	$12,538,301
Funded	$992,879	$1,123,948
Percent of Request	72%	9%
Both Cycles		
Requested	$2,821,637	$29,947,791
Funded	$2,181,014	$2,629,496
Percent of Request	77%	9%

TABLE 11

Distribution of Technical Assistance and Energy Conservation Measures Grants to Public K-12 Schools (8)

	Technical Assistance	Energy Conservation Measures
Total Eligible Districts	734	734
Total Eligible Buildings (excluding NYC)	4,177	4,177
Districts Submitting Grant Applications:		
1st Cycle	116	123
2nd Cycle	104	107
TOTAL	220	230
Districts that Received Funds:		
1st Cycle	87	43
2nd Cycle	86	22
TOTAL	173	65
Buildings For Which Grants Were Submitted:		
1st Cycle	381	345
2nd Cycle	425	279
TOTAL	806	624
Buildings That Received Grants:		
1st Cycle	320	103
2nd Cycle	273	76
TOTAL	593	179
Dollars Received for Grants:		
1st Cycle	$1,188,135	$1,505,548
2nd Cycle	$ 992,879	$1,123,948
TOTAL	$2,181,014	$2,629,496

Total monies going to all sectors of education dropped from 67 percent of first cycle funding to 58 percent of second cycle funding. Public K-12 schools received only $2.1 million, or 24 percent of the diminished total of $8.9 million that New York received in the second round. Of the 211 school districts that submitted grant proposals, 108 received funds.

The distribution of the State's share of Schools and Hospitals funds is supposed to be accomplished on a competitive basis using an evaluation scale with such factors as payback period, previous monies received for projects, feasibility and magnitude of the project, and the past record of energy savings by the institution submitting the proposal. A project evaluation team composed of SEO personnel, one member from SED and local school personnel, selects and rates project submissions. Those gaining the highest rating should receive funding. However, this is not always the case. Even with such a predetermined rating system, disagreements within the team over feasibility questions and potential versus real success factors have caused internal disagreements in the selection process. According to those familiar with the program, projects showing the shortest payback period (i.e., the estimated time required to pay for the project based upon savings accrued from consumption cutbacks) receive the most favorable ratings and thereby stand a better chance for funding (9).

Analysis of the Program's Impact on NYS Schools

It has been estimated that the impact of the Schools and Hospitals Program on the State's schools represents eight percent of the overall energy savings realized during 1979-81 (10). However, it is too early to determine the program's long-term impact because the results of the third cycle of funding have not yet been compiled and analyzed. As the data included in the tables indicate, New York State concentrated its efforts on distributing the funds to as many institutions as possible. Because a large number of schools individually received a small amount of money, the impact at the single district level has been minimal. Also, most of the districts involved received Technical Assistance grants for use in undertaking detailed energy conservation studies. These grants might be expected to lead to future energy savings if the school districts can find the money to fund suggested projects. Out of the 772 school buildings that received grants, only 179 actually were awarded funds for energy conservation measures.

One fact is certain, the program has acted as a catalyst, forcing SED to organize itself so that the schools in the State would receive their maximum share of federal monies. In the fiscal sense, a total of $19.6 million in fed-

eral funds has been pumped into the State for energy conservation in schools and hospitals. With the additional $19.6 million in local or State matching funds, this represents a substantial $39.2 million in two years. For the public K-12 schools alone, this program has generated $9.6 million in total monies spent on energy conservation. Without this incentive, would those schools participating in the programs have taken the steps necessary to make their facilities more energy efficient? The progress made under SED leadership is detailed in the next few pages.

SED SPONSORED INITIATIVES

Before the recent infusion of federal monies for energy conservation in schools, the New York State Education Department responded erratically in its efforts to constrain energy costs. The following chronological series of actions instituted by SED documents this inconsistency and provides a brief overview of events leading up to the most recent actions involving the implementation of federal energy conservation programs.

Year: 1973

The Commissioner of Education established a State Education Department Task Force on Fuel Allocation and Conservation with the Associate Commissioner for Educational Finance and Management Services as chairperson. The objectives of the Task Force were:

- to disseminate information to the educational institutions of the State concerning the Federal Fuel Allocation Program;
- to plan and recommend economy measures which could be implemented by all types of educational institutions in the interest of conserving energy; and
- to plan for and implement a program for using the educational institutions of the State to help in the broad educational program on fuel conservation (11).

The Task Force published a total of three bulletins on energy during its first year in operation and distributed these bulletins to New York school administrators, chief executive officers of higher educational institutions and superintendents of buildings and grounds. The three bulletins dealt directly with the specifics of the Federal Fuel Allocation Program, an explanation of the Federal Emergency Petroleum Allocation Act of 1973, and the recommended de-

velopment of regional contingency plans for school transportation, respectively (12). All the information in the bulletins underscored the need for voluntary cooperation by the State's schools. Each school had the final decision, however, on whether or not to participate in suggested energy conservation activities. No effort was made by SED to determine if schools were participating. School districts were required to report their energy consumption totals annually to SED.

Year: 1974

A three-phased plan for energy conservation was introduced through the Task Force bulletins.

- Phase I.--Immediate curtailment of energy consumption, especially gasoline.
- Phase II.--Adjustments in school calendars and educational programs.
- Phase III.--School closings and emergency actions (13).

As the year progressed schools were informed through bulletins about federal regulations, primarily the Mandatory Petroleum Allocation Program established by the Federal Energy Administration in June, 1974 (14).

By the beginning of the 1974-75 school year, schools were applauded by SED for their response to the previous year's energy crisis. A survey conducted by the Division of Educational Facilities Planning indicated the following level of consumption reduction (15):

Type	Percentage Reduction	Equivalent
Fuel oil (#2)	23	30,000,000 gallons
Natural Gas	18	750,000,000 cu. ft.
Electricity	15	150,000,000 kwh

Schools were urged to continue their cutbacks in consumption.

Additionally, SED published two classroom texts on energy: Living Within Our Means: Energy and Scarcity, K-6 and Living Within Our Means: Energy and Scarcity, 7-12. Unfortunately, SED failed to develop any type of energy conservation curriculum guidelines for school implementation in which these texts would be used.

During 1974 the level of responsiveness shown by SED to the State's energy crisis indicated that energy conservation was receiving a great deal of

attention and being made a high priority item for the State's schools. Upon closer examination, though, several problems surfaced regarding energy efforts in 1974.

- The plan to phase in energy conservation activities had little impetus behind it. All actions were voluntary for schools, and once the immediate energy crisis was over there were no assurances that further conservation steps would be undertaken. The plans took on a "band aid" appearance.

- Energy conservation information vis-a-vis the Task Force bulletins had no built-in feedback mechanism to determine whether school officials were receiving and understanding the messages being disseminated. Information was a one way process: from SED to selected school personnel.

- Most of the emphasis on conservation strategies focused on gasoline and little on other energy sources. In addition, there seemed to be an assumption that the crisis, once recognized and administered to, was of immediate, short-term duration. Therefore, energy conservation was merely a matter of short-run adaptation rather than long-range energy management. As the snow melted so did the resolve behind the energy conservation efforts.

Year: 1975

By 1975, energy matters had diminished as a critical problem as evidenced by the fact that only one bulletin was published by SED's Task Force that year. The bulletin explained the recent federal regulations for gasoline allocations (16). Little else occurred during that year which directly related to energy conservation in the State's schools. The energy crisis was considered to be over for the State's schools. There was a plea made by SED for schools to aggressively continue in their efforts to conserve energy but, understandably, on their own volition (17).

Year: 1976

There was again a minimum of activity by the Task Force on Fuel Allocation and Conservation. Bulletins sent to school officials provided updates and current information on the status of the Federal Energy Act of 1976, and its impact on education. The messages diminished in number and in the quantity of information covered regarding energy conservation for schools. Energy conservation had taken a backseat and was no longer a principal motivation for information dissemination from SED to school personnel. The operations of the Task Force became unofficially dismantled.

Year: 1977

Under contract to the New York State Energy Research and Development Authority, Educational Facilities Laboratories, Inc. (EFL) developed a comprehensive energy conservation program for New York State schools in 1977. The study was conducted in two phases. Phase I focused on adapting for use in New York State the data collection instruments, computer-based analytical models and energy analysis procedures of the Public Schools Energy Conservation Service (PSECS). PSECS is an energy assessment program which first diagnoses a school's energy consumption rate and then prescribes methods to conserve energy. This program was developed by EFL under contract with the Federal Energy Administration. A sample of 22 school districts in New York State, varying in size and location, was used as a basis for the development of the energy conservation program. By assuming that the districts were typical of those in the entire State, EFL determined that there was great potential for energy and dollar savings in New York's public schools. The study indicated that by making minor improvements to mechanical systems and certain operational changes, an average energy savings of 35 percent at the elementary level and 26 percent at the secondary level would be possible (18). These figures represented an annual savings of $32 million in 1977 with no capital investments.

Phase I also detailed several weaknesses in the State's approach to energy conservation and outlined various steps that New York's educational community must take in order to achieve the projected savings.

- Energy conservation efforts have not received high priority status in most districts.
- Training programs designed to instruct district maintenance and operations personnel and the school building operators in energy efficient operational and maintenance procedures are essential.
- Recordkeeping on the part of school districts needs to be improved.
- A long-term energy monitoring system is needed if effective energy planning is to occur.
- School districts do not have the funds to handle the additional burdens that a new energy program requires.
- A strong commitment to energy conservation by the school board and top level administration is essential to the success of any energy conservation program.
- Some means of providing technical assistance to small districts, of which New York has a preponderance, must be part of any

successful energy conservation plan.

- Utilization of capital improvements, such as sealing windows and doors, insulating roofs and improving control systems, can be cost effective by reducing the energy required to operate a given facility.

The comprehensive Phase II report laid out all the necessary aspects for implementing an energy conservation plan, including administrative organization, organizational strategies, incentive considerations and program cost estimates. Strongly emphasized in the report was the need for a continuous energy monitoring system as part of a complete energy management program. The estimated time for implementing the plan was 260 days. The program cost for the three year period, exclusive of expenditures for district personnel, was estimated at $5.6 million. The estimated cost avoidance for that same period was $42.6 million--a return on investment of more than 760 percent. Table 12 shows a detailed summary of the projected costs and savings of the program if it had been instituted statewide.

TABLE 12

Budget Summary of EFL's Proposed Energy Conservation Plan (19)

	YEAR 1	YEAR 2	YEAR 3	TOTAL
State Personnel				
State Energy Coordinator	$30,000	$30,000	$30,000	$90,000
Energy Engineer	22,000	22,000	22,000	66,000
Support Staff	6,000	6,000	6,000	18,000
Regional Personnel				
Coordinator	$660,000	$660,000	$660,000	$1,980,000
Support Staff	165,000	165,000	165,000	495,000
Energy Audits				
Annual	$1,275,200	$746,000	$210,000	$2,231,200
Monthly	52,000	80,000	80,000	212,000
Workshops	$208,500	$150,000	$112,500	$471,000
Total Program Cost	$2,418,700	$1,859,000	$1,285,500	$5,563,200
Estimated Cost Avoidance (operations)	$8,713,000	$12,510,000	$21,395,000	$42,618,000

The report was submitted to the New York State Board of Regents for consideration on December 13, 1978. According to SED's own publication, Energy, until the report there had been no overall statewide coordination of efforts regarding energy matters in schools. This plan should have reversed that situation (20). To date, the Board of Regents and the State Education Department have failed to act on any of the recommendations stemming from the report, with the exception of setting a goal of 40 percent energy reduction of 1972-73 energy consumption levels in schools by 1985.

Also in 1977, under the leadership of the Director of Educational Facilities Planning, schools were encouraged to participate in energy conservation projects. Building energy conservation projects with construction costs of $10,000 or more were requested for review and subsequent approval by the Commissioner of Education. These projects were directed primarily towards buildings that were less than 15 years old. For the older buildings many of the projects were eligible for state building construction aid where the project guaranteed a payback period of 10 years or less (21). The response by the State's schools was modest. Under this program a total of 869 building project proposals were processed in 1977, some with energy conserving measures included. All 869 projects received aid at a total cost of $222 million (22).

Year: 1978

The Assistant Commissioner for Educational Finance and Management Services, reorganized energy conservation activities within SED. Beginning in January, 1978, an energy conservation bulletin, Energy, was sent to school personnel periodically. The purpose of the bulletin was to act as a clearinghouse for energy conservation information to school districts (23). In its first issue, the bulletin described the New York State Energy Emergency Plan being developed by the New York State Energy Office. The plan, which designated energy supply, use and allocation within the State during an emergency, excluded educational institutions from those services earmarked as "essential" (24). Other information contained in the Energy bulletins included:

- recent activities at the local school level describing successful energy conservation projects;
- suggested programs which schools could incorporate into their existing structure to further conserve energy;

- compilations of energy consumption figures statewide for the preceeding school year; and
- general news regarding the energy situation nationally and statewide.

Year: 1979

The major thrust of SED's energy actions surrounded the newly legislated National Energy Conservation Policy Act of 1978. More specifically, the schools were given information through bulletins in preparation for the State's participation in the Schools and Hospitals Program. Throughout the year schools received periodical updates on the procedures necessary for participation in the federal program. Under a mandate from the Commissioner of Education, and with the financial support of SEO, all the State's schools (excluding New York City, which was included in the mandatory audit program in 1980) were directed to participate in a PSECS building energy audit program. The original deadline date for statewide completion of the energy audits was set for July, 1979. The deadline date has since been extended four times. As of January, 1982, the completion date for auditing the remaining schools was set for July, 1982. The reason for the mandated audit was to assure that all the schools could participate in the Schools and Hospitals Program, which required such an energy audit for eligibility. The Energy Task Force on Fuels began publishing its own bulletin describing federal regulations regarding energy conservation.

Year: 1980

By 1980, energy was once again perceived as a serious problem due to the rapid escalation of energy prices during 1979. School participation in the PSECS audit was slower than projected. Deadlines for completion of audits were extended and New York City schools were included under the mandate.

The Commissioner of Education, Gordon Ambach, and the Director of the State Energy Office, James Larocca, jointly announced an interagency agreement signaling the creation of a statewide energy education program for New York. To date, the specifics of this program have not been outlined or announced.

In early 1980, the Energy Task Force was reorganized under the Chairmanship of the Assistant Commissioner for Educational Finance, Management and School Services. Like its predecessors, the activities and purposes of the Task Force remained illusive. In response to questions regarding the Task Force's

purpose, membership, meeting times and places, the Assistant Commissioner could not give specifics (25). However, the Task Force did publish one bulletin during 1980 (26).

In a formal oral report made before the New York State Board of Regents in October, 1980, the Assistant Commissioner summarized the progress that the New York public schools had made in conserving energy. The presentation was based on a written SED report entitled "The New York State Education Department's Contribution to Public School Energy Management Control." The report claimed that the State's schools reduced total energy consumption by 25 percent between 1972 and 1979. It also stated that the schools were making progress toward achieving the Board of Regents' goal established in 1978 to reduce public school energy consumption from its 1972-73 levels by 40 percent. According to the report, the Regents' goal would be achieved by 1984 (27). In other words, SED informed the Regents that the schools, under SED's leadership, had been moving quickly toward the maximization of energy conservation.

At the same time, SED submitted to the Legislature a bill requesting $200,000 to establish an energy management system for schools throughout the State. Several questions arise regarding the above two incidents:

- If the report does accurately reflect the energy situation as being well-in-hand and conservation targets being met, why was SED seeking money to establish a management system which it had argued it did not need? These two messages contradicted themselves. Why was there no information within the context of the report which outlined the need for statewide energy management in schools in order to remedy existing problems?

- According to sources in both SED and SEO, major weaknesses exist in the data base and the methodology used in determining energy trends in the State's schools. Due to the lack of accurate and/or accessible energy-related data, percentages of consumption reduction are difficult to calculate. Until the data is available and analyzed using a more technically sophisticated methodology, consumption figures are unreliable.

- The SED report to the Regents is totally positive in nature. There was no effort made to point out existing weaknesses or concerns regarding energy matters in schools. Persons unfamiliar with energy analyses would not be sensitive to any reported inaccuracies. The underlying message transmitted throughout the report is that the State's schools have been successful in becoming more energy efficient and that, based on past progress, they will attain the 40 percent cutback set by the Regents in 1978. As the next chapter shows, this is simply not the case.

Finally, the problems associated with energy in the State's schools may go deeper than agency directives. During the course of the formal presentation to the Regents, Assistant Commissioner O'Connell was requested by a Regent to speak quickly so that the Board could move on to more important issues. To quote:

> I would like to use the prerogative of the chair and ask that no more questions be asked of Commissioner O'Connell. According to the clock we have only a few minutes left (15 minute presentation) and, as you know, we have a full schedule ahead with many important issues (28).

Year: 1981

Little changed in 1981 other than a reorganization of the SED Facilities and Planning unit. Former staff, recognized as the energy experts in the Department, either left or were reassigned. In early 1981, Commissioner Ambach commended the State's schools for the "enormous energy savings achieved in the past several years," but cautioned that even greater savings would be necessary in the years ahead (29). Speaking at the opening general session of the first annual New York State Energy Technology Conference and Exposition, the Commissioner said that the Department would introduce legislation in 1981 to create an energy task force. Its function would be to set energy policies and goals for the educational community, maintain an information clearinghouse and evaluate local efforts to achieve State goals.

By the end of 1981, Commissioner Ambach released figures indicating that the State's public schools had reduced their energy consumption by 26.7 percent since 1972-73. Most importantly, Commissioner Ambach stated:

> The nine-year reduction in energy consumption brings schools closer to the goal of 40 percent energy savings established by the (Board of) Regents in 1978. At the current rate of energy conservation, the Education Department estimates that school districts will achieve the Regents' goal in 1985 (30).

The energy savings were attributed to the following:

- strict enforcement by school districts of energy guidelines distributed by SED in 1974. These guidelines ranged from suggested temperature settings for heating and air conditioning to recommended operating procedures to keep equipment functioning at maximum efficiency;

- requirements that all school districts conduct a computer-based audit of their energy use;

- advisories sent by SED to school districts on how to identify surplus buildings and how to make more efficient use of space in buildings selected for continued operations;

- the availability of financial incentives to school districts through the State's building aid program. Building aid is provided for projects that will produce a ten percent reduction in energy consumption in one year or for projects that will pay for themselves in energy savings within ten years; and

- the use of the financial incentives offered through the federal Schools and Hospitals Program (31).

This annual report by SED clearly reaffirmed to the Board of Regents that energy reduction was being given necessary attention by SED and the State's schools. Like SED's other annual reports and public energy messages, it left the impression that energy conservation has been successfully progressing toward the targeted goal of a 40 percent reduction by 1985. However, based upon the data found in two separate reports to the Regents in 1979 and 1981, it is highly doubtful that the State will reach its 40 percent goal if it continues on the same energy reduction path that it currently uses. Between 1979 and 1981, the State says that it has reduced energy consumption in schools by 1.5 percent, from 25.2 to 26.7. At this current rate of 0.75 percent reduction per year, the State will reach its targeted 40 percent reduction goal not by 1985, but in 18 years, or by the year 2000!

Year: 1982

In a speech before the second annual New York State Energy Technology Conference and Exposition on January 26, 1982, Commissioner Ambach again praised the State's public schools for their energy conservation efforts since 1972-73. He pointed to a 27 percent decrease in public school energy use that resulted in savings to taxpayers of $78.8 million during the 1980-81 school year alone. "Unfortunately, because the cost of energy has outpaced conservation efforts, actual expenditures for energy increased from $120 million in 1972-73 to $278 million in 1980-81," stated Commissioner Ambach (32). Interestingly, the Commissioner again mentioned a proposal by the Department to create an energy task force similar to that submitted in 1980. The Task Force would be responsible for establishing energy policies and goals for the educational community, maintaining an information clearinghouse, assisting regional and local school energy con-

servation activities, and evaluating local efforts. The estimated cost of the program is $1 million--$200,000 for each of the next five years.

WEAKNESSES IN THE STATE'S RESPONSIVENESS

The preceding historical overview of SED's response to energy conservation reveals a number of inadequacies and weaknesses. Undergirding all SED energy conservation activities has been the obvious omission of a clear, consistent agency policy regarding the role of energy conservation in schools. Energy problems have been relegated to a low priority within the agency unless an impending energy crisis arose. A series of "bandaid" proposals set forth in 1973-74 and in 1979-80 illustrate a crisis management approach to resolving energy problems. In addition, these same proposals did little more than address immediate, short-term fuel shortage situations. They have provided no long-term framework upon which the State's schools could build an effective and continuing energy management system.

In 1973 SED created a unit buried within the agency to handle energy conservation. Yet, SED has failed to staff the unit with adequate numbers of qualified personnel familiar with energy conservation technologies. Under such conditions any energy conservation leadership exerted by SED over local school districts has been minimal. Additionally, energy-conscious efforts by individual SED personnel aimed at improving the status and effectiveness of the unit within SED have been met with negative support. Much of the success of SED's energy conservation program is attributable to a single individual committed to reducing energy consumption in schools, not to any holistic effort on the part of SED.

There also has been a minimum of official interagency collaboration between SED and SEO regarding mutually benefiting concerns: energy conservation and fiscal savings. Any cooperation or collaboration between the two on the Schools and Hospitals Program has been in name only, and beyond that particular federal initiative, little has occurred to further energy conservation in schools. An excellent example of this glaring problem was pointed out in a letter to Commissioner Ambach from the New York State School Boards Association. The Association, in its review of SED's draft of Federal Legislation and Education in New York State for February, 1981, pointed out the omission of any mention of the Schools and Hospitals Program (33). The letter stressed the vital nature of that program in assisting the schools to economize on energy. "We would like to see strong Regents' support for reauthorization of the program through appropriate discussion in the 1981 federal program." This letter il-

lustrates well how SED continues to overlook the significant impact of energy costs on the State's schools.

This puzzling disregard for the formulation of a cohesive State policy has left local school districts to fend for themselves. As the cost for fuels has risen, the burden of staving off excessive energy expenditures has fallen completely on the backs of school administrators and maintenance personnel. Unfortunately, the technical expertise and authority necessary to implement even simple energy conservation measures is often beyond local district means. If the detailed technical knowledge had been imparted to district personnel along with a statewide mandate to undertake active energy management in schools, the districts may have been more responsive in developing energy conservation plans. SED has failed to provide its school administrators and school maintenance personnel with the instructional materials necessary for improving energy conservation at the local building operations level.

Those districts which have a sophisticated system for writing grant proposals have had an advantage in receiving federal monies. Due to the competitive nature of the Schools and Hospitals Program, many school districts failed to receive assistance and therefore, any conservation effort would have to be financed solely through local revenues. Unfortunately, energy conservation requires capital outlays which, in turn, require voter approval. Passing school budgets with these additional costs is not easy.

Finally, efforts to collect and analyze energy-related data from the local school districts have been inadequate. The types of data collected are not conducive to easy analysis and, once gathered, the data has remained for years in handwritten tables instead of being transcribed into computer-readable form for easy access and use. No attempt has been made to ensure that the files are complete for each district. Any attempt at the State level to formulate policy decisions using the existing energy data files in SED would be very cumbersome. This partially explains why SED's claims of energy conservation progress are not presented with statistically reliable supporting evidence. This lack of supporting evidence was one of the principal reasons that the Task Force undertook its comprehensive statistical analysis of school energy data. The results, detailed in the next chapter, were surprising.

"C": TASK FORCE ASSIGNS A LOWER GRADE

CONSERVATION EFFORT: STUDY FINDS LESS SUCCESS THAN STATE CLAIMS

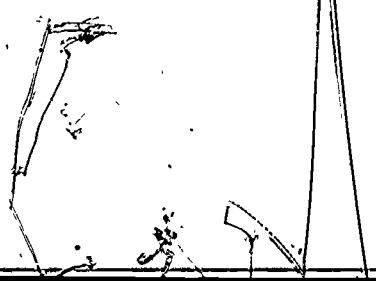
How much energy did New York schools save between 1972-73 and 1978-79? Unlike the 25.2 percent purported by the State Education Department (SED), the Task Force's preliminary findings disclosed only an 18.9 percent reduction. The Task Force calculation, which was one-fourth less than the total amount of reduction claimed by SED, presented a discrepancy sizable enough to warrant further and more finite examination of New York schools' responsiveness to energy conservation.

The following portion of this chapter briefly describes the statistical procedures involved in the overall process of deriving accurate energy information regarding the schools' response to the demand for energy conservation. More importantly, it provides statewide, aggregate figures for energy consumption, energy costs and cost avoidance. The second part of the chapter describes what trends occurred at the school district level. The analysis also examines consumption trends within certain types of school districts. This section also provides important information about energy consumption which, to date, has not been thoroughly examined.

Purpose of the Task Force Study

The Task Force initiated this study to assess the effectiveness of public primary and secondary schools in New York State in conserving energy. The evaluation involved a systematic and comprehensive statistical analysis of the actual amounts of energy consumed between 1972-73 and 1978-79. This aspect of the study was an attempt to verify the State's unsupported energy conservation claims and to statistically examine the energy-related data in more detail. In particular, the Task Force focused on:

- statewide energy consumption trends;



- statewide energy cost trends in relation to school district general fund expenditures (money spent on total educational costs) and operations and maintenance budgets;

- cost avoidance realized through energy conservation;

- the effects on district energy use resulting from switching from one primary fuel source to another;

- any relationship existing between selected school district characteristics and energy conservation efforts, including:

  .upstate/downstate differences;

  .rural/urban distinctions;

  .wealth of the district based on full property valuation, gross income and tax rate assessment;

  .size of the district based on enrollment; and

  .the impact of school closings on district energy consumption levels; and

- differences exhibited between school districts which have received federal Schools and Hospitals Energy Conservation Program grants and those that have not.

Before the findings in each of these areas are discussed, a short description of the preparation of the comprehensive energy file is necessary.

School Energy Data Preparation

In an effort to construct a more accurate representation of the energy situation in New York's schools, a complete set of energy consumption figures for public primary and secondary schools from 1972-73 until 1978-79 (the latest available at that time) was requested from SED. The information was provided in the form of a handwritten table (see Appendix Table A-1) for each of the 721 school districts for which the Department had data. Since the information was not available on computer tape, the Task Force initially coded and filed all energy data received. Any district that had either incomplete or inconsistent energy data for the seven-year period was contacted to obtain the missing figures or to correct erroneous numbers. Districts that could not provide this requested information were deleted from the data set.

The energy data file was then compared with a directory of school districts as listed in the SED Code Manual for Public School Districts: New York State 1978-79. Out of the 736 school districts listed, 15 districts had no

energy information and 20 had incomplete data. This left 701 school districts with complete energy consumption data.

SED supplied computer tapes containing annual data for 1972-73 through 1978-79 for each school district, including:

- total general fund expenditures (total school district budget);
- total operations and maintenance budgets;
- wealth, as measured by full property valuation, gross district income and tax rate; and
- active enrollment.

The Task Force energy consumption file for all 701 school districts was compared to this SED file. Any district having a complete energy file, but not having a complete SED finance and enrollment file, was deleted. This process removed 14 more districts, leaving a total of 687 with a complete file.

The data base for these 687 districts was expanded to include the remainder of the variables necessary to complete the analysis of each district's energy record.

- Heating Degree Days.--To accurately compare yearly fuel usage figures, the raw consumption data must be adjusted to reflect variations in weather. SED attempted to accomplish this by using one single statewide annual heating degree day figure. The Task Force employed a far more sensitive method taking into account the weather differences among regions in the State. Weather reporting stations with an overall variation of less than five percent in the number of heating degree days were clustered into the 13 regions shown in Figure 10. The school districts located within each region were assigned the average annual heating degree day figures from that respective reporting station for each year between 1972-73 and 1978-79 (see Appendix Table A-2).

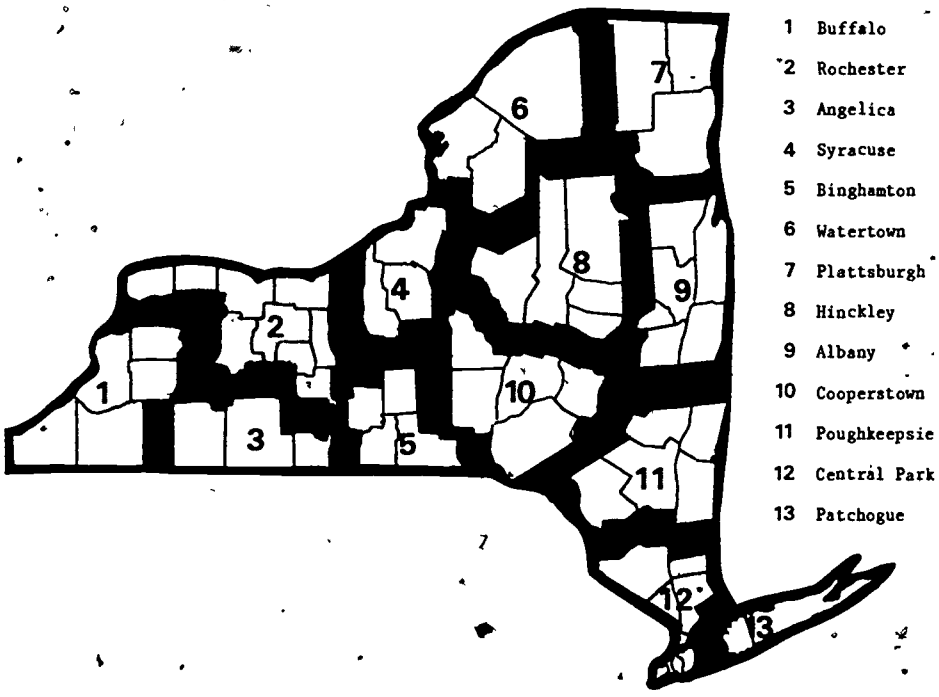
- School Closings.--The number of school closings for each district between 1972-73 and 1978-79 was obtained from SED.

- Urban/Rural Classification.--Districts were classified as urban if they were located in a Standard Metropolitan Statistical Area (SMSA) or as rural if they were not.

- Upstate/Downstate Designation.--Districts were also designated as downstate if they were located in New York City or in Nassau, Suffolk, Westchester or Rockland Counties. All other districts were designated as upstate.

FIGURE 10

NYS Heating Degree Day Regions



•Schools and Hospitals Program.--The State Energy Office (SEO) provided data identifying school districts which applied for and received grants in the first two rounds of funding, in 1979-80 and 1980-81 respectively.

The 687 public elementary and secondary school districts included in the study comprised 93.3 percent of the 736 districts existing in 1978-79. However, because most of the deleted districts were small, the data base actually covered 98.3 percent of the statewide school districts' total general fund and 98.7 percent of the total State enrollment. Therefore, approximately 98 percent of New York State's school energy consumption was included in the Task Force analysis.

Once the comprehensive energy file was compiled, the Statistical Package for the Social Sciences (SPSS) computer program was used to analyze the data. Due to the large number of variables used, as well as the large size of many of the numbers, there was some rounding error in the storage and manipulation of the data. However, this did not significantly affect the numbers or statistics generated in this study because the rounding off was limited to the

statistically insignificant last digits of any number. The findings of the analysis are presented in the remainder of this chapter.

ENERGY CONSUMPTION: A STATEWIDE PATTERN EMERGES

Calculating Statewide Energy Consumption

The procedures required in collating, coding, key punching and analyzing the statewide raw energy consumption information provided by SED proved to be a most difficult and time-consuming process. The conversion of this raw energy consumption data into forms more appropriate for comparison purposes was accomplished by:

- aggregating all school district raw consumption data by fuel source for each year between 1972-73 and 1978-79;
- converting all raw consumption data (gallons, cubic feet, tons and kilowatt hours) into a universal measure of energy--British Thermal Units, or Btu's;
- adjusting each district's Btu consumption data for weather variations based upon that district's annual heating degree day average (hdd); and
- adjusting for variations in the size of districts by using student enrollment. Unfortunately, SED has no actual record of building square footage which would have been the best measure to use for such an adjustment.

Raw Consumption Data

Table 13 shows aggregated figures for New York schools' total energy consumption, by energy source, between 1972-73 and 1978-79. Especially relevant here are the columns indicating percentage changes in consumption between years. Note the following.

- Between 1972-73 and 1978-79, coal consumption dropped 28.7 percent while total oil averaged a 21.5 percent reduction.
- Electricity actually increased by 6.9 percent.
- In the initial year of the Arab oil embargo crisis, 1973-74, fuel consumption in all fuel sources dropped dramatically (first column under Amount Conserved in Table 13). Then, however, fuel consumption in #2 oil and electricity actually increased from their 1973-74 lows (second column under Amount Conserved in Table 13).

TABLE 13

Statewide Raw Energy Consumption Totals by Energy Source: 1972-73 through 1978-79

	1972-1973	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978	1978-1979	Amount Conserved* 1972-73 1973-74	1973-74 1978-79	1972-73 1978-79
#2 oil (millions of gallons)	37	32	35	36	41	38	36	14.8	-11.5	5.0
#4 oil (millions of gallons)	94	73	74	70	79	76	69	21.9	5.0	25.7
#6 oil (millions of gallons)	48	39	40	37	41	39	36	20.0	6.8	25.5
Total Oil (millions of gallons)	179	144	149	143	161	153	141	19.9	1.9	21.5
Natural Gas (millions of cubic feet)	8,531	7,860	7,862	7,731	7,497	7,190	7,460	7.9	5.1	12.6
Coal (thousands of tons)	124	109	105	95	105	98	89	12.6	18.5	28.7
Electricity (millions of kwh's)	1,806	1,737	1,749	1,843	1,901	1,859	1,929	3.8	-11.1	-6.9

*Percentages calculated using the actual numbers, not rounded off (see Appendix Table A-3).

- The reduction in fuel oil and natural gas consumption after 1973-74 reflects very small percentages. This could mean that once the shock of the energy crisis had abated, many schools returned to past energy consumption practices.

Converting Raw Consumption to Btu Consumption

The conversion of raw fuel data into Btu consumption adds a new dimension to the analysis of the energy information. Regardless of the number of fuel sources used, total energy consumption in Btu's can be calculated on a statewide basis. Table 14 represents the new fuel figures converted into Btu's by fuel source and by statewide totals. (Appendix Table A-4 presents the conversion factors used.) Note also in Table 14 that percentage changes for each fuel source remain identical to those in Table 13. Figure 11 shows how the consumption for each fuel source has changed from 1972-73 to 1978-79.

Instead of the 20.9 percent decline in actual consumption indicated by SED figures, the Task Force study discovered only a 16.2 percent reduction in energy usage over these seven years. Even more importantly, virtually all of that savings came in 1973-74 during the oil embargo. Since that time a reduction of only 1.8 percent was found.

TABLE 14

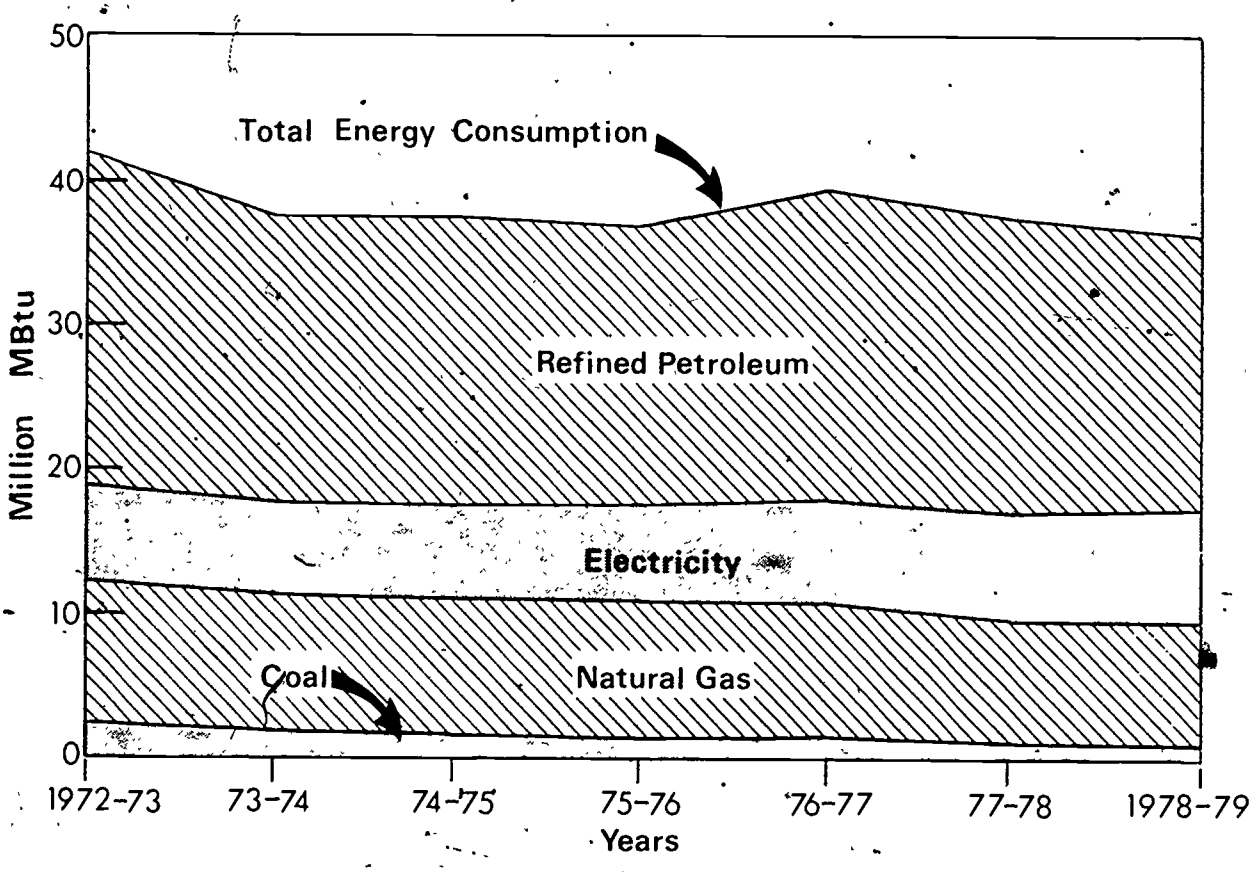
Statewide Btu Consumption Totals by Energy Source:
1972-73 through 1978-79
(millions of MBtu's)

	1972-1973	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978	1978-1979	Amount Conserved** 1972-73 1973-74	1973-74 1978-79	1972-73 1978-79
#2 oil	5.2	4.4	4.9	4.9	5.6	5.3	4.9	14.8	-11.5	5.0
#4 oil	13.2	10.3	10.4	9.9	11.2	10.7	9.8	21.9	5.0	25.7
#6 oil	7.3	5.8	6.0	5.6	6.1	5.8	5.4	20.0	6.8	25.5
Total Oil*	25.6	20.5	21.3	20.4	23.0	21.8	20.1	19.9	1.9	21.5
Natural Gas	8.7	8.1	8.1	7.9	7.7	7.4	7.6	7.9	5.1	12.6
Coal	3.2	2.8	2.7	2.4	2.7	2.5	2.2	12.6	18.5	28.7
Electricity	6.2	5.9	6.0	6.3	6.5	6.3	6.6	3.8	-11.1	-6.9
TOTAL* STATEWIDE	43.7	37.3	38.0	37.0	39.8	38.0	36.6	14.7	1.8	16.2

*May not add due to rounding off of numbers
**Percentages calculated using the actual numbers, not rounded off (see Appendix Table A-5).

FIGURE 11

Energy Consumption in NYS Schools by Energy Type:
1972-73 through 1978-79



Consumption Adjusted for Weather Variations

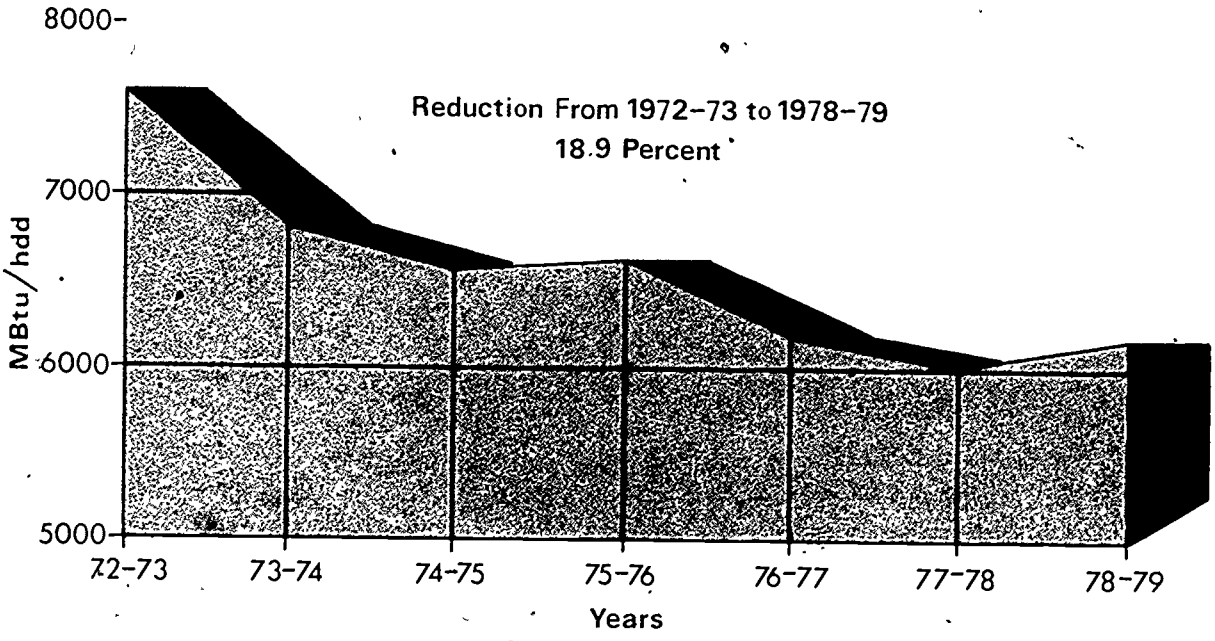
Weather conditions vary significantly both from one year to the next and from one part of the State to another. By dividing a district's annual consumption figure by the number of heating degree days measured for each year, these weather variations can be taken into account. When the Btu consumption figures are adjusted for weather variations between years and between districts, the actual energy reduction for the State's schools appears better. Figure 12 graphically portrays this reduction and shows that an 18.9 percent overall reduction was experienced since 1972-73. However, this 18.9 percent figure does not come close to the 25.2 percent conservation figure presented by SED.

Consumption Adjusted for Weather and Enrollment

In addition to weather variations, the amount of space that a school district must heat and light varies from year to year. To make each district's consumption record comparable, school district population changes were factored into the district's energy consumption equation. Because a central record of actual square footage data for each district does not exist, the Task Force used

FIGURE 12

Consumption Adjusted for Weather

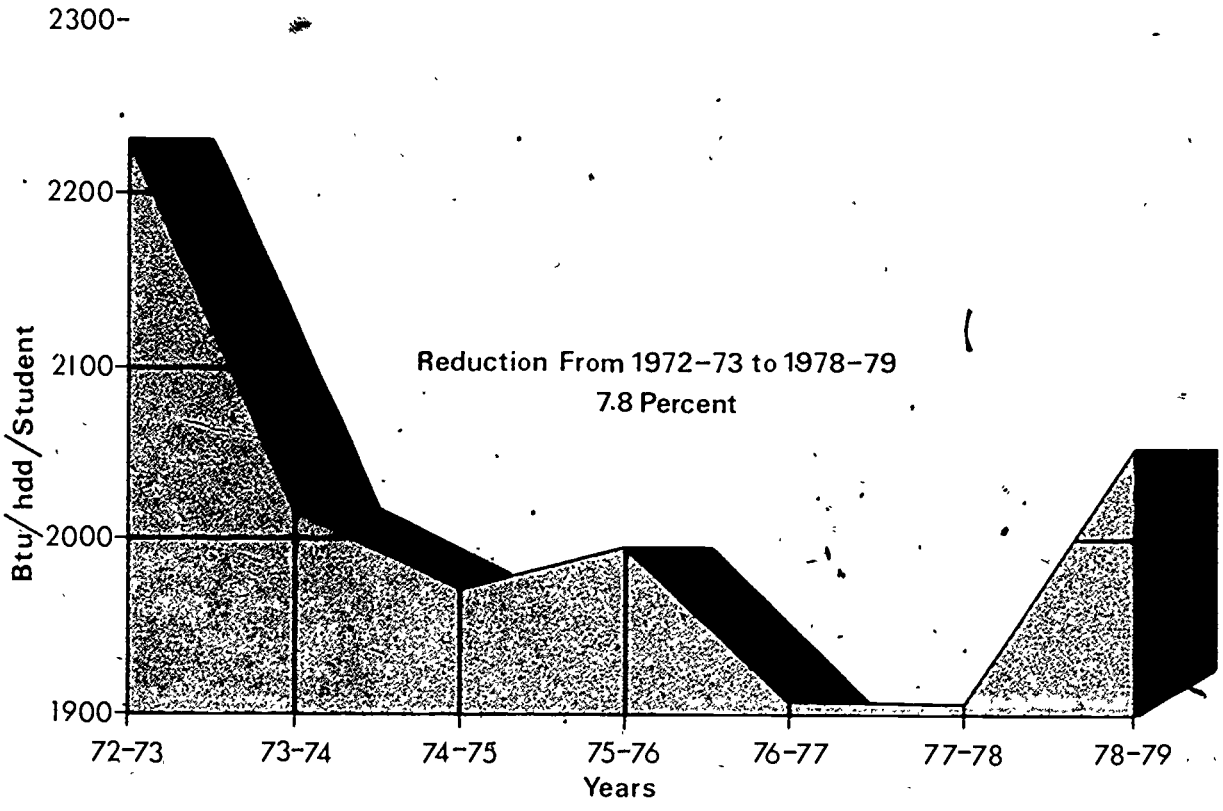


enrollment as a rough measure of variations in district size. This is an appropriate measure since SED also calculates square footage estimates based on an enrollment formula. (A comparison of SED and Task Force enrollment figures is seen in Appendix Table A-6.) Unfortunately, using enrollment to adjust for size in place of actual square footage figures can be misleading. A declining student enrollment may result in school closures, yet many of these buildings continue to be minimally heated to prevent damage due to freezing. However, until SED has a more accurate square footage figure for the State's school buildings, enrollment is the only option left for estimating space to be heated.

An example of the discouraging information generated from the Task Force analysis is illustrated in Figure 13. This graph represents the total statewide Btu consumption adjusted for weather variations on a per pupil basis. While total fuel consumption may have decreased by 16.2 percent between 1972-73 and 1978-79, on a per pupil basis adjusted for weather variations that figure is only 7.8 percent. In addition, between 1973-74 and 1978-79, that trend reversed itself and showed an <u>increase</u> of 2.4 percent!

FIGURE 13

Consumption Adjusted for Weather and Enrollment



Statewide Energy Costs

In the 1972-73 school year, the energy bill for the State's public schools was nearly $95 million. By 1978-79, even with a 16.2 percent reduction in actual energy consumption, the bill totaled over $229 million, or an increase of 141 percent. Table 15 unveils the statewide energy cost data in several ways, while Figure 14 dramatically illustrates how costs have soared out of sight even though actual consumption has fallen. When energy costs are adjusted for weather variations among years, the data demonstrates that schools have experienced an increase in costs of 133 percent during these seven years. Energy costs per pupil rose from $27.70 in 1972-73 to $76.00 in 1978-79, a rise of 174 percent. When these figures are compared to the Association of School Administrators' nationwide averages, New York's per pupil costs are higher. The 1972-73 United States average was $20.00 per student, while New York's average was $27.70. By 1977-78, the national figure was $57.00 compared to the Empire State's $60.23. This gap in per pupil energy costs can be partially explained by the higher

TABLE 15

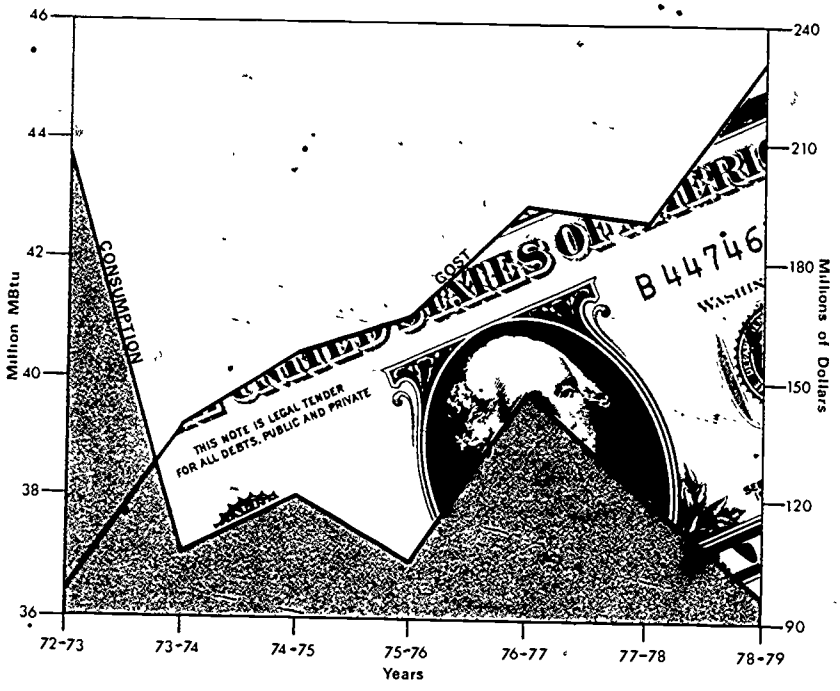
Total Statewide Energy Costs*

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percentage Change** 1972-1973 1978-1979
Total Energy Cost (millions of dollars)	95	138	155	165	194	189	229	141
Energy Costs per hdd ($/hdd)	16,510	25,262	26,907	29,413	29,965	29,423	38,525	133
Energy Costs per student ($/student)	27.70	40.84	46.19	49.44	59.33	60.23	76.00	174
Energy Costs adjusted for hdd and enrollment (¢/hdd/student)	0.5	0.8	0.8	0.9	0.9	0.9	1.3	167

*The fuel cost figures used to calculate energy costs are shown in Appendix Table B-1.
**Percentage calculated using the actual numbers, not rounded off (see Appendix Table B-2).

FIGURE 14

Comparison of Energy Costs and Energy Consumption Trends
in NYS Schools: 1972-73 through 1978-79



heating expenses incurred by school systems located in colder climates. Perhaps the most surprising information revealed in Table 15 is the per pupil cost data adjusted for heating degree days which indicates that energy costs increased by 167 percent. The larger increases in the cost figures adjusted for enrollment are due to the declining student population in New York. As previously discussed, enrollment data was used to estimate the changing school district size because no actual square footage data was available.

Impact of Energy Costs on Educational Budgets

The amount of money spent by school districts per year on total educational costs is referred to as general fund expenditures. Within the general fund are monies allocated for operating costs, including fuel. These operating costs are referred to as operations and maintenance expenditures (O&M). The relationship exhibited between energy costs and school expenditures since 1972-73 has not been thoroughly explored. As general fund expenditures continue to rise, too little has been known about the degree to which energy costs have affected these increases. Three important questions surface.

- How have energy costs affected O&M budgets?

•What impact have energy costs had on general fund expenditures?

•Have O&M expenditures kept pace with general fund expenditures?

The data displayed in Table 16 and Figure 15 vividly show the relationships between energy costs and school budgets between 1972-73 and 1978-79. The data also provides a basis upon which definitive answers to these three questions can be made.

How Have Energy Costs Affected O&M Budgets?--In 1972-73 energy costs consumed 21.4 percent of the total of the State public schools' O&M budgets. As Table 16 shows, by 1978-79 energy costs absorbed 32.3 percent of the total of the O&M budgets. Over seven years energy costs increased their portion of O&M funds by 51 percent. This growth can be explained by the fact that energy costs rose by 141 percent during this time, while O&M expenditures increased by only 60 percent.

What Impact Have Energy Costs Had on General Fund Expenditures?--Energy costs represented 1.7 percent of the State's total educational expenditures for

TABLE 16

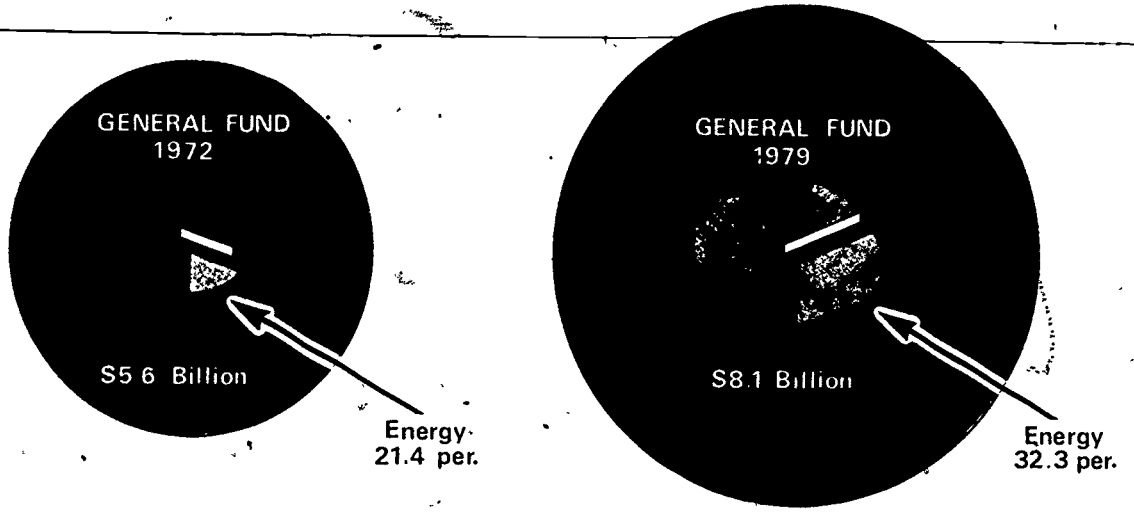
Impact of Energy on School Budgets:
1972-73 through 1978-79

Statewide	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percent Increase* 1972-1973 1978-1979
Total Energy Cost (millions of dollars)	95	138	155	165	194	189	229	141.1%
Operations & Maintenance (millions of dollars)	444	527	636	635	642	691	710	59.9%
General Fund (millions of dollars)	5,600	6,300	7,000	7,200	7,500	7,900	8,100	44.6%
Energy Costs as a Percent of O&M Budgets	21.4%	26.2%	24.4%	26.0%	30.2%	27.4%	32.3%	51%
Energy Costs as a Percent of General Fund	1.7%	2.2%	2.2%	2.3%	2.6%	2.4%	2.8%	65%
O&M Budgets as a Percent of General Fund	7.9%	8.4%	9.1%	8.8%	8.6%	8.7%	8.8%	11%

*Percentages calculated using the actual numbers, not rounded off (see Appendix Table B-3).

FIGURE 15

Comparison of the Growth of Energy Costs, O&M Budgets and District General Fund Expenditures Between 1972-79



Growth in NYS Schools General Fund 44.6 Percent

Growth in O&M Budgets 59.9 Percent

Growth in Energy Costs 141.1 Percent

1972-73. By 1978-79, energy costs had increased their share of the general fund to 2.8 percent, a rise of 65 percent over the 1972-73 amount. While energy costs soared 141 percent, general fund expenditures increased at a much slower rate of 45 percent.

Have Operations and Maintenance Expenditures Kept Pace with General Fund Expenditures?--According to Table 16, general fund expenditures increased by 44.6 percent between 1972-73 and 1978-79. At the same time, O&M budgets increased by 59.9 percent. This caused that portion of the general fund consumed by O&M budgets to jump by 11 percent, from 7.9 percent in 1972-73 to 8.8 percent in 1978-79. This further suggests that as the "pie" got larger, the portion targeted toward O&M budgets increased at a proportionately higher rate than funds for educational programs.

The Impact of Energy Costs on Educational Budgets--An Answer.--The answers to the preceding questions have confirmed that energy costs escalated at a much faster pace than either O&M or general fund expenditures. Undoubtedly, energy costs have eaten away at portions of O&M and general fund expenditures not traditionally allocated for paying energy bills. Apparently, internal spending

patterns within school districts have had to change in order to compensate for increased energy costs. What operational or maintenance projects are left unaccomplished in order to fund this increase in energy costs? To what degree have other educational programs and services been sacrificed? Unfortunately, these questions cannot be answered by the available data. However, the expenditure trends outlined leave little doubt that energy costs are affecting educational budgets adversely by diverting funds away from instructional services and programs.

COST AVOIDANCE

School districts which conserved energy between 1972-73 and 1978-79 were able, in most cases, to realize a cost savings over what they would have spent if consumption had remained at 1972-73 levels. This savings is referred to as cost avoidance. Districts which consumed more energy in 1978-79 than in 1972-73, however, usually experienced a negative cost avoidance referred to here as overspending. For the school year 1978-79, the State's schools could claim an energy cost avoidance of $16.5 million, the difference between the total saved and the total overspent. Table 17 outlines the statewide cost avoidance figures for 1978-79. (Appendix Table C-1 presents the formula use for calculating cost avoidance.)

A total of 487 or 71 percent of the State's school districts experienced a cost avoidance totaling $33.6 million. Put another way, if these districts had consumed energy at their 1972-73 rates, New York's energy bill would have increased by $33.6 million. That would have meant a total of $262.6 million spent by the schools on energy rather than the $229 million actually spent.

For those 200 school districts which increased their consumption, and therefore overspent, it cost the State an additional $17.1 million. Had these schools kept their consumption rates stable since 1972-73, the State would have spent $212 million on energy, rather than the $229 million it actually spent.

Finally, by ranking all the school districts according to their cost avoidance totals, the variance between the highest savers and the highest overspenders became apparent. The district with the highest cost avoidance experienced a $693,000 cost reduction, while the smallest amount saved was $141.

TABLE 17

Cost Avoidance Data for NYS: 1972-73 to 1978-79

	No. of Districts	Amount Saved (+) or Overspent (-)
Districts Experiencing a Cost Avoidance	487	$33.6 million
Districts Overspending for Energy	200	-$17.1 million
Total Statewide Cost Avoidance	687	$16.5 million
Actual 1978-79 Energy Cost	687	$229.3 million
Energy Cost if all Districts had continued at 1972-73 energy consumption levels	687	$245.8 million
Percent Reduction in Cost due to Cost Avoidance	687	6.7 percent

Districts experiencing cost savings averaged $69,000 in cost reduction on their energy bills for 1978-79.

On the other hand, for the 200 districts which overspent on energy, the average additional cost per district was $86,000. The highest overspender district's energy bill was $4.4 million over what it would have been at the 1972-73 consumption level. The smallest amount overspent was $98, indicating a wide range among overspending districts. Certainly these extreme differences in cost avoidance raise serious questions as to why some districts were able to minimize co[redacted]s and why others failed to do so.

ENERGY CONSERVATION: PROFILING SCHOOL DISTRICT PROGRESS

What did energy conservation look like from the school district perspective? The following description highlights energy consumption, energy costs and cost avoidance from such a perspective. Most importantly, not until the statewide aggregate data was collapsed down to the school district level did

unexpected "exceptions to the rule" emerge regarding energy conservation patterns and assumptions. Particularly interesting were the findings stemming from comparisons between district cost avoidance and district conservation. These comparisons contradicted the generally held assumption that reducing energy consumption automatically results in cost avoidance. An explanation of this surprising phenomenon is also described in this portion of the chapter.

Average District Energy Consumption

The average school district in New York State consumed 63,612 MBtu's in 1972-73. By 1978-79, that figure dropped to 53,295 MBtu's, representing a decrease of 16.2 percent. However, adjusted for heating degree days and enrollment, the conservation record appears less successful. In 1972-73 the average district consumed 2,241 Btu's per pupil adjusted for heating degree days, while in 1978-79 the consumption figure was 2,066 Btu's per pupil. The difference in per pupil consumption within this time span represents a decrease of only 7.8 percent. One explanation for this disappointing percentage is the decline in student enrollments faced by nearly all districts across the State. What this means is that districts are not getting good "energy mileage" because they continue to heat approximately the same space for fewer and fewer students.

Average District Energy Costs

Because school districts have experienced poor "energy mileage" in fuel consumption, they also have not gotten their money's worth in the amount of energy used. Table 18 reinforces the assertion that energy costs have risen regardless of consumption cutbacks. As a result, these accelerating costs have engulfed greater portions of local school budgets, rising from 1.7 percent in 1972-73 to 2.8 percent in 1978-79. Even though general funds averaged a 45.4 percent increase during these years, this does not come near the 141.4 percent increase in costs for energy expended by the average district.

Conservation: Who Conserved and Who Did Not?

School district energy conservation, adjusted for weather and enrollment, ranged from a high of 72 percent savings in one district to a low, or overconsumption figure, of 1,469 percent in another district. This shows a substantially wide variance in what school districts have been able to accomplish in the seven-year period examined.

What kinds of districts were energy conservers and what kinds were

TABLE 18

Average District Fuel Cost: 1972-73 through 1978-79

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percentage Change* 1972-1973 1978-1979
Total Energy Cost (thousands of dollars)	138.3	201.1	225.7	240.1	281.7	275.8	333 8	141.4%
Energy Costs per hdd ($/hdd)	24.03	36.77	39.17	42.81	43.62	42.83	56.08	133.4%
Energy Costs per student ($/student)	33.87	48.49	56.19	63.05	75.10	77.66	97.11	186.7%
Energy Costs adjusted for hdd and enrollment (¢/hdd/student)	0.54	0.80	0.88	1.02	1.07	1.11	1.47	172.2%
General Fund (millions of dollars)	8.2	9.1	10.1	10.5	10 9	11.5	11.9	45 4%
Energy Cost as a percent of General Fund	1.7%	2.2%	2.2%	2.3%	2.6%	2.4%	2.8%	64.7%

*Percentages calculated using the actual numbers, not rounded off (see Appendix Table D-1).

What kinds of districts were energy conservers and what kinds were nonconservers? To answer this question districts were ranked according to the percentage of energy conserved between 1972-73 and 1978-79. The list of districts, ranked from the best conservers to the worst conservers, was then divided into four categories:

- high conservers, the top 25 percent of the districts;
- moderate conservers, the districts falling into the 26-50 percent group;
- low conservers, the districts in the 51-75 percent range; and
- nonconservers, the districts in the bottom 25 percent of the ranked list.

Table 19 compares the wealth, total energy cost, cost avoidance and enrollment of the average district within each of these four groups. It also displays how district energy costs in each category affected O&M budgets and general fund expenditures. The table shows some interesting findings.

- Wealth.--The districts with the best energy conservation records (those in the high and moderate conserver groups) were poorer in

TABLE 19

Average District Characteristics for the Four Energy Conservation Groups

District Characteristic	Average District Values For: High Conservers	Moderate Conservers	Low Conservers* With NYC	Low Conservers* Without NYC	Nonconservers
Wealth--Adjusted Gross Income (millions of dollars)	76.7	81.6	317.2	116.6	94.4
Wealth--Full Property Value (millions of dollars)	204.4	204.5	738 3	277.5	238 4
Tax Effort--Tax Rate	1.65	1.64	1.70	1.69	1.71
1978-79 Energy Cost	$230,000	$228,000	$562,000	$313,000	$314,000
Cost Avoidance	$83,700	$50,200	$23,900	$26,100	-$61,500
Enrollment	2,900	2,600	9,100	3,300	2,800
Increase in Energy Cost as part of O&M Budget 1972-1979	22.5	41.9	56.3	56 6	150.2
Increase in Energy Cost as part of the General Fund 1972-1979	30.8	50.0	71.4	69.3	182.4

*New York City, because it is considered one school district, tends to completely dominate the other districts in its category. Therefore, the results of most analyses of any group of districts including NYC are presented both with and without NYC included.

both measures of wealth than those with the worst energy conservation records (low conservers and nonconservers).

- Tax Effort.--The districts in the two categories with the best energy conservation records had a lower tax rate than districts in the two worst conserving groups.

- Energy Cost.--Total district energy costs were substantially lower in the higher conserver districts than in the low conserver and nonconserver districts.

- Cost Avoidance.--As expected, district cost avoidance was largest in the high conserver group and dropped rapidly for districts in the moderate and low conserver categories. Nonconserver districts overspent an average of $61,500.

- Enrollment.--No clear relationship existed between a district's energy conservation and enrollment size. Because conservation was calculated on a per student basis to account for variations in district size from year to year, this finding was not surprising.

- Energy Costs as a Part of O&M Budgets and General Fund Expenditures.--The most remarkable trends found in this part of the Task Force analysis involved the growth of energy costs in comparison to other school expenditures. The last two rows of Table 19 show

that districts in the high conserver group were most capable of containing the growth of energy costs as a part of O&M and general fund expenditures. The ability to minimize the impact of escalating energy costs steadily declined from the high conserver group to the nonconserver category. In the latter group, district energy costs, as a part of O&M budgets, increased by an extraordinary 150.2 percent. Energy costs as a component of general fund expenditures in the nonconserver group escalated by an unbelievable 182.4 percent over the course of seven years!

The findings from this analysis suggest many things regarding the relationship between district characteristics and their responsiveness and/or ability to conserve energy. These findings also suggest that future energy policies and programs should look at internal patterns of behavior exhibited by districts as they respond to energy crises.

How Did Fuel Switching Affect Conservation?

This question can be answered by carefully examining fuel consumption between 1972-73 and 1978-79 based on the type of fuel used as the principal source for energy consumption. Each district was identified according to the largest fuel source used in both these school years. Table 20 shows that most districts did not switch from one principal fuel type to another; however, those that did switch exhibited some interesting results.

- Most districts in the State, 475 in this study, were primary oil users and did not switch energy sources. Another 149 districts remained gas users throughout this period.
- Districts remaining primary oil or primary gas users were the only ones showing a reduction in energy consumption adjusted for weather and size.
- Districts switching to coal or remaining principal coal users averaged the lowest district energy costs.
- Electricity, as a principal fuel source, produced some of the highest average district costs. An exception to this was the one district which switched from electricity to oil. This exception might be explained by the addition of a new oil burning facility in the district.
- No districts switched from gas to coal or from electricity to coal.
- According to the cost avoidance figures found in this study, fuel switching did not often result in cost savings. The districts remaining primary oil and primary gas users were the only district types experiencing a cost avoidance. The only

TABLE 20

Effects Of Switching Fuels On Energy Use and Cost: 1972-73 through 1978-79

District Fuel Use Pattern	Number of Districts	Average District Value For: Amount Conserved Per Pupil (percent)	Cost Avoidance	Total Energy Cost in 1979
Remained Oil	475	8.7	$ 40,600	$ 325,000
Oil to Gas	18	-10.9	-4,700	291,000
Oil to Coal	1	-240.2	-20,800	65,000
Oil to Electricity	11	-7.3	-210,300	422,000
Remained Gas	149	10.3	30,300	357,000
Gas to Oil	4	-12.9	9,300	276,000
Gas to Electricity	5	-94.3	-902,800	1,207,000
Remained Coal	1	-50.8	-4,600	23,000
Coal to Oil	1	-0.5	-14,600	36,000
Coal to Gas	1	-284.9	-101,300	161,000
Remained Electricity	19	-11.0	-15,500	204,000
Electricity to Oil	1	-90.0	-24,500	522,000
Electricity to Gas	1	-384.6	-55,900	112,000
TOTAL	687	7.8	24,100	334,000

exceptions to this rule were the four districts switching from gas to oil. All other districts had no cost avoidance.

In summary, it appears that switching fuel sources as a district's way to conserve energy was not successful in the time period studied. Other factors affected the degree to which fuel switching improved a district's energy situation: fuel costs, supplies and Btu equivalency of the fuels involved. Undoubtedly, coal appeared to be the least expensive fuel and electricity the most expensive.

Exceptions to the Rule: Explaining the Phenomena

Two unexpected findings surfaced during the cost avoidance analysis:

- school districts could decrease overall energy consumption yet experience no cost avoidance; and
- school districts could increase overall energy consumption, on a per pupil basis, yet experience cost avoidance.

The first of these situations could occur only in districts whieh switched a large portion of their energy consumption from one fuel source to a much more expensive one. Oil, natural gas and coal are primary energy sources. Each is found as a natural resource and is consumed directly to produce energy. They are far less expensive than electricity. Electricity is a secondary energy source produced from these primary fuels. Even though electricity showed the lowest increase in price over the seven years studied, Table 21 demonstrates that it still remained the most expensive source of energy. Therefore, any district reducing consumption by switching a large portion of its fuel usage from a primary energy source to electricity experienced an increase in its energy costs. Table 22 illustrates how one of New York's school districts experienced a cost avoidance of $147,842 by conserving 55.2 percent of its primary fuel usage. Yet by replacing much of this saved energy with electricity, the district actually overspent by $96,059 even though it conserved 60,576 MBtu's. A total of 69 school districts in New York fell into this category.

TABLE 21

Unit Prices Of Energy By Source
($/MBtu)

Fuel	1972-73 Price	1978-79 Price	Percent Increase
#2 Oil	1.067	4.117	286
#4 Oil	0.773	3.468	349
#6 Oil	0.768	3.240	322
Natural Gas	1.337	3.912	193
Coal	0.531	1.496	182
Electricity	9.795	18.869	93

TABLE 22

Exception 1: How One School District Actually Conserved 31 Percent of its 1972-73 Energy Consumption, Yet Overspent by $96,059

Fuel Type	1972-73 Consumption (MBtu's)	1978-79 Consumption (MBtu's)	Amount Conserved (Percent)	Cost Avoidance ($)
#2 Oil	5,797	7,911	-36.5	-8,703
#4 Oil	23,801	3,595	84.9	70,074
#6 Oil	0	0	0	0
Natural Gas	43,209	21,105	51.2	86,671
Coal	0	0	0	0
TOTAL PRIMARY ENERGY SOURCES	72,807	32,611	55.2	147,842
Electricity	15,039	27,965	-86.0	-243,901
DISTRICT TOTAL	87,846	60,576	31.0	-96,059

The second surprising situation--districts which did not conserve energy yet showed a cost avoidance--was the result of calculating energy conservation on a per pupil basis. Though the 67 districts in this category reduced their actual Btu consumption by an average of 12 percent, they experienced an average decrease in enrollment of over 20 percent. Therefore, energy consumption on a per pupil basis actually increased. Table 23 illustrates how one district fell into this category.

The impact of price differentials on the overall statewide cost avoidance figure is shown in Table 24. A 20 percent reduction in the use of oil, natural gas and coal resulted in a cost avoidance of $24.5 million. Yet an increase of only 6.9 percent in electricity consumption offset this savings by $8 million. This $8 million reflects nearly one third of the total realized cost savings.

The unexpected findings generated by this internal analysis of school district energy consumption data suggest that districts should be aware of the overall impact of proposed energy conservation measures prior to their imple-

TABLE 23

Exception 2: How One School District Increased its Energy Consumption Per Student, Yet Saved $157,000

MBtu Consumption Declined by:	9.7 percent
Enrollment Declined by:	20.3 percent
Consumption Per Pupil INCREASED by:	6.5 percent
Cost Avoidance (savings):	$156,883

TABLE 24

Statewide Cost Avoidance By Fuel Type

Fuel Type	1972-73 Consumption (MBtu's)	1978-79 Consumption (MBtu's)	Amount Conserved (Percent)	Cost Avoidance ($)
#2 Oil	5,185,798	4,928,393	5.0	1.1 million
#4 Oil	13,189,310	9,794,467	25.7	11.8 million
#6 Oil	7,262,886	5,409,827	25.5	6.0 million
Natural Gas	8,744,479	7,646,038	12.6	4.3 million
Coal	3,156,457	2,249,651	28.7	1.3 million
TOTAL PRIMARY ENERGY SOURCES	37,538,915	30,028,361	20.0	24.5 million
Electricity	6,162,567	6,585,034	-6.9	-8.0 million
TOTAL STATEWIDE	43,701,482	36,613,395	16.2	16.5 million

mentation. Will the proposed measures actually produce consumption cutbacks? What will the impact on energy costs be both in the short and long term? The examples described in this section underscore the need for further examination of the relationships between energy consumption and other school district characteristics. Further, school district personnel need to be cognizant of what effects these relationships have on energy conservation efforts.

FURTHER ANALYSIS BY DISTRICT CHARACTERISTICS REVEALING

Undoubtedly, the aggregated statewide data and school district profiles clarify the impact of energy costs on the State's schools and further confirm how the State has responded, as a whole, to the energy situation. These data also raise other pertinent questions regarding internal energy conservation patterns.

- Has a district's location in the State, either upstate or downstate, influenced its energy conservation record?
- Have there been differences in the responsiveness between rural and urban school districts?
- Has the wealth of a school district affected energy reduction?
- Has a school district's size been a contributing factor in the reduction of energy consumption?
- Do the districts with the best energy conservation records also have the highest number of school closings?

The following sections address these questions, extracting from the data information which best answers each question.

Has an Upstate/Downstate Location Influenced a District's Energy Conservation Record?

School district energy consumption was analyzed using an upstate/downstate differentiation. Downstate districts were located in New York City and Nassau, Suffolk, Westchester and Rockland Counties. All other districts were classified as upstate. Table 25 displays energy data based upon the district's locale. The figures indicate that on a per pupil basis, without the New York City school district, energy conservation has been more effective downstate. Downstate districts also had a higher cost avoidance and a lower per pupil energy cost. However, average district energy expenditures also were higher for down-

TABLE 25

Upstate/Downstate Energy Differences
1972-73 to 1978-79*

District Characteristics	Upstate	Downstate	
		With NYC	Without NYC
Number of Districts	521	166	165
Percent Reduction in Consumption (per pupil/hdd)	8.8%	7.1%	11.1%
Cost Avoidance (million of dollars)	4.7	11.8	12.2
Average District Energy Costs: 1978-79 (thousands of dollars)	245	613	355
Energy Cost per Student ($/student)	98.55	59.08	80.78
Increase in Energy Costs as a Part of O&M Budgets: 1972-79	55.9%	46.6%	48.6%
Increase in Energy Costs as a Part of General Fund: 1972-79	64.0%	66.7%	50.0%

*More detail concerning upstate/downstate district energy use is provided in Appendix Table D-2.

state districts. Upstate districts were less able to contain the growth of energy costs as part of their O&M and general fund expenditures than were downstate districts without New York City included.

Some of this can be explained by the information in Table 26. Upstate and downstate districts here were analyzed based upon three other factors: wealth, size and the fiscal effort exerted by local districts directed toward supporting education. This table shows the following.

- A larger number of upstate districts were in the poorest categories of wealth measured by property valuation and income. The

TABLE 26

Upstate/Downstate District
Wealth, Size and Tax Effort Characteristics

District Characteristics	Upstate No. of Districts	Upstate Percent of Upstate Districts in Category	Downstate No. of Districts	Downstate Percent of Downstate Districts in Category
Wealth (full property valuation)				
Districts in poorest 25%	169	32%	3	2%
Districts in wealthiest 25%	69	13%	103	62%
Wealth (total gross income)				
Districts in poorest 25%	160	31%	12	7%
Districts in wealthiest 25%	78	15%	94	57%
Size (enrollment)				
Districts in smallest 25%	152	29%	20	12%
Districts in largest 25%	96	18%	77	46%
Size (general fund)				
Districts in smallest 25%	158	30%	14	8%
Districts in largest 25%	76	15%	96	58%
Tax Effort (tax rate)				
Districts in lowest 25%	154	30%	17	10%
Districts in highest 25%	41	8%	131	79%

reverse was true for downstate districts, which were more frequently included in the higher wealth categories.

- Upstate school districts were smaller in size, as can be seen by the proportionately higher number of districts found in the lower 25 percent categories of population size and general fund expenditures.

- Districts contributing the greatest tax effort in support of education were found more frequently downstate. Conversely, districts showing the least effort were located more often in upstate areas.

When these factors were combined with the differences in consumption and costs found in Table 25, several new facts became apparent.

- Downstate districts, the wealthier and larger in the State, spent less per student on energy. In addition, heating degree days were fewer and therefore, heating requirements less.

- Upstate districts, often the poorest and smallest in pupil size, spent proportionately more on energy and had fewer dollars to do so. Districts in upstate New York also had the severist winter temperatures and therefore more heating degree days. As a result, heating expenses would be higher than downstate.

- Between 1972-73 and 1978-79, energy costs upstate consumed greater portions of both general fund expenditures and operations and maintenance expenditures than they did downstate. While energy costs rose throughout the State during this period, upstate districts could not adjust their budgets as readily to this increase as could downstate districts.

Have There Been Differences in the Responsiveness Between Rural and Urban School Districts?

According to the data base, 296 districts were classified as rural (43 percent) and 391 districts were urban (57 percent). Table 27 divulges how energy differences occurred by rural and urban classifications. It indicates that rural districts were less effective than urban districts in conserving energy since 1972-73. Even without New York City data, urban schools accomplished more in reducing consumption and the costs associated with energy.

TABLE 27

Rural/Urban Energy Differences*

District Characteristics	Rural	Urban	
		With NYC	Without NYC
Number of Districts	296	391	390
Percent Reduction in Consumption (per pupil/hdd)	5.7%	8.2%	11.0%
Cost Avoidance	overspent by $1.4 million	saved $17.9 million	saved $18.3 million
Average District Energy Cost	$167,000	$460,000	$350,000

*More detail concerning rural/urban district energy use is provided in Appendix Table D-3.

Other peripheral factors, shown in Table 28, may be associated with a rural district's inability to react more aggressively toward energy conservation. Rural districts were found more frequently in the lower 25 percent of districts ranked by wealth. Based on gross income, 77 percent of the poorest districts were rural. Seventy-five percent of the districts in the lowest full value groups were rural. This percentage changes to 60 percent when groups were ranked and clustered around tax rate effort, thereby indicating that rural school districts could not rely as heavily upon local tax revenues for support as urban districts. Eighty-nine percent of the highest tax rate districts were in urban areas. Finally, on the average, rural districts had fewer students and smaller general funds, required more transportation services, and were located in the colder climate regions of the State. These factors may also affect the degree to which energy reduction can occur.

TABLE 28

Rural/Urban District Wealth, Size and Tax Effort Characteristics

District Characteristics	Rural		Urban	
	No. of Districts	Percent of Districts in Category	No. of Districts	Percent of Districts in category
Wealth (full property valuation)				
Districts in poorest 25%	129	75%	43	25%
Districts in wealthiest 25%	14	8%	158	92%
Wealth (total gross income)				
Districts in poorest 25%	133	77%	39	23%
Districts in wealthiest 25%	13	8%	159	92%
Size (enrollment)				
Districts in smallest 25%	123	72%	49	28%
Districts in largest 25%	24	14%	149	86%
Size (general fund)				
Districts in smallest 25%	128	74%	44	26%
Districts in largest 25%	15	9%	157	91%
Tax Effort (tax rate)				
Districts in lowest 25%	102	60%	69	40%
Districts in highest 25%	19	11%	153	89%

Has the Wealth of a School District Affected Energy Conservation?

For purposes of this analysis, all school district wealth data was collected from SED. Wealth was measured using three criteria:

- total full property valuation of a district;
- total gross income of a district; and
- the tax rate assessment level for local school district contributions.

All school districts were ranked in order from the lowest to the highest according to these three factors. Districts then were clustered into four groups, each representing 25 percent of the total number. The lowest ranking group was classified as the poorest while districts in the highest ranking groups were classified as the wealthiest. Tables 29, 30 and 31 describe how each of these groups fared in their conservation efforts. The data indicate the following.

- The wealthier districts had larger student enrollments, consumed the largest proportion of the State's energy resource base, and experienced the highest percentage in student population decline. However, one exception to this was seen in population decline and wealth as measured by tax rate. Here, the percentage in student population decline was nearly equal in all four groups.
- Based on property values, district wealth did not affect the degree of energy conserved per pupil by districts in Groups 1,3 and 4 (without NYC). Group 2 and New York City showed substantially smaller conservation efforts.
- Income also did not significantly affect the conservation efforts achieved by districts in Groups 1, 3 and 4 (without NYC). Only those districts in Group 2 showed a considerably poorer record, achieving only a 6.5 percent energy reduction compared to a high of 12.2 percent in Group 1.
- The higher the tax rate group, the greater the percentage that was realized in energy consumption reduction.
- Groups 1 and 2, the two lowest in wealth, differed in their cost avoidance according to the criteria used to determine wealth. Group 1 showed cost avoidance except when groups were clustered by tax rates. Group 2 also experienced cost avoidance, but only when clustered according to tax rate criteria. Groups 3 and 4 experienced cost avoidance regardless of the wealth measure used.

TABLE 29

Differences in Energy Use by Wealth Groups Based on Total Assessed Property Value*

Energy Characteristics	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest) NYC	Other	Total Group 4
Total MBtu Consumption 1972-73 (millions)	43.7	2.3	4.2	7.8	8.8	21.1	29.9
Conservation Adjusted for Enrollment and Weather	7.8%	12.6%	5.5%	10.1%	0.9%	10.2%	7.4%
Active Enrollment 1972-73 (millions)	3.4	0.1	0.3	0.5	1.1	1.4	2.5
Percent Decline in Enrollment 1972-79	12.0%	7.7%	9.8%	10.3%	11.2%	14.1%	12.8%
Cost Avoidance (millions of dollars)	16.5	1.0	-2.4	3.3	-0.4	15.0	14.7

*Actual numbers can be found in Appendix Table D-4.

TABLE 30

Differences in Energy Use By Wealth Groups Based on Total Gross Income*

Energy Characteristics	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest) NYC	Other	Total Group 4
Total MBtu Consumption 1972-73 (millions)	43.7	1.9	4.2	7.4	8.8	21.4	30.2
Conservation Adjusted for Enrollment and Weather	7.8%	12.2%	6.5%	9.0%	0.8%	10.5%	7.6%
Active Enrollment 1972-73 (millions)	3.4	0.1	0.3	0.5	1.1	1.4	2.5
Percent Decline in Enrollment 1972-79	12.0%	7.6%	8.6%	10.6%	11.2%	14.1%	12.9%
Cost Avoidance (millions of dollars)	16.5	0.8	-2.1	2.0	-0.4	16.3	15.9

*Actual numbers can be found in Appendix Table D-5.

TABLE 31

Differences in Energy Use by Wealth Groups Based on Tax Rate*

Energy Characteristics	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest)		
					NYC	Other	Total Group 4
Total MBtu Consumption 1972-73 (millions)	43.7	4.4	6.6	10.8	8.8	13.1	21.9
Conservation Adjusted for Enrollment and Weather	7.8%	3.8%	8.8%	11.0%	0.8%	11.1%	6.9%
Active Enrollment 1972-73 (millions)	3.4	0.3	0.4	0.7	1.1	0.9	2.0
Percent Decline in Enrollment 1972-1979	12.0%	11.6%	12.3%	12.2%	11.2%	12.8%	11.9%
Cost Avoidance (millions of dollars)	16.5	-2.1	3.1	4.3	-0.4	11.5	11.2

*Actual numbers can be found in Appendix Table D-6.

These findings suggest that, depending upon the criteria used to measure the wealth of a school district, energy conservation achievement can fluctuate from exemplary to disappointing. Several trends did appear which need further attention. Wealthier districts were bigger, used larger amounts of energy and were the hardest hit in enrollment declines. Because of these circumstances, those districts may need to be treated differently in terms of how they can best respond to energy conservation in the future.

Has a School District's Size Affected its Energy Conservation Responsiveness?

School population size is an important factor in determining the effectiveness of school district energy conservation initiatives. The figures in Table 32 suggest that the bigger the school enrollment in a district, the more cost avoidance is attainable. This is a direct result of larger energy costs and larger educational budgets. The margin for savings is proportional to the size of the district.

School population size did not appear to affect the percent of energy savings achieved on a per pupil basis. However, when the size of the district is

TABLE 32

School Population Size and Energy Conservation*

Population Size	Energy Conservation (per pupil)	Total Cost Avoidance (millions)	Average District Cost Avoidance	Total Energy Cost 1978-79 (millions)	Average District Energy Costs 1978-79 (thousands)
Smallest	10.9%	Saved $0.4	Saved $2,300	$8.6	$50.1
2nd Smallest	6.2%	Overspent $1.7	Overspent $10,200	$26.2	$153.3
2nd Largest	7.1%	Saved $2.8	Saved $16,100	$38.9	$227.3
Largest (includes NYC)	11.3%	Saved $15.1	Saved $87,400	$155.6	$899.5

*Actual numbers can be found in Appendix Table D-7.

compared to the average district energy costs, the percentage of per pupil energy savings in the smaller districts becomes more impressive. Districts in the second smallest group not only experienced the lowest per pupil energy savings, 6.2 percent, but they also overspent on energy by $1.7 million. The data suggest no explanation for this pattern.

Do the Highest Energy Conservation Districts Also Have the Highest Number of School Closings?

In order to answer this question, a comparison was made between those districts having the greatest number of school closings since 1972-73 and districts which conserved most effectively. Table 33 displays school closings by conservation groups. All school districts were ranked according to their energy conservation record. Districts were then divided into four groups, each comprising 25 percent of the total districts, and classified from the lowest energy conserving group (Group 1) to the highest (Group 4).

TABLE 33

School Closings and Energy Conservation:
1972-73 to 1978-79

Number of School Closings per District	Number of Districts in Category	Number of Districts in: Group 1 (non-conservers)	Group 2 (low conservers)	Group 3 (moderate conservers)	Group 4 (high (conservers)
0	486	121	127	118	120
1	115	30	26	31	28
2	40	11	8	8	13
3	22	4	7	5	6
4	10	3	2	4	1
5	6	1	1	2	2
6	2	1	0	1	0
8	1	1	0	0	0
9	1	0	0	1	0
10	1	0	0	1	0
11	1	0	0	1	0
12	1	0	0	0	1
16	1	0	0	0	1

As expected, districts with the highest number of school closings were located in the highest conserving groups, 3 and 4. Beginning with the line indicating a district had closed five facilities and moving downward toward the line indicating 16 closings, note how the district location moves toward the right, or toward the highest energy conserving group, number 4. School closings have made a definite difference in the results of conservation efforts by districts.

SCHOOLS AND HOSPITALS PROGRAM: WHERE HAS ALL THE MONEY GONE?

For school years 1979-80 and 1980-81, New York State received and distributed to public K-12 schools $4.8 million in federal Schools and Hospitals Program monies for the first two rounds of funding. How were these monies distributed? What kinds of school districts received money?

How Were the Schools and Hospitals Monies Distributed?

To determine how these funds were disseminated, Table 34 was constructed. The table shows the number of districts which received monies in the two funding cycles and how much they received. Of the 687 school districts involved in the study, 291 (42 percent) applied for Schools and Hospitals Program grants. Of these, 188, or 27.4 percent of all districts, received some form of funding. The average amount of money distributed to districts which applied for and received monies only in the second round of funding was considerably less (approximately $10,000 less) than those districts applying for and receiving funds only in round one.

What Kinds of School Districts Received Money?

Table 35 compares various energy use characteristics for the average district in each of the nine funding categories. (Category 9 consisted of a single district and is not included in the basic trends discussed below). The most interesting points displayed in the table are that the 395 districts which applied for neither round of funding and received no monies (Category 1):

- had the second smallest cost avoidance per school district;
- directed the highest percentages of their O&M and general fund budgets toward energy; and
- had among the largest increases in that portion of their budgets allocated toward energy costs.

These were districts that should have taken part in the Schools and Hospitals Program, yet failed to do so. No other clear trends were apparent from the data in this table.

Table 36 illustrates how conservation groups fared regarding Schools and Hospitals monies. As before, districts were ranked according to their energy

TABLE 34

Distribution of Schools and Hospitals Funds
for Cycles I and II: 1979-1981

Type of District	Number of Districts	Total Funds Received ($)	Average Received per District ($)
Category 1 Applied: neither Received no funding	395	0	0
Category 2 Applied: 1st round Received funding	60	1,429,143	23,819
Category 3 Applied: 1st round Received no funding	54	0	0
Category 4 Applied: 2nd round Received funding	66	883,428	13,385
Category 5 Applied: 2nd round Received no funding	27	0	0
Category 6 Applied: both Received funding for one	51	1,146,331	22,477
Category 7 Applied: both Received funding for both (includes NYC)	10	958,073	95,807
Category 8 Applied: both Received no funding	23	0	0
Category 9 Applied: neither Received funding	1	12,904	12,904

TABLE 35

Average District Energy Characteristics for the Schools and Hospitals Groups*

Type of District	Amount Conserved	Cost Avoidance (thousands of dollars)	Energy Cost as a part of O&M Budget 1978-79	Increase in Energy Costs as a part of O&M Budget 1972-79	Energy Cost as a part of General Fund 1978-79	Increase in Energy Costs as a part of General Fund 1972-79
Category 1 Applied neither Received no funding	9.0%	10 7	41 1%	58.7%	3 7%	68.2%
Category 2 Applied 1st round Received funding	9.4%	53.0	35.8%	42 1%	3.3%	57.1%
Category 3 Applied 1st round Received no funding	4.9%	18 0	35 6%	43 0%	3.2%	52.4%
Category 4 Applied 2nd round Received funding	11 1%	28.6	32.2%	60.2%	3.0%	66.7%
Category 5 Applied 2nd round Received no funding	14 0%	47.5	33 0%	54.4%	2.9%	61.1%
Category 6 Applied both Received funding for one	15.6%	63 7	32.3%	40.4%	2.9%	45.0%
Category 7 Applied: both Received funding for both (includes NYC)	1 8%	-46 5	22.0%	48.6%	1 7%	41.2%
Category 8 Applied: both Received no funding	6.5%	95.6	33.6%	55.6%	3.2%	60 0%
Category 9 Applied: neither Received funding	-19.3%	-15.1	49.4%	197.6%	4 1%	241.7%

*More detail relating to the Schools and Hospitals Program and district energy use can be found in Appendix Table D-8

TABLE 36

Distribution of Schools and Hospitals Program Funds by Conservation Group

Group Ranking	Number of Districts Receiving Funds	Percent of Districts Receiving Funds	Number of Districts Not Receiving Funds	Percent of Districts Not Receiving Funds
High Conservers	49	26%	123	24%
Moderate Conservers	38	20%	133	26%
Low Conservers	53	28%	119	23%
Nonconservers	48	26%	124	24%
Total	188	100%	516	100%

conservation levels. Then the schools were clustered into four categories: high conservers, moderate conservers, low conservers and nonconservers. This table points out that districts were not selected for funding based upon any prior record of conservation. Of the two best conserving groups, representing one-half of all districts, 87 districts received money. Meanwhile, 101 districts in the worst two conservation groups received funds.

Even though a district's past energy conservation performance was not the primary determinant in the decision to approve a district grant, Table 37 suggests that a district's wealth, size, tax effort and location may have been important factors.

- Wealth.--Poor districts were nearly twice as likely not to apply for grants as were wealthy districts. Almost three times as many wealthy districts applied for and received funding. In addition,

TABLE 37

Characteristics of Districts Receiving Schools and Hospitals Program Grants

District Characteristics	DISTRICTS APPLYING				DISTRICTS NOT APPLYING	
	Received Funding		Did Not Receive Funding			
	No. of Districts	Percent of Districts in Category	No. of Districts	Percent of Districts in Category	No. of Districts	Percent of Districts in Category
Wealth (full property valuation)						
Districts in poorest 25%	29	17%	25	14%	118	69%
Districts in wealthiest 25%	75	43%	27	16%	70	41%
Wealth (total gross income)						
Districts in poorest 25%	23	13%	25	15%	124	72%
Districts in wealthiest 25%	76	44%	26	15%	70	41%
Size (enrollment)						
Districts in smallest 25%	24	14%	21	12%	127	74%
Districts in largest 25%	80	46%	27	16%	66	38%
Size (general fund)						
Districts in smallest 25%	24	14%	25	15%	123	71%
Districts in largest 25%	83	48%	24	14%	65	38%
Tax Effort (tax rate)						
Districts in lowest 25%	24	14%	25	15%	122	71%
Districts in highest 25%	63	36%	32	19%	77	45%
Location						
Upstate	127	24%	77	15%	317	61%
Downstate	60	36%	27	16%	79	48%
Location						
Rural	62	21%	46	16%	188	63%
Urban	125	32%	58	15%	208	53%

while only half of the poor districts' applications were funded, almost 75 percent of the wealthy districts' applications were approved.

- Size.--Small districts were nearly twice as likely not to apply for grants as were large districts. Almost four times as many large districts received funding. While one-half of the small districts applying received funding, over 75 percent of the larger districts applying got money.

- Tax Effort.--A much larger percentage of the lowest tax effort group failed to apply for grants. While 63 districts in the highest effort group were funded, only 24 districts in the lowest group received money. More than 50 percent of the lowest group's applications were rejected, while only one-third of the highest effort group's proposals were denied funding.

- Upstate/Downstate Location.--The only differences in this breakdown indicate that a greater proportion of upstate districts did not apply for funding and that a slightly larger proportion of downstate applications were accepted.

- Rural/Urban Location.--Categorizing districts in this manner shows that rural districts were less likely to participate in the program. Also, urban district applications were approved for funding more often than rural district applications.

In summary, these data describe a distribution pattern which did not consider prior conservation efforts. Instead, the grant program elicited greater response from, and directed more money to, the larger, wealthier and more urban districts. Percentagewise, more federal support also was geared toward downstate districts than upstate districts.

CONCLUSION: WHAT DO THE FINDINGS REVEAL?

The wealth of information stemming from the Task Force analysis provides new insight into the level of responsiveness New York schools have achieved in energy reduction. It is important to stress the fact that this study has attempted to generate new information as well as to verify information available through SED and SEO. This exhaustive analysis has provided an indepth look at patterns of response by the State's schools in their reaction to rising energy costs. The main conclusion drawn from the findings of this study is that the State has not given adequate attention to energy conservation in schools. Not only do the findings directly challenge the official State reports outlined in the preceding chapter, but they also indirectly suggest that the

State has done little to better understand the dynamics of the energy problem in its schools.

In order to draw a clearer picture of what the State's schools have and have not accomplished in energy conservation, the findings emanating from this study should be laid out and compared to the State's official claims. This comparison is presented in the following chapter, "Piecing Together the Energy Puzzle." Not only does a new picture of energy conservation in schools emerge, but the implications of this new picture for New York schools now and in the future also are addressed.

PIECING TOGETHER THE ENERGY PUZZLE

As evidenced in the last two chapters, many revelations and discrepancies surfaced regarding the progress New York schools have achieved in energy conservation. The Task Force analysis was able to delineate clearly what the State had and had not accomplished and, at the same time, to generate new information about energy consumption patterns. These are two very important results because they present a new picture of energy conservation in schools.

In order to better understand the nature and scope of this information, a comparison of the old and new pictures is described here. The old represents what was known about energy conservation trends and responses in the State's schools prior to the Task Force study. The new represents the findings of the Task Force analysis. Laid out in this fashion the discrepancies between the old and the new are glaring. More importantly, the implications stemming from these discrepancies provide valuable insight into what is needed to improve the State's energy conservation record in schools.

GRADE INFLATION EVIDENT IN THE STATE'S REPORT CARD

How well have New York's schools conserved energy? A cursory examination of SED's energy progress reports and press releases indicates that the State's schools have been highly responsive. In 1980 the Department claimed a 25.2 percent reduction in energy use between 1972-73 and 1978-79 and stated that the Regents' 40 percent conservation goal would be achieved by 1984. One year later, SED reported that energy reductions of 26.7 percent had occurred by 1980-81. The date for reaching the Regents' goal was extended one year to 1985. The report card from the State gives New York's schools an "A" for their efforts in conserving energy. With such an applaudable commendation, is it surprising that few challenges have been made regarding the educational community's energy conservation progress?

But do the State's schools deserve this commendable rating? Contradictions found in the projected target dates for reaching the Regents' 40 percent

reduction level are puzzling. A closer examination of the limited details presented in energy conservation progress reports indicates that nearly half of the energy savings were realized in the first year alone--the 1973-74 school year spanning the Arab oil embargo. Since that time, the conservation effort has been sporadic, as seen in Figure 16, and in recent years has even begun to level off. Based on the trend established during the seven years since 1973-74, the Regents' goal will not be met by 1985. A more realistic approximation, judging from the recent energy conservation rate of 1.5 percent from 1978-79 to 1980-81, is the distant year 2000. SED's energy progress reports also:

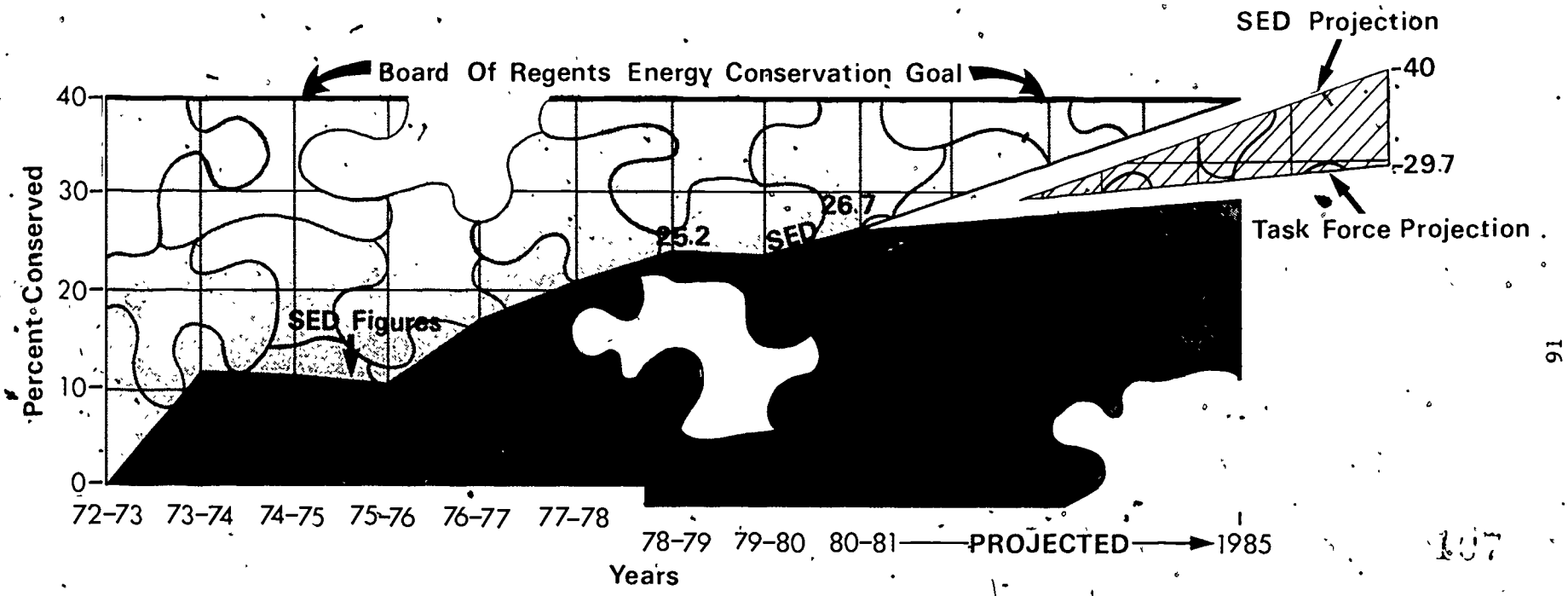
- failed to adequately adjust energy consumption data for weather variations (SED used one statewide heating degree day average for all schools regardless of location or differences in the severity of winter conditions);
- failed to adjust energy consumption data for variations in each school district's size from year to year;
- neglected to mention how their data base was adjusted to reflect districts lacking complete energy records;
- included Boards of Cooperative Educational Services (BOCES) energy data in their calculations, yet when SED submitted its energy records to the Task Force, they did not include BOCES data (upon further inquiry, it was discovered that BOCES data is neither recorded nor stored with school district data);
- failed to provide any indepth analysis of conservation trends by school districts;
- neglected to examine or compare conservation patterns between various types of school districts such as urban and rural or wealthy and poor; and
- omitted any discussion of the distribution formula for the federal Schools and Hospitals Program.

The only conclusion to be drawn regarding this fuzzy picture is that too little attention has been directed toward better understanding energy use and conservation efforts in schools. Only in times of severe crises did SED respond, and then, only by a limited crisis management approach. This type of erratic response has made it difficult to get a firm handle on what problems exist regarding the ability of schools to ease the burdens created by energy costs and supplies.

These apparent discrepancies and the lack of detail provided in SED's reports raise serious doubts regarding the State's level of responsiveness to the energy dilemma. The contradictions evident between public statements and in-

FIGURE 16

Projected Energy Conservation Progress: A Puzzling Contradiction
Between SED and Task Force Projections (1)



1978-79: SED claimed that schools had reduced energy consumption since 1972-73 by 25.2%.

1980-81: SED claimed that schools had reduced energy consumption since 1972-73 by 26.7% and projected 40% reduction by 1985.

Based upon SED's own percentages, since 1978-79 N.Y.S. schools have shown an annual energy conservation rate of 0.75%. Assuming that schools continue at that rate, a 40% reduction will not occur until the year 2000.

ternal agency actions, coupled with the weaknesses identified in the State's energy conservation effort as outlined in the second chapter, "'A': The Grade Found on the State's Report Card," suggest that the State may not deserve such a high rating in its progress towards effective energy conservation. In an effort to determine how inflated the "A" grade really is, the Task Force embarked on its own comprehensive statistical analysis of the State's energy conservation record using SED's data. The results were helpful in placing several of the pieces into the energy puzzle.

NEW PIECES TO THE ENERGY PUZZLE REVEAL A DIFFERENT PICTURE

The new pieces in the energy puzzle uncovered in the Task Force analysis of the school energy consumption data directly challenge official State reports. More importantly, these new pieces serve as the cornerstone for the recommendations presented in Chapter 8, "Energy Conservation: How Much Is Enough?" The following overview presents the findings of the Task Force study and depicts a more explicit picture of the State's energy record in schools.

Energy Consumption

The statewide energy consumption trends uncovered by the Task Force analysis do not match those conservation trends claimed by SED. Table 38 presents a direct comparison between SED's consumption figures and conservation claims with those generated by the Task Force analysis. The actual statewide consumption, according to SED, was cut by 20.9 percent from 1972-73 to 1978-79. The Task Force found only a 16.2 percent decrease in actual energy use, with virtually all of that reduction coming in 1973-74 due to the severe shortages resulting from the oil embargo. During the next six years, the schools conserved only 1.8 percent of their actual consumption. Note that the Task Force's 1978-79 actual consumption figure is larger than the SED number, even though the Task Force used only 687 school districts rather than the 736 districts presumably used by SED.

The 25.2 percent reduction in energy consumption adjusted for heating degree days claimed by SED in 1978-79 is considerably higher than the 18.9 percent conservation effort yielded in the Task Force analysis. Again, nearly 60 percent of this decrease in energy consumption occurred in 1973-74. These

TABLE 38

Direct Comparison of SED and Task Force Energy Consumption and Conservation Figures: 1972-73 through 1978-79

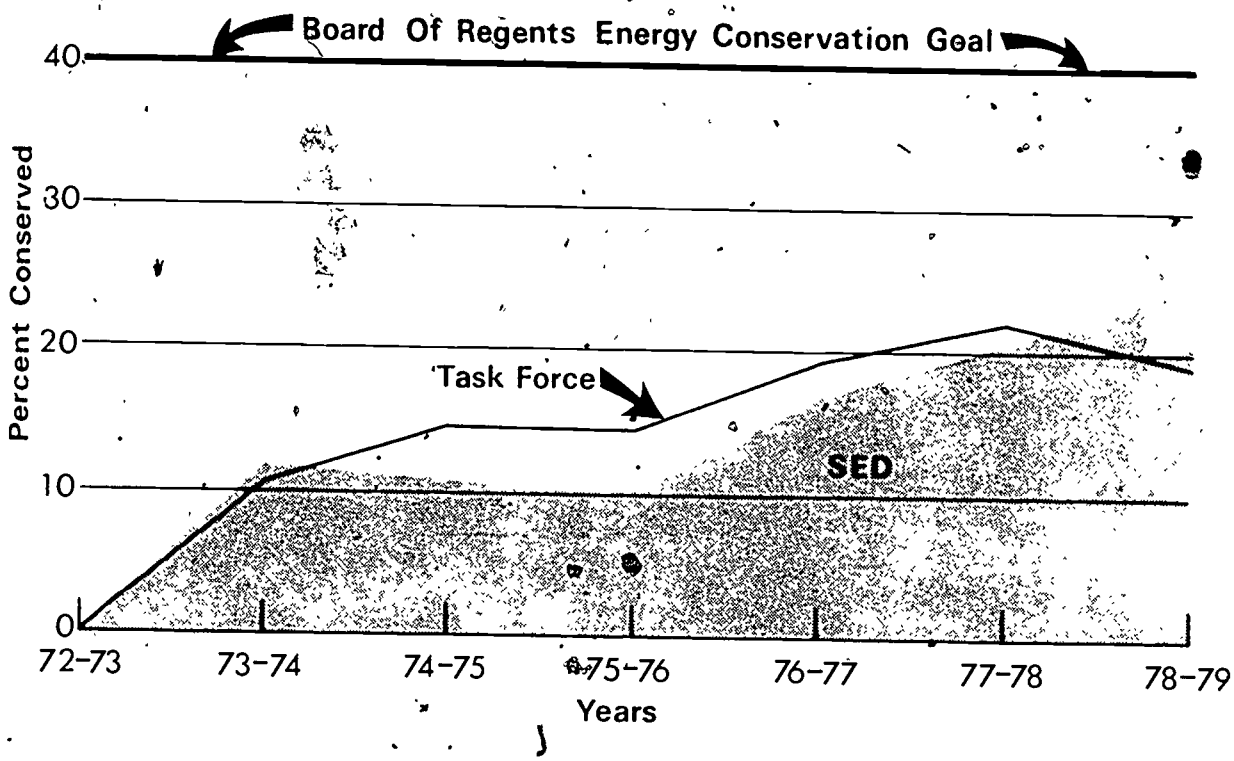
	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Conservation Claims 1972-73 1973-74	1973-74 1978-79	1972-73 1978-79
Total MBtu Consumption										
SED	45,435,000	41,218,000	42,803,000	39,576,000	40,925,000	38,639,000	35,943,000	9.3	12.8	20.9
Task Force	43,701,497	37,275,832	38,013,849	37,034,275	39,822,988	38,004,594	36,613,409	14 7	1 8	16.2
Total Consumption Adjusted for weather (MBtu/hdd)										
SED	6,773	5,943	6,009	6,081	5,607	5,367	5,066	12.3	14 8	25.2
Task Force	7,686	6,827	6,619	6,655	6,228	5,991	6,234	11 2	8.7	18.9
Total Consumption Adjusted for Enrollment (MBtu/student)										
SED	13.079	12.025	12.583	11.701	12 374	12.113	11 743	8.1	2 3	10.2
Task Force	12.741	11.018	11.324	11.099	12.208	12.083	12.133	13.5	-10.1	4.8
Total Consumption Adjusted for hdd and Enrollment (Btu/hdd/student)										
SED	1,950	1,734	1,767	1,798	1,695	1,683	1,655	11.1	4.6	15.1
Task Force	2,241	2,018	1,972	1,995	1,909	1,905	2,066	10.0	-2.4	-7.8

figures reconfirm the fact that the State's schools must respond more aggressively if they expect to reach the Regents' goal of a 40 percent reduction in energy use by 1985. Figure 17 compares SED's energy conservation trend with that found by the Task Force.

The amount of energy used per student (the third set of comparisons described in Table 38) also declined during the seven-year period. SED figures show that the actual Btu consumption per student statewide decreased 10.2 percent, while the Task Force calculations found only a 4.8 percent reduction. An amazing 13.5 percent was conserved in 1973-74 alone, but since that time the amount of energy used per student actually increased by over 10 percent. As explained in the preceding chapter (page 56), enrollment was used as a measure of the changes in school size. Though declining enrollments throughout these years have led to school closings, care must be exercised in relating these closings to energy savings. Many of the closed buildings must be minimally heated to guard against damage due to freezing.

FIGURE 17

Comparison of SED and Task Force Energy Conservation Findings



The final comparison contained in Table 38 looks at energy usage adjusted for both heating degree days and enrollment. While SED's numbers indicate a 15.1 percent reduction, the Task Force data reveal a 7.8 percent decrease. Since 1973-74, the energy used per pupil adjusted for heating degree days has actually grown by 2.4 percent.

Energy Costs and Their Impact on School Budgets

Energy costs for New York schools increased by over 140 percent from 1972-73 to 1978-79, rising from $95 million to $229 million. Energy costs per pupil rose from $27.70 to $76.00, a jump of 174 percent. The difference in the growth rates between the statewide and the per pupil energy costs can be explained by the overall decline in New York's student enrollment during the same period. The nation's average energy cost per pupil in 1977-78 was $57.00 compared to New York's $60.23. New York schools annually experience one of the highest energy bills of all the state school systems in the country.

The total amount of money spent by school districts per year on education costs is referred to as general fund expenditures. Within the general fund are monies allocated for operations and maintenance costs, including fuel costs. The Task Force studied the impact of rapidly escalating energy costs on these school budgets from 1972-73 to 1978-79. It found that, while energy costs grew by over 140 percent:

- operations and maintenance budgets grew by only 60 percent, causing the portion of O&M budgets spent on energy costs to increase by 52 percent; and
- general fund expenditures rose by only 45 percent, causing the proportion of these funds used to pay for energy to jump 61 percent.

In other words, because energy costs have increased at a far greater rate than school budgets, a larger proportion of each of these budgets had to be devoted to paying for energy. These disproportionate increases raise many questions regarding how and where monies will originate in order to cover this increasingly expensive commodity--energy.

Cost Avoidance

Most school districts which reduced energy consumption in an era of increased energy costs realized cost avoidance. Cost avoidance is the difference between what a school district spent on energy in 1978-79 and what it would have had to spend had it not reduced consumption. Although a district actually may have spent more on energy in 1978-79, it would have spent a much greater amount had it not cut back from its 1972-73 consumption level.

Using 1972-73 as a base year, New York accumulated a $16.5 million cost avoidance in 1978-79. A total of 487, or 70 percent of the State's school districts, experienced cost avoidance. However, the 200 school districts which did not reduce their energy consumption spent $17 million more than if they had simply maintained their 1972-73 consumption levels. By ranking all the school districts according to their cost avoidance totals, the Task Force analysis revealed that:

- the district with the highest cost avoidance had a substantial $693,000 energy cost reduction;
- districts experiencing cost avoidance averaged a savings of $69,000;

- one district's energy bill showed an expenditure of $4.4 million beyond what it would have spent at the 1972-73 consumption level;
- the average additional cost per district for those districts which did not conserve was $86,000; and
- districts primarily using fuel oil and gas had the highest cost avoidance.

Conservation Effort by District

The average school district in New York State consumed 63,612 MBtu's in 1972-73. By 1978-79, that figure was reduced to 53,295 MBtu's. This represents a 16.2 percent reduction. Conservation ranged from a high of 72 percent in one district to a low or overconsumption rate, of 1,469 percent in another district. By ranking districts from high to low according to their energy conservation achievements and comparing the characteristics of those districts with a high conservation rate to those with a low conservation rate, some important findings surfaced.

- Districts with a high conservation rate had lower energy costs.
- Districts with a high conservation rate managed to control the relationship between energy costs and school budgets better than those districts which had a low conservation rate or which overconsumed.
- Because a district achieved energy conservation in one fuel source did not guarantee that the district experienced cost avoidance. Energy switching often increased energy costs, particularly when schools replaced cheaper fuel sources with electricity.
- School closings have decreased substantially a district's energy consumption.

School district energy consumption and costs were analyzed further by looking at a selected number of district characteristics. These characteristics, including student population size, wealth as measured by gross income and full property values, tax rate for school taxes, location in the State (upstate or downstate) and rural or urban designation, appeared to influence a district's energy conservation record.

- School population size was an important factor in determining the effectiveness of school district energy conservation initiatives. The larger the district the more flexibility it had in reducing energy consumption and costs. However, on a per pupil basis, size did not appear to affect energy conservation.

- Wealthier districts used larger amounts of energy and were the hardest hit in enrollment declines. As a single factor, district wealth did not significantly affect energy conservation.

- Districts with high tax rates realized greater energy consumption reductions.

- Downstate districts, the wealthier and larger in the State, spent less per student on energy.

- Upstate districts, often the poorest and smallest in student population size, spent proportionately more on energy and had fewer dollars to do so.

- Between 1972-73 and 1978-79, energy costs upstate consumed greater portions of both general fund expenditures and operations and maintenance budgets than they did downstate.

- Rural districts have been less effective than urban districts in conserving energy since 1972-73. Urban schools have accomplished more in reducing consumption and costs associated with energy.

Schools and Hospitals Energy Conservation Program

For school years 1979-80 and 1980-81 New York State received and distributed to public K-12 schools $4.8 million in federal Schools and Hospitals Program monies. Combined with the local school district match, representing the same level provided by the federal program, the State spent $9.6 million in conservation projects in schools for the first two funding cycles. Of the 687 school districts involved in the Task Force study, 291 (42 percent) applied for federal funding. Of these, 188 or 27.4 percent of all districts, received some form of funding. For those districts receiving funding, the average grant recipient received $23,819 in the first round of funding and only $13,385 in the second. More importantly, other findings from the analysis show that:

- a district's energy conservation record had little to do with its participation in the program or receipt of federal monies;

- based upon the wealth of a district, the poorer the district the less likely it was to apply for and receive grant monies;

- based upon the student population size of a district, small districts were nearly twice as likely not to apply for grants as were larger districts;

- based upon local tax effort, the lower a district's tax rate the greater its chances of not applying for or receiving funds;

- based upon a district's location in the State, a greater proportion of upstate districts failed to apply for funding and a

slightly larger proportion of downstate applications were approved; and

- rural districts were less likely to participate in the program than were urban districts.

The Schools and Hospitals Energy Conservation Program infused energy conservation money into the State's school system by utilizing a distribution formula which apparently favored certain sectors of the educational community. There was no evidence that the distribution was based upon a district's current conservation need or past efforts.

The findings of the Task Force analysis reflect the two stated purposes of this study. First, the findings do not substantiate the aggregate energy conservation figures released by SED. Second, the findings provide important information which describes internal energy conservation patterns within and among school districts in the State.

IMPLICATIONS OF THIS NEW PICTURE FOR NEW YORK STATE

The new energy consumption and cost picture for New York schools presented in this section leaves little doubt that more needs to be accomplished in energy management. The energy problem will not fade away. It will continue on its undulating course, bringing times of energy supply disruptions and high cost, and times of temporary relief. Regardless of the energy phase that New York schools now find themselves in, none should assume that energy problems will dissipate in the near future. The new picture drawn by the Task Force analysis described areas of success and failure. Reflecting on this new energy picture three important points cannot be overlooked.

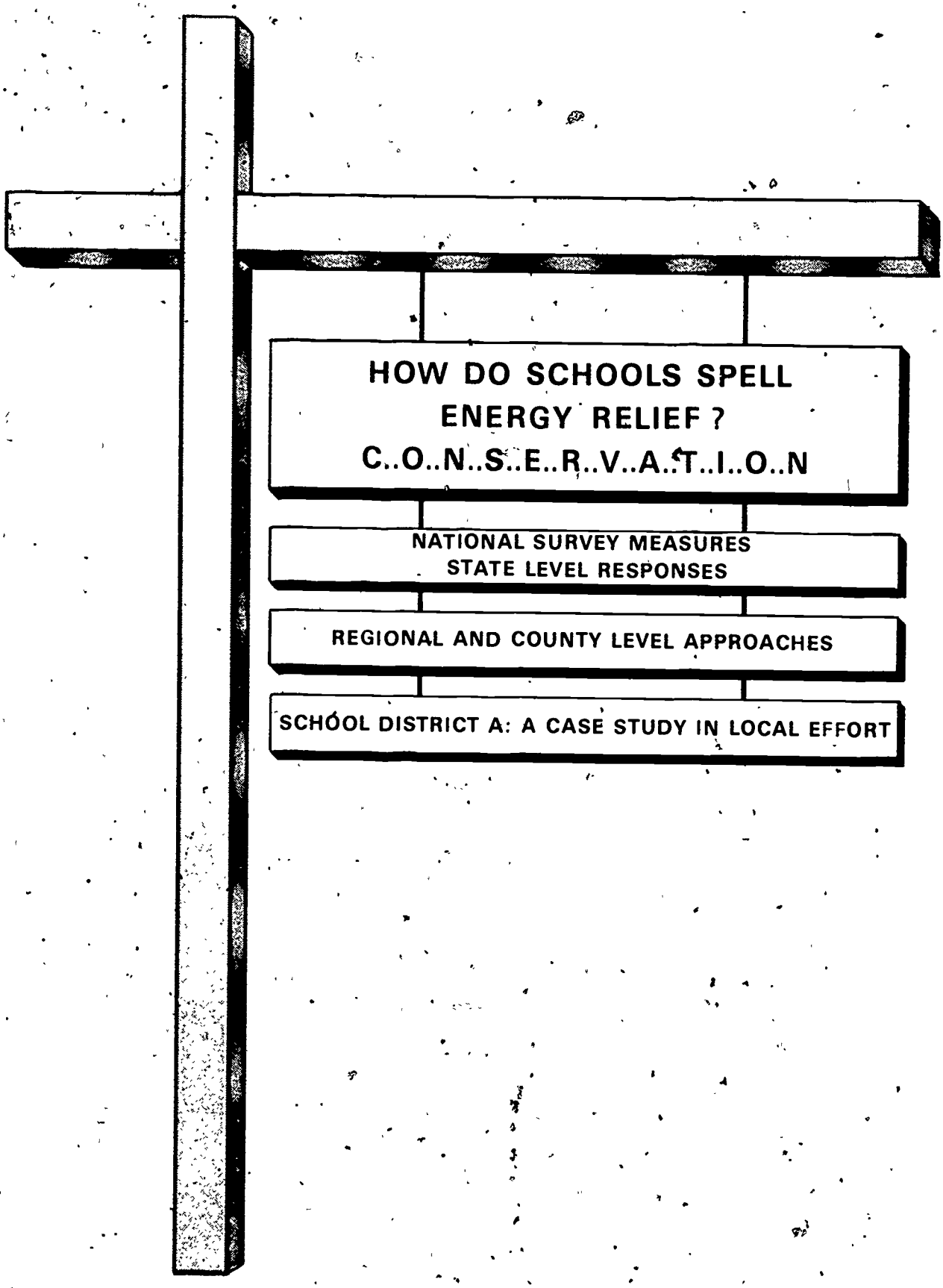
First, and probably most important, the new picture indicates that school budgets have not kept pace with energy costs and that energy conservation has not been effective enough to alleviate the overwhelming fiscal burdens caused by energy costs. The impact of energy on the State's school system has been dramatic. Oftentimes this impact has been obscured due to the magnitude and number of other interrelated educational problems, such as general economic inflation, declining enrollments and school budget defeats. Hidden within the myriad of these problems lies energy--a recognized economic foe of the State's school system. Set apart and scrutinized singularly, energy costs have the potential of seriously jeopardizing the State's ability to maintain its traditional standards of educational excellence in the public schools. Keeping school

facilities operating in times of fuel shortages and/or escalating fuel costs can deteriorate the quality of New York's educational program.

Second, energy conservation is a two-pronged process. One part entails statewide energy data coordination, especially regarding reporting and monitoring systems. The second involves the local school district in the daily maintenance and implementation of energy conservation measures. These two aspects of energy conservation are seen clearly in the new picture depicted by the Task Force study.

Third, the findings provide a framework upon which further examinations may occur and should serve as guidelines for developing successful remedial actions which can improve the energy conservation response of schools in New York State.

Many successful attempts have been made to effectively reduce energy consumption in schools. These attempts have come at the State, county and local levels and have enjoyed varying degrees of success. The programs selected and described in the next section reflect how school systems, once committed toward easing the fiscal burdens placed on them by rapidly escalating energy costs, can experience the satisfaction resulting from energy conservation. These programs also document how energy conservation can be achieved regardless of the level of participation in the program--State, county or local school district. Finally, these efforts further serve to illustrate that energy conservation could be more effective if a coordinated, multilateral approach was developed using a combination of support levels, including, but not limited to State, county and local efforts.


HOW DO SCHOOLS SPELL
ENERGY RELIEF ?
C..O..N..S..E..R..V..A..T..I..O..N
NATIONAL SURVEY MEASURES
STATE LEVEL RESPONSES
REGIONAL AND COUNTY LEVEL APPROACHES
SCHOOL DISTRICT A: A CASE STUDY IN LOCAL EFFORT

NATIONAL SURVEY MEASURES STATE LEVEL RESPONSES

Some type of a yardstick is necessary to determine whether or not New York's response to energy management and conservation in schools compares favorably to that experienced by other states. A national survey conducted by the New York State Senate Task Force on Critical Problems in July, 1980, yields such a yardstick. The purpose of the survey was to gather information relative to educational energy policies and/or programs implemented by other states. By analyzing the content of the survey responses, a distinctive, composite picture emerged. The picture depicts the degree to which many states have quickly responded to the energy crisis while others have dragged their heels. The composite nature of the pattern of response often complements New York's experience. In some cases, however, New York's progress falls short of the advancement in other states.

As outlined in the April/May, 1980 issue of The Energy Consumer, all 50 states have formulated various types of conservation policies and programs for their respective school systems (1). In order to gain greater insight into energy conservation adaptations attempted by other state education agencies (SEA's), a survey letter was sent to all 49 SEA's excluding New York. Especially important was the identification of successful programs which had helped to offset the huge energy expenditures experienced by each state's public school system. In particular, the Task Force survey letter requested the following information:

- documents describing state legislation, regulations and/or policies requiring energy conservation programs in schools;
- special energy conservation activities in which schools in each respective state were involved;
- the cost of energy conservation activities and how they were financed (local, state or federal funds);

- energy and budgetary savings that have been achieved as the result of such programs; and
- energy curricula.

RESULTS OF THE SURVEY

Of the 49 states contacted in July, 1980, 28 (57 percent) responded. Table 39 identifies each of the responding states and the information provided. Eleven of the states responding were contacted again in January, 1982, in order to update their progress on energy management in schools. The 11 were selected based upon their geographical location, climate and their initial interest in and adaptation toward energy conservation in schools. An asterisk identifies these 11 states in Table 39. The following discussion is based on the data collected from the survey letter and the follow-up contact.

State Agencies with Primary Responsibility for Energy Conservation in Schools

Twenty-seven states named particular state agencies which are responsible for energy conservation in schools. This included 12 which identified special units within the agencies that handle these programs. Three states--Illinois, Indiana and Nebraska--described state agencies other than the SEA which were spearheading energy conservation efforts in the schools.

State Energy Conservation Policies and/or Legislation for Schools: 1980

Eight states, including California, Idaho, Louisiana, Maine, Minnesota, Nebraska, Ohio and Pennsylvania, indicated that they had either proposed or pending legislation affecting energy conservation in schools. In most instances the legislation merely reaffirmed the need for education to conserve energy (in the form of a public statement or in a legislative resolution) or instructed the SEA to study ways in which schools could maximize their energy efficiency. Maine was one exception. It enacted legislation and generated state revenues for the purpose of conserving energy in public facilities, including public schools. This program is explained in more detail later in this chapter.

Types of Energy Conservation Programs Available for Schools

Twenty-two states provided documents and other materials describing the kinds of energy conservation measures being adopted in the schools. Of those responding, 13 mentioned the development and implementation of energy education

TABLE 39

National Survey Responses by State: Energy Conservation in Schools

State	Energy Conservation Agency Locale	Energy Conservation In Schools Legislation	Energy Conservation In Schools Programs	Funding Sources	Statewide Energy Data Available
Alabama	SEA**--Energy Conservation Section	---***	Energy Management Plan free to participating schools	U.S Dept of Energy, $70,000 (1979)	---
Arizona	SEA--Energy Education Bureau	---	---	PL 95-619. Schools and Hospitals Energy Conservation Program	---
Arkansas	SEA--Economic, Energy Environmental Conservation Education	---	Energy education curriculum	PL 95-619	---
California*	SEA	Improved recordkeeping AB 1070 (1980)	---	---	---
Delaware	SEA	---	Energy education curriculum	---	---
Florida*	SEA	---	---	---	---
Hawaii	---	---	Energy education plan	---	---
Idaho	SEA	Regional Energy Education Organization	Workshops on energy management; curriculum materials	U S Dept. of Education State Energy Office	---
Illinois*	Dept of Business & Economic Development	---	Media Self Audit Project	---	---
Indiana	Dept of Commerce and SEA	---	Energy education curriculum	---	---
Kansas	SEA	---	EME--Energy and Man's Environment	---	---
Louisiana	SEA	Chapter 153; 1977 Energy Conservation in Buildings Act	Energy education curriculum, workshops for teachers	$60,000 in state funds	---
Maine*	SEA--School Facilities	Joint Resolution: Energy Conservation in Schools, 1976	Statewide school energy audits	$10 million state bond	---
Massachusetts*	SEA	---	Approaches to Energy conservation	CETA County Extension Service	---
Michigan*	SEA--Ad Hoc Energy Education Task Force	---	Energy education curriculum	---	---
Minnesota*	SEA--School Facilities Operations	M.S.120.78, Subd. 2--Fuel Conservation Reports by Schools	Energy conservation workshops	PL 95-619	---
Mississippi	SEA	---	Energy education guides	---	---
Missouri	SEA	---	---	Local revenues	---
Nebraska	Energy Office: Education Coordinator	LB 954 (1979) Energy Conservation	PL 95-619, Schools and Hospitals Program	PL 95-619 State Energy Office	---
New Hampshire	SEA	---	Energy conservation materials package	U.S Dept. of Education	---
New Jersey*	SEA	---	Energy education curriculum	PL 95-619	---
North Carolina*	SEA--Division of Plant Operations	---	Energy audit statewide; NC SED Energy Conservation Plan: 1976.	PL 95-619	---
[redacted]	SEA--Energy Assistance Office	Energy Conservation in Schools: HB 419 Sec 3301.07 (M) 1978	PSECS Program workbook for administrators; workbook for teachers	PL 95-619 CETA	---
Oklahoma	SEA	---	Energy education curriculum	---	---
Pennsylvania*	SEA--Bureau of Management; small scale support services	Energy Council HB 1861 Financing Act HB 1861 Energy Development Act HB 2443	---	Local revenues	---
South Carolina	SEA	---	Energy education curriculum	---	---
Virginia	SEA--Energy and Facilities Services	---	Energy conservation in school facilities	PL 95-619	---
Washington	SEA--Environmental Education	---	---	---	---

*Contacted for follow-up information in January, 1982 **SEA: State Education Agency. ***No Information Provided.

curricula in existing programs. More importantly, nine states have implemented some type of energy management system for use in the schools. Included in these nine states are: Alabama, Idaho, Illinois, Maine, Massachusetts, Minnesota, North Carolina, Ohio and Virginia. All of these states have been financially supported in their energy management efforts by federal funding, primarily through the Schools and Hospitals Program (PL 95-619).

Funding Sources for Energy Conservation Programs in Schools

When mentioned, funding sources for the majority of the states came from the Schools and Hospitals Program. However, several states did mention other resources. For example, Ohio used monies from the Comprehensive Education and Training Act (CETA) for training energy auditors to work with school systems. New Hampshire, Massachusetts, North Carolina and Washington received federal funds from the United States Department of Education's Elementary and Secondary Education Act of 1965 (PL 89-10, Title V, Section 505) for the "Interstate Energy Conservation Leadership Project." In each instance, the purpose was to involve schools in energy conservation using available funds from a variety of sources. State monies have been used sparingly and most frequently only in the form of matching funds for federal programs such as the Schools and Hospitals Program.

Energy and Budgetary Savings Accrued

In not one instance did any state responding indicate the amount of monies energy conservation efforts had saved the schools, nor what savings were projected for the future. In each instance, respondents mentioned that such data was not available at that time.

Overall Picture Presented by the Survey

Several general conclusions can be drawn from the data collected in the initial survey.

- Very little state legislation had been enacted or policies formulated which directed the schools toward a goal of greater energy efficiency.
- Most states appeared to rely heavily upon funds from the federal Schools and Hospitals Program for energy conservation efforts.
- The development of energy curricula for implementation by K-12 schools has been the primary focus of many states' energy conservation efforts.

The follow-up contact to the 11 selected states reinforced these conclusions by providing the following information.

- Except for New Jersey, no legislation has been enacted or introduced in the last two years regarding energy conservation in schools. The New Jersey bill, if enacted, would provide monies to local districts to take care of energy and facility improvements simultaneously.

- States still do not have figures readily available to describe statewide school energy reduction levels.

- In every state contacted except Maine, state energy coordinators felt that schools had an excellent response record to participation in the Schools and Hospitals Program. Maine's efforts had begun prior to the federal program and therefore fewer schools responded when federal monies became available.

EXAMPLES OF OTHER STATES' RESPONSES

From the information supplied by respondents to the Task Force survey, and through follow-up contact, it became apparent that several states had initiated major efforts to address the energy problems confronting their school systems. The efforts of these states--California, Maine, Massachusetts, North Carolina and Ohio--are described briefly in this section along with a discussion of their various approaches.

California's Energy Conservation Assistance Act of 1979

The California Energy Commission coordinates a state sponsored energy conservation loan program for schools, hospitals and local governments. Instituted in 1979, in accordance with State legislation (A. 900), the loan program was appropriated $10 million for each of the fiscal years 1980 and 1981. Funds could be used to match federal grants or provide up to 100 percent of a project's cost. The loan program has a 10-year life and requires that all loans be repaid by 1991.

State loans to 49 institutions totaling nearly $3.9 million were approved in 1980 in conjunction with Cycle II federal grants under the Schools and Hospitals Program (2). The interest rate at that time was 7.75 percent and is readjusted every July 1 according to general interest rates in the State. The first loan payment was not due until at least six months after the project was completed.

To date, the loan program has received-increased interest and participation by schools. Program officials, however, do not have up-to-date figures reflecting the success of the program in terms of energy cost avoidance for schools (3).

Maine

Like New York, Maine is located in the northeastern snowbelt region of the country. Its energy needs and problems are similar to those experienced by New York, especially the heavy dependency on foreign imported oil as the major fuel source for heating schools. Unlike New York, Maine had taken vigorous steps in constructing a statewide energy conservation program for its schools even prior to the creation of the Schools and Hospitals Program. The following chronological account of events describes the degree of commitment Maine has made toward energy conservation in schools.

Early in 1976, the Maine State Board of Education directed the State Department of Educational and Cultural Services to review energy standards for school buildings and recommending improvements. A few months later, the Special Session of the 107th Legislature requested the same in a joint resolution (4).

In response to these requests, the Commissioner of Education convened a Task Force on Energy Conservation for the stated purpose of defining problems and issues concerning energy conservation as it relates to schools and school construction. Representatives on this Task Force included architects, engineers and school administrators, as well as State officials from the Bureau of Public Improvements, Office of Energy Resources, University of Maine and the Departments of Public Safety and Educational and Cultural Services. Subsequent to its initial meetings, the Task Force divided into subcommittees in order to pursue two studies: one to determine energy conservation measures for existing buildings and the other to develop energy standards applicable to new school construction.

As a result of the committees' recommendations, in 1977 the 108th Legislature enacted legislation known as the "Energy Conservation in Buildings Act" which required life cycle costing in public improvements and public school buildings (5). Life cycle costing means estimating the cost of purchase and use of the purchased item throughout its anticipated useful life. Life cycle cost analysis includes:

- the initial cost of the purchased item;

- the cost of energy used by the operation and maintenance of the item;
- the salvage value of the item at the end of its useful life;
- the interest on moneys borrowed for the item's purchase; and
- other energy related costs determined to be applicable to the intended use of the item (6).

The voters of the State gave their approval of this action in a referendum held in December, 1977 (7). The Act called for an equal division of the appropriated $10 million between public schools and State-owned buildings. It also required that ten percent of the costs of approved energy conservation projects in public schools be raised locally in order to qualify for State funds.

In June, 1977, a statewide energy auditing program was initiated. A cadre of auditors, including a large number of recent graduates of engineering programs, were trained and sent into the field. Funding for these audits totaling $400,000 came from several legislative appropriations and some federal monies (8).

In the spring of 1980, the 109th Legislature passed an act authorizing a bond issue for $7 million dollars to continue the program of energy conservation projects in public schools (9). By the fall of 1980, in a statewide referendum, Maine's voters approved the $7 million bond issue to be used as 90 percent State matching funds in public elementary and secondary school projects.

According to the Maine State Department of Educational and Cultural Services, many projects in the public schools of the State that have already demonstrated remarkable results attest to both the validity of the energy audit method and to the necessity of modifications in school buildings in order to save energy and money (10).

Finally, two important steps have been taken to further efforts in energy conservation by schools. Beginning in the fall of 1979, a more comprehensive energy reporting system was mandated for all of the State's public school districts. This reporting system should provide the benchmark upon which to measure the effects that building modifications have in conserving energy. In addition, it can be used to compare various approaches for the purpose of identifying the most energy efficient ways to operate schools (11). The latest step has been the formation of a state-level Energy Education Task Force in 1981 that will terminate upon completion of the following goals:

- to identify and document energy and education related activities, resources and opportunities which exist in the State;
- to conduct and document a needs assessment to determine the energy education needs of Maine's students and teachers; and
- to develop a strategy and make recommendations to the State Office of Energy Resources and the Department of Educational and Cultural Services regarding the optimal use of existing resources for meeting identified needs.

Three Initiatives Set Exemplary Pattern In Ohio

One of the lead states in formulating effective strategies for the implementation of energy conservation in schools is Ohio. This may have been the direct result of the 1977 natural gas crisis which debilitated the State's school system for the 1977-78 school year. Ohio initiated its programs without the financial assistance and incentives provided by the Schools and Hospitals Program. Most monies were generated from the local school districts themselves or from other various federal assistance programs, such as the ESEA Title IV-C, Innovative Programs in Education. Three examples of energy conservation initiatives illustrate the degree of seriousness shown by the State towards improved energy efficiency in schools.

Legislation.--Ohio Amended Substitute House Bill 419 (1979) addresses energy education and conservation in Ohio public schools. Its most significant provision for energy education in schools is Section 3301.07 (M), which:

> Requires that all public schools emphasize and encourage within existing units of study the teaching of energy and resource conservation, beginning in the primary grades.

The bill also addresses energy conservation in schools in Section 123.011 (A):

> The Department of Administrative Services in its responsibility for state owned, assisted, and leased facilities, shall ensure that energy conservation goals are observed in the design, construction, renovation and utilization of these facilities in a manner that will minimize the consumption of energy used in the operation and maintenance of such facilities. This process shall include the use of life-cycle costs, including construction, the costs of operation and maintenance of the facility as it affects energy consumption over the economic life of the facility, and energy consumption analyses of existing facilities in order to determine and require necessary changes in the operation and maintenance of such facilities.

What this bill does is to set into motion two energy functions for the education sector: energy education and energy conservation in construction and renovation of school facilities.

Inservice Energy Education for Teachers.--To assist teachers in both the elementary and secondary schools, a manual on inservice guidelines on energy conservation and energy education, entitled Energy: A Teacher's Introduction to Energy and Energy Conservation, was prepared by the Ohio Department of Education. This inservice package is designed to improve teachers' understanding of the problems associated with energy in this country. Its intent is to not only make teachers more aware of the existing problem, but also to encourage them to incorporate energy education into the classroom.

Energy Management.--Of particular interest to New York State is the Energy Management for School Administration handbook developed in 1980 by the Ohio Department of Education. This hardcover handbook was funded under an ESEA Title IV-C grant. The handbook is designed to provide assistance in the procedural management of energy use in Ohio schools. It is intended to assist education decisionmakers to effectively and aggressively pursue management strategies aimed at reducing the demand for supplies of energy. Included in the handbook are such pieces of information as:

- an energy management model for determining and implementing conservation measures;
- energy reduction guidelines;
- curriculum guides;
- information on Ohio energy supplies;
- environmental standards;
- technical reports on solar energy, thermography and computerized energy control systems; and
- a statewide directory with up-to-date references to the various sources of information necessary for successful energy management. This information includes funding sources, references to energy literature, a list of schools with solar installations, and a catalogue of suppliers of professional services.

The handbook represents a comprehensive approach to energy conservation in schools by directing technical information toward those who can, at the local level, effectively institute action--school administrators. The handbook suggests that the Ohio Department of Education has taken the initiative to dissem-

inate energy information in supporting local efforts toward improved energy management.

Ohio's Success Unclear.--Unfortunately, Ohio school officials remain unable to document the effectiveness of these energy management programs due to a weak, statewide energy reporting system. Additionally, there are no dollar figures available which represent the savings accrued from energy conservation activities. A number of schools have participated in the Public Schools Energy Conservation Service (PSECS) computer-based audit. For the 1,721 buildings audited, or one-third of the school buildings in Ohio, there is an estimated savings of 2.7 billion MBtu's. No effort has been made to calculate the dollar value of this energy reduction (12).

Ohio's efforts are currently targeted toward the resolution of this inadequate system of analysis. The State's schools have been in the process of being audited under the regulations established by the Schools and Hospitals Program. Officials hope that more technically-specific information will be generated from these audits which will eliminate existing inadequacies in statewide fiscal analysis and future planning for energy management in schools.

North Carolina Department of Education's Statewide Energy Conservation Plan

In February, 1976, the North Carolina State Board of Education adopted a Conservation of Energy Plan. The plan offers energy management services to interested schools. Computer printouts, derived monthly at the State level from energy use reports of administrative units, provide superintendents' staffs with necessary information on the energy utilization of each school. Printouts also provide comments describing causes of inefficient or excessive energy uses. Each school has a Conservation Committee which devises its own energy conservation plan and implementation program. An energy conservation coordinator from each administrative unit serves as the coordinator between State, administrative unit and local school energy management activities.

Important in this statewide plan is the inclusion of all persons involved in the educational sector, from the superintendent to the student. All have specific roles to play in energy conservation efforts. From the very inception of the program, the intent was to create a multipurpose management tool with these objectives:

- to promote an awareness of the energy problem in terms of basic facts about supply, demand, consumption, costs and economic-political consequences;

- to improve the technical knowledge of school administrators, maintenance staffs, principals, teachers, students and others in energy conservation as related to facility operation;

- to provide an accurate method of monitoring performance and making comparisons of facilities;

- to establish an effective recordkeeping system for each fuel type on a building basis;

- to distribute the energy use and cost results to all appropriate school personnel;

- to promote the evaluation of conservation efforts;

- to provide data that supports the selection of the most appropriate fuel source or mechanical system to obtain maximum energy efficiency; and

- to provide the State Comptroller's Office with the data for budget preparation.

Approximately $30,000 in State funds were used to initiate the program in 1977. Table 40 summarizes the program funding since that time. Currently, 117 local education agencies (about 1,700 schools) are reporting energy use data monthly. The remaining units have been surveyed and most are preparing to report in the near future.

Substantial energy and cost savings have been attributed to the program. From 1977-78 through 1980-81, the 1,700 schools participating conserved 20.4 percent of their actual energy consumption. This amounted to a cost avoidance of over $7 million. Some benefits were also gained by nonparticipating schools through over 100 workshops and conferences and through technical information received during energy audits. The energy savings totalled 8.5 percent, representing a cost avoidance of $860,000.

North Carolina was one of the first states to institute a statewide energy management and monitoring program. Because they had a conservation plan devised by 1979, the State was able to fold into its management system federal funds from the Schools and Hospitals Program. Their early initiatives paid off.

Massachusetts

Massachusetts, like Ohio and North Carolina, recognized early the need for providing school administrators with guidelines for possible energy conservation approaches at the local level. In 1980 the Massachusetts Department of Education published and distributed a manual, Approaches to Energy Conservation: A Guide for Massachusetts School Administrators. The manual encompasses a wide

TABLE 40

Funding Summary of North Carolina's Energy Conservation Plan (13)

Federal Grants	
1977 funds	$ 37,091
1978 funds	61,500
1979 funds	59,200
1980 funds	65,000
1981 funds	-0-
Total Grants	$222,791

Spending in Each Fiscal Year (federal funds)

July 1, 1977 - June 30, 1978	$ 45,171.89
July 1, 1978 - June 30, 1979	62,135.00
July 1, 1979 - June 30, 1980	41,715.34
July 1, 1980 - June 30, 1981	48,157.65
Total federal funds spent	$197,179.88
State expenditures 1979-81	$103,300.00
Total all expenditures all years through 1980-81	$300,479.88

range of energy related measures which can be used by schools. Some of the energy conservation information in the manual was produced by the Interstate Energy Conservation Leadership Project (IECL) funded by the United States Office of Education in 1978. Again, federal assistance provided the seed money necessary for the State's school system to conserve energy.

In the winter of 1980, the Massachusetts Department of Education published a pamphlet describing 23 successful energy conservation practices in the State's schools. The pamphlet, entitled Focus On: Energy Conservation Practices in Schools, encourages school officials to carefully scrutinize each example described with the idea of adopting some of the examples in their own respective school district conservation efforts (14).

One successful local energy conservation model cited in the pamphlet is in Brockton. Brockton is a large urban system of 45 school buildings. Between 1979 and 1981, an extensive insulation program progressed with significant bene-

fits in fuel cost reduction and improved building comfort. Since labor for the project was provided by CETA workers, the City was responsible solely for the purchase of materials which kept costs down. It was reported that schools built since 1950 were more in need of insulation than older buildings. Additional savings were realized through the creation of a position for a control mechanic, thereby eliminating the necessity for costly contracting services. Other energy saving measures included the installation of flourescent bulbs in place of incandescent bulbs and the replacement of old boilers, steam traps and thermostats as well as malfunctioning pneumatic controls. In July, 1979, an energy task force held its first meeting. This task force continues to formulate energy policies with final project approval by the SEA. A total one-time charge of $55,000 plus was invested in the three-year capital project. The resultant savings in a one-year period tallied $100,000 for electricity and $50,000 for fuel.

CONCLUSIONS

The major outcome of the survey was a compilation of descriptive information regarding the degree of responsiveness by 28 states in energy conservation by schools. Highlights of this information indicate the following points:

- A few states have successfully enacted legislation for erecting and instituting energy conservation policies in their school systems. New York has not done so.
- State Departments of Education, exemplified by Ohio and Maine, have taken aggressive steps in planning strategies for energy conservation.
- Several attempts have been made to involve greater community input into school energy conservation efforts by including the private business sector, local community groups, energy advocacy organizations and other state agencies with peripheral interest in energy conservation.
- The lead agency for coordinating energy actions in schools has been the SEA. Some SEA's have been very explicit in their energy goals and appear to take energy conservation seriously.
- Several states indicated that federal monies have played a significant role in assisting local school districts in implementing energy conservation programs. The funds used to pay for conservation projects have originated in a variety of places with the greatest proportion supplied by the Department of Energy's Schools and Hospitals Program.

- Maine exemplifies a State supported system for generating matching funds which lift the local match burden from individual school districts. New York's policy has been restricted to a laissez faire approach, leaving it to the local district to find the means for supporting the local match.

- Several states have taken steps to carefully scrutinize existing state education law pertaining to building regulations, renovation and building aid formulas in order to revise existing funding limitations and build in energy incentives for local school districts.

- New York has not been as active as many other states in developing instructional and training materials for use by school personnel. New York has concentrated exclusively on regional workshops for informing schools about the grant regulations in the Schools and Hospitals Program.

- Few states have the necessary data, or have attempted to analyze the energy data available, to describe their progress in conservation and the cost savings accrued from their efforts.

In the area of legislation, New York, like most other states responding in the survey, has not pursued the enactment of laws regulating energy conservation in schools. With the exception of the states discussed in this chapter, legislation has been sparse. There does not appear to be any attempt by those states responding to the survey to develop comprehensive legislation concerning energy conservation needs by State schools. Legislative involvement is one fundamental issue to be resolved in New York State. Can the State Education Department or the State Energy Office, given the current energy conservation status, coordinate a long-term program to minimize the impact energy has on the State's schools without legislative directives and support?

Several exemplary state level efforts have been mentioned which can be replicated in New York State. These include:

- the development of energy policies by State Departments of Education and/or Energy which outline a long-term commitment toward energy management in schools;

- the development and dissemination of energy management manuals for use by school officials at the local educational unit level;

- the use of state revenues or bond issues to assist schools in paying for energy conservation programs; and

- the disbursement of energy conservation information in a variety of formats stressing facts, figures and examples that work.

To date, states have pursued a composite approach in utilizing the best means for relieving the fiscal burdens created by energy costs. Unfortunately, no linking mechanism exists which provides states with a central clearinghouse of energy conservation information. It would be a valuable resource to school administrators if documentation was available describing successful energy conservation projects.

This chapter has attempted to describe such projects located in a variety of states. The following chapter outlines two successful programs in New York which have reduced significantly energy costs and consumption using a county approach. Both programs are coordinated by Boards of Cooperative Education Services (BOCES), and both illustrate a fresh and effective concept in energy reduction in schools.

REGIONAL AND COUNTY LEVEL APPROACHES

Several New York State school districts are improving their energy conservation records through the assistance of two exemplary programs. Both of these programs are coordinated by a Board of Cooperative Educational Services (BOCES) unit. Erie 1 BOCES coordinates an effective multicounty energy conservation program for seven of its surrounding counties. Cattaraugus County BOCES, representing a single county approach, also has shown how energy conservation can be managed using the computer-based model at Erie 1 BOCES along with its own district-based conservation program. Together, these two approaches to energy conservation further define what effective energy management is, and how it can work in New York State.

COLLABORATION UNDERLIES SUCCESS: ERIE 1 BOCES MODEL

The recommendation emanating from the 1977 Educational Facilities Laboratories' (EFL) study to institute a statewide energy management/monitoring system in schools using PSECS has not been implemented. (This study was discussed in some detail on page 40 of Chapter 2.) However, a PSECS energy monitoring program has been implemented in one region in the State. Entitled "Energy Awareness to Energy Conservation," the program was developed at the Erie 1 BOCES center in Lancaster, New York, in 1977. Its original source of funding came from Title IV-C of the Elementary and Secondary Education Act (ESEA) as a three-year developer grant of $106,530. In its final 1980 ESEA report to the United States Office of Education, Erie 1 BOCES claimed to have successfully:

- developed and tested a computerized energy conservation monitoring system capable of providing monthly energy guideline information for school buildings;
- developed training programs to assist school districts and building personnel in meeting conservation goals;

- worked to establish school board and superintendent commitment to energy management;
- worked with districts to build broad-based energy committees and establish a sense of need for a long-term energy management plan; and
- provided districts with the benefits of qualified experts, when necessary, to extend staff capabilities in the energy field (1).

Description of the Erie 1 BOCES Program

The number of participating school districts in the project grew from 12 in 1977 to 55 in 1982 representing 270 school buildings (2). These buildings spanned a seven-county region in Western New York. Each needed to complete an initial self-audit. A sample of this audit form is shown in Figure 18. This established the baseline data fundamental for energy analysis of the participating schools.

Once the audit was completed, schools reported energy consumption figures twice a month to a central computer terminal. Information then was sent back to each school including:

- biweekly records of energy consumption;
- conversion of this consumption to Btu's;
- further conversion of Btu's to Btu/DD/sq. ft. (DD=degree day);
- comparison of each building's consumption to that of all reporting buildings;
- a cumulative record of heating Btu's;
- a notation of any large consumption discrepancies between reporting periods; and
- a notation of missing data.

Figure 19, a sample report, illustrates how information was dispersed back to the schools. Schools also would receive graphs or tabulations describing consumption levels.

Coinciding with this monitoring system was a series of workshops aimed at improving the level of energy consciousness and technical awareness of participating school custodians. Private companies knowledgeable about energy

FIGURE 18

Erie 1 BOCES Audit Form (3)

Name of District _____

Superintendent _____

In order to accurately calculate energy statistics, the following information is needed for each of the buildings in your district (refer to footnotes for explanation of information needed):

Name of Building	Total Square Footage	Electric Meter Multiplier[1]	Gas Meter Multiplier (10, 100, or 1000 cf.)[2]	Fuel Oil Type (2 or 6)[3]
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

1: Electric meter multiplier- meter multiplier can be found on face of each respective electric meter.
2: Gas meter multiplier-this will either be 10, 100, or 1000 cubic feet. You should get this information from your fuel bill, not from your gas meter.
3: Fuel oil type- if your fuel oil type is other than type 6, it will be classified as type 2.

Exceptions: There are special cases that require special handling. Please indicate if buildings in your school district share electric, gas, or oil facilities.

Please return this information to:

Robert Colon, Energy Coordinator
Division of Planning and Instructional Services
Erie Boces #1
2 Pleasant Avenue West
Lancaster, New York 14086

District: Building: Sq. Ft.:

Degree Days:											
Date											
Electric Reading: 1 M											
Electric Reading: 2 M											
Gas Reading: 1											
Gas Reading: 2											
Gas Reading: 3											
Gas Reading: 4											
Gas Reading: 5											
Gas Reading: 6											
Oil Reading: Delivered:											
Oil Reading: Now:											
Fuel Use:											
ot. BTUs Consumed-1/2 month:											
" " " - month:											
BTUs/DD/Sq.Ft. Consumed-1/2 mo.:											
" " " -month:											
Consumed (ab.,bel.) average:											
BTUs Consumed to date:											

FIGURE 19

Erie 1 BOCES Sample Reporting Form (4)

28) WNY REGIONAL ENERGY MONITORING SYSTEM

MONTH DECEMBER

DISTRICT NAME KENMORE
BUILDING NAME BRIGHTON

AMOUNT OF ENERGY CONSUMED DURING 1 HALF OF MONTH:

ELEC	19980	KWH =	68191740	BTU
GAS	9000	CF =	9279000	BTU
OIL	3113	GALS =	463837000	BTU
COAL	0	TONS =	0	BTU

TOTAL BTU'S FOR 1 HALF; 541307740

TOTAL BTU'S/DD/SQ.FT. IS; 15.31

AMOUNT OF ENERGY CONSUMED DURING 2 HALF OF MONTH:

ELEC.	10260	KWH =	35017380	BTU
GAS	7100	CF =	7320100	BTU
OIL	3767	GALS =	561283000	BTU
COAL	0	TONS =	0	BTU

TOTAL BTU'S FOR 2 HALF; 603620480

TOTAL BTU'S/DD/SQ.FT. IS; 19.87

TOTAL BTU'S CONSUMED IN MONTH; 1144928220

TOTAL BTU'S/DD/SQ.FT. CONSUMED IN MONTH; 17.59

THERE * IS * A DISCREPANCY OF '10 PERCENT' OR MORE IN CONSUMPTION BETWEEN THE TWO HALVES OF THE MONTH.

AVERAGE BTU'S CONSUMED FOR ALL REPORTING SCHOOLS THIS MONTH/DD/SQ.FT.
18.57

THIS BUILDING CONSUMED .98 BTU'S/DD/SQ.FT. (ABOVE, BELOW) THE AVERAGE FOR ALL REPORTING BUILDINGS THIS MONTH.

THE STATE EDUC. DEPARTMENT RECOMMENDS A HEATING BUDGET OF 70,000 BTU'S FOR ELEMENTARY AND 85,000 BTU'S FOR SECONDARY BUILDINGS. THIS BUDGET APPLIES FOR HEATING ONLY (SEPT.-JUNE). ACCORDING TO THIS BUDGET, THIS BUILDING HAS CONSUMED 15463.80 BTU'S THIS MONTH, 26,781.64 BTU'S TO DATE AND HAS 43,218.36 BTU'S LEFT FOR THE REMAINDER OF THIS YEAR'S HEATING SEASON.

MESSAGES: FIRST HALF MONTH;

MESSAGES: SECOND HALF MONTH;

related products were invited to attend the workshops. A newsletter was established and distributed among participating schools in order to strengthen the communication network.

The most significant aspect of the monitoring program has been that, once implemented, it has proven to be a relatively inexpensive yet effective means for controlling energy consumption and costs in schools. As far as the Erie 1 BOCES project is concerned, the record of cost savings justifies the expenditures for the program. Since its initiation in 1977, the project has reported a reduction in overall Btu consumption averaging 37 percent. Table 41 indicates the savings experienced by schools participating in the project between 1977-78 and 1979-80.

Until 1980, the Erie 1 project was the recipient of federal funding. However, that money was terminated and the project was not renewed for continued funding. Faced with the possibility of extinction, and receiving no financial support from the State, the Erie 1 project's chances of survival appeared slim. However, the project has been able to continue operations due to the support of those districts it had previously served. Based upon a successful record for saving money, participating school districts now finance the Erie 1 energy monitoring program. Out of the 80 participating districts in 1980, 55 have continued to participate, using BOCES aidable funds to help subsidize costs.

Under the new funding system, each participating school district pays Erie 1 BOCES $125 annually for administrative and computer charges. In addition,

TABLE 41

Energy and Cost Savings Experienced by Schools Participating in the Erie 1 BOCES Project (5)

Year of Project	Annual Percentage Consumption Savings			Annual Average Dollar Savings (thousands)		
	Electricity	Nat. Gas	Fuel Oil	Electricity	Nat. Gas	Fuel Oil
1977-78	16	11	15	18.4	11.7	12.4
1978-79	18	10	14	18.4	11.7	12.4
1979-80	10	8	9	18.4	11.7	12.4
TOTAL	44	29	38	55.2	35.1	37.2

a scale is set up for calculating other costs. The costs are based on the number of participating buildings:

- buildings 1-2 --$250;
- buildings 3-5 --$300;
- buildings 6-9 --$350; and
- buildings 10+ --$450.

The total annual cost for running the program represented $30,000 at the end of the 1980-81 school year. In terms of energy savings or cost-avoidance, districts continue to experience savings well above this cost, thus making participation in the program worthwhile.

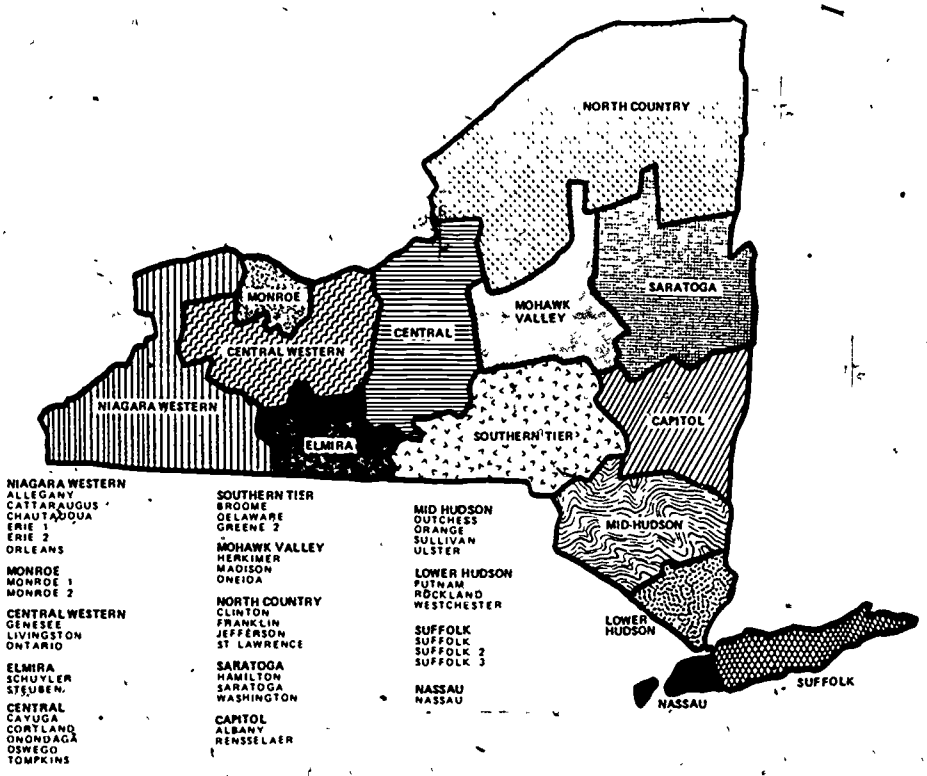
Implications of the Erie 1 BOCES Model for Energy Conservation in Schools

Many school districts participating in the original Title IV-C program learned a valuable lesson: effective energy management is not a one-shot effort. It requires continuous monitoring and a technically sophisticated educational staff committed to saving energy in schools. The Erie 1 experience also has provided other important insights into energy responsiveness by schools.

- With fiscally creative initiatives and school personnel committed to resolving energy overuse, schools--either singularly, collaboratively or regionally--can reduce, manage and control energy consumption.
- The framework for implementing a statewide energy conservation system is in place. The regional BOCES, as seen in Figure 20 encompasses all the State's schools in a network prepared to handle such a system.
- The mechanism for promoting conservation in schools is already available for New York. The PSECS program and the recent involvement by SEO and SED with statewide energy audits in schools attests to its availability. The success experienced by Erie 1 in coordinating energy monitoring through a BOCES multicounty approach also signals readiness.
- The Erie 1 program has shown results. If applied on a larger scale to a statewide school system, the savings could be impressive.
- School personnel familiar with the program are available in the State for possible consultation and coordinating activities.

FIGURE 20

Regional BOCES Structure in New York State (6)



- New York State has the capacity to become one of the few states in the country to establish a comprehensive statewide monitoring system for managing the energy needs of the State's schools. The savings accrued and the information generated from such a systematic program would more than justify any initial seed monies required for implementation.

A more complete analysis of the feasibility of a statewide energy conservation program is discussed in the recommendations in Chapter 7. For now it is sufficient to conclude that a dual purpose management/monitoring system is currently available for use by the State.

A SINGLE COUNTY APPROACH TO ENERGY CONSERVATION: CATTARAUGUS COUNTY

Unlike the Erie 1 BOCES multicounty approach, Cattaraugus County BOCES has developed a highly successful energy conservation program at the county level for its schools. Located in a rural, upstate region of New York, this single county's effort illustrates how schools can organize to curb energy costs effectively without relying heavily on anyone other than their own school personnel.

This BOCES-sponsored energy conservation program has resulted in a 32.3 percent decrease in overall energy consumption since 1972-73 in the 13 component school districts in Cattaraugus County (7). Established in the summer of 1977, the program is designed to increase the efficient use of energy in schools. The beginning of the Cattaraugus County project coincided with the Erie 1 BOCES project. Although Cattaraugus County is one of the seven counties serviced by the Erie 1 BOCES program, the Cattaraugus conservation program was conceptualized and engineered independently from the Erie 1 project. However, the project has used the computer facilities at Erie 1 BOCES to provide its personnel with ongoing school-based energy information. The program is intended to increase the awareness of students, faculty, administrators and support personnel towards energy conservation. The county schools were able to avoid $609,000 in energy costs for the 1981-82 school year due to the effectiveness of this conservation program.

The program began by conducting preliminary energy audits of the 34 school buildings in the BOCES area and compiling energy records dating back to 1972-73. Each school was encouraged to form energy conservation committees to set goals and monitor energy use. Energy conferences were held for school administrators and inservice workshops for custodial staff. Special instructional materials were distributed to area classrooms. Efficiency testing equipment was made available to the school maintenance staffs to monitor the progress.

Table 42 displays how each of the districts fared between 1979-80 and 1980-81. There are some notable changes which occurred in several districts. The district with the second smallest energy consumption, Pioneer, showed the greatest change in usage between 1978-79 and 1979-80, or 20.59 percent. Overall, this district reduced its consumption level by 45.4 percent since 1972-73. The most impressive data are located in the column of percentage changes between 1972-73 and 1980-81. Most districts far exceeded SED's purported reduction rate of 26.7 percent. This suggests that a successful energy management system can improve the effectiveness of no system at all.

How has the county managed to achieve such dramatic reductions? Through the BOCES program, each building has undergone a thorough computer analysis of its energy usage. As a result, school authorities are provided with special insight into how their buildings compare with an energy-efficient model. They are also provided with additional information on specific actions they can take to make their buildings operate more efficiently. A superintendents' advisory committee gives advice and direction.

TABLE 42

District Energy Consumption Report for Districts Participating in Cattaraugus County Program (8)

District	1979-80 *Rank	MBtu/ Sq Ft/Yr	% Change Over 1972-73	Change in % From Previous Year	1980-81 Rank	MBtu/ Sq Ft/Yr	% Change Over 1972-73	Change in % From Previous Year
Allegany	9	104.85	-1.97	+1.12	9	100.74	-5.82	-3.85
Cattaraugus	10	113.50	-40.23	-8.10	10	109.82	-42.17	-1.94
Ellicottvile	6	97.97	-31.14	-1.85	3	90.31	-36.52	-5.38
Franklinville	15	158.65	-19.80	-4.06	15	160.65	-18.79	+1.01
Gowanda	7	99.50	-31.06	-7.60	4	90.37	-37.38	-6.32
Hinsdale	3	89.93	-34.65	-7.34	5	90.54	-34.21	+0.44
Limestone	11	116.41	-32.68	+0.47	11	111.39	-35.59	-2.91
Little Valley	1	86.55	-26.53	-3.98	2	83.20	-29.38	-2.85
Olean	8	101.34	27.17	+2.68	8	94.70	-31.94	-4.77
Pioneer	2	88.81	-39.32	-20.59	1	79.86	-45.44	-6.12
Portville	14	135.77	-14.94	+4.26	13	128.27	-19.64	-4.70
Randolph	4	93.42	-41.34	-4.93	7	93.35	-41.38	-0.04
Salamanca	12	126.60	-20.93	+0.49	12	119.56	-25.33	-4.40
West Valley	13	134.94	-25.18	-2.02	14	136.49	-24.32	+0.86
BOCES	5	96.70	-25.45	-12.20	6	92.26	-28.88	-3.43
CATTARAUGUS CO. & GOWANDA TOTAL		106.46	-28.54	-5.59		100.87	-32.29	-3.74

*Smallest No. is Lowest Energy User
(+) = Increased Consumption
(-) = Decreased Consumption

This BOCES project has shown how, through creative programming and human commitment, a network of concerned schools at the county level has attacked energy costs. Unlike the Erie 1 BOCES regional approach, the Cattaraugus model provides more direct on-site technical assistance to school authorities and does not have to rely on other counties for financial support in order to sustain the program.

CONCLUSIONS

The two energy management models described in this chapter confirm the idea that workable energy conservation programs are a tangible reality. By using creative planning and providing schools with immediate, positive results, these two BOCES projects reflect a sincere commitment to maximize energy efficiency in schools. Can schools, without the support of a countywide or regional network, singularly combat energy costs and consumption? In order to answer this question, one New York school district, whose energy conservation record is applaudable, is briefly described in the following chapter. The chapter describes the district's struggle to control energy use in its schools over the five year period of 1977-1982.

SCHOOL DISTRICT A: A CASE STUDY IN LOCAL EFFORT

Like many of the State's school districts, District A has had to face some tough budgetary decisions in the last few years. Confronted with the impact of runaway inflation and declining enrollments, local school administrators and school board members have become concerned about the inability of the school district to keep pace with educational costs. Rising energy costs are a major source of their frustration. District A was selected for examination because it initiated significant steps to change its energy usage, especially in terms of fuel oil, without direct assistance from the State or federal governments. This small, rural district has been able to reduce its consumption of fuel oil by 56.5 percent between 1976 and 1981. The Task Force analysis found that this district experienced an overall reduction in energy consumption of 36 percent and a cost avoidance of over $67,000 between 1972 and 1979. This remarkable level of reduction is worth further inspection.

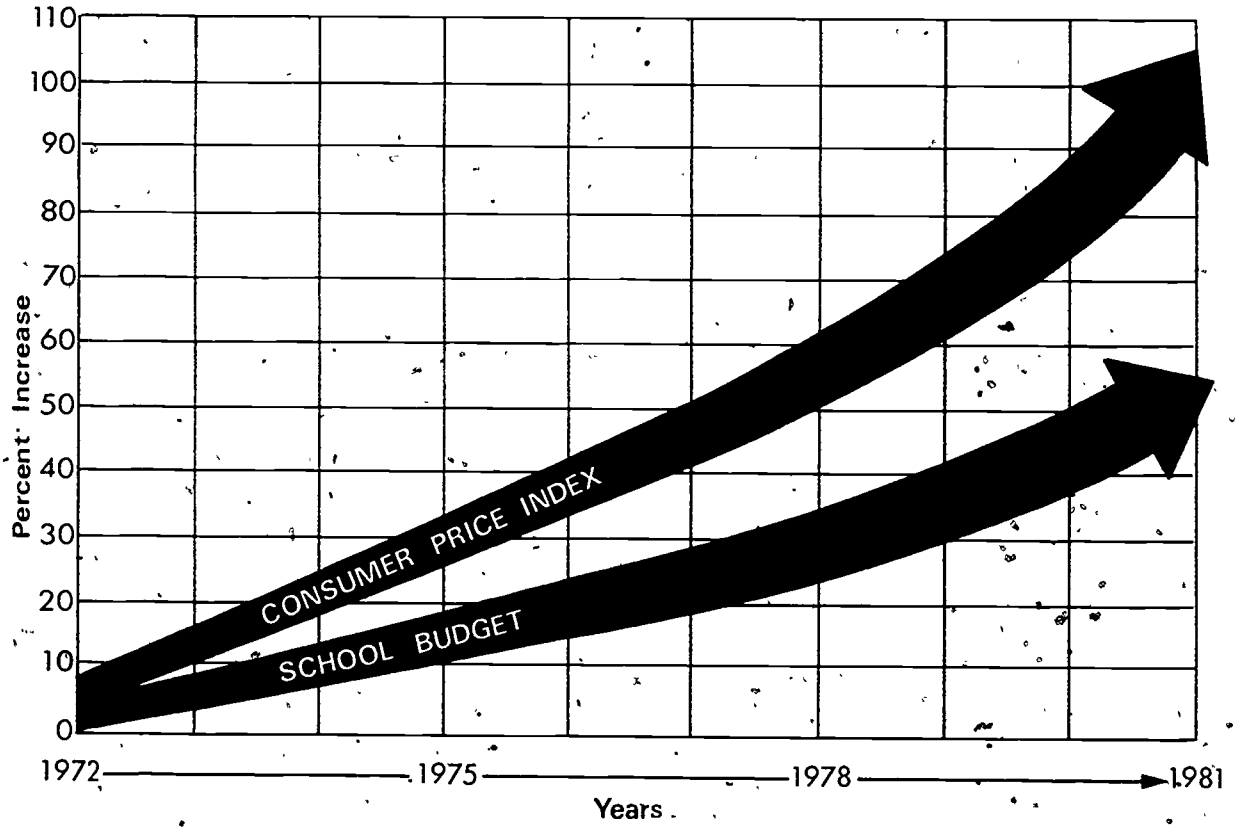
PROFILE OF DISTRICT A

The district has a total student population of 1,150 as of 1980-81. It has decreased in size by 13 percent since 1977 (1). The district has one consolidated high school and two elementary schools. It is located in a rural, upstate New York county whose major sources of employment are farms, light industry and government. The 1977 personal income per capita for all age groups in the county was $5,398. The county is ranked as the 21st largest in the State (2).

School district expenditures have increased from $2,741,655 in 1977-78 to $3,568,513 for the 1981-82 budget. This represents a 30 percent increase in the last four years. Figure 21 compares the budgetary increases with the Consumer Price Index between 1972 and 1981. This comparison illustrates how the school district has been able to reasonably contain its school budget in light of a rapidly rising inflationary trend.

FIGURE 21

Comparison of District A's School Budget to the Consumer Price Index (3)



The district has concentrated its energy conservation efforts on reducing fuel oil consumption. Although the district has experienced a 56.5 percent reduction in the number of gallons of fuel oil consumed between 1976 and 1981, it still has budgeted $103,000 for fuel oil for the 1981-82 school year. Had it not reduced its intake of fuel oil, the fuel oil budget would have totaled $152,000, a 47.6 percent increase.

How was this small, rural district able to accomplish such a reduction? Does it have "special" characteristics not found in other school districts? The following chronology of events may explain why this district has succeeded while others have not. Most importantly, the description also points out the difficulties incurred by a district singlehandedly taking on the battle against rapidly escalating energy costs.

A CHRONOLOGY OF ENERGY CONSERVATION TACTICS

The energy crisis in 1973 brought immediate reaction from local school district administrators. A letter sent to all staff from the District Principal on November 9, 1973, reads:

To: All Staff
From: District Principal
Re: Energy Crisis

Those of you who heard the President Wednesday night realize that all our talk locally regarding an Energy Crisis has not been exaggerated. There are possibilities that our schedules as we know them now for this winter will have to be altered. If I receive any word on these you will be notified immediately.

I would encourage you to cooperate voluntarily with the suggestions offered and to do all that is reasonably possible to conserve fuel. We will continue to look at district policies that might have an effect on the situation and will keep you informed of any changes.

Your past and future cooperation is greatly appreciated.

In addition, a letter from the Superintendent of Buildings and Grounds to all staff listed ways in which energy usage could be reduced.

To: All Staff
From: Superintendent of Buildings and Grounds
Re: A few practices concerning saving energy

1. Do not cover the lower side or upper vents on the ventilators.

2. Close all drapes and shades when you leave your room at night.

3. Close all doors leading to corridors. There is no heat in the halls. Leaving doors open will cause heat from classrooms to go into the halls.

4. Turn off lights when they are not needed.

Rooms are set for 68° in the daytime and 62° at night and when school is not in session. If your room is unduly cold, please let me know.

A report from the Superintendent of Buildings and Grounds on December 17, 1973, identified places in the school facilities where electric energy had been reduced. These are detailed in Table 43.

By 1976, the school district recognized that the previous efforts taken to reduce energy costs in the district's schools did not go far enough. Under the supervision of the Director of School Facilities and Operations (previously known as the Superintendent of Buildings and Grounds), accurate consumption records were kept annually for each school facility in the district. Under the new system it was easier to identify exactly where waste was occurring. With the assistance of the district's Business Administrator, who recognized the fiscal waste created by the inefficient use of energy, conservation became a high priority item for the school district.

TABLE 43

1973 Electric Energy Savings in District A (4)

ELEMENTARY--	Energy Saved
Mrs. Smith's room	600 Watts
Corridors	2100 Watts
Office	450 Watts
Art Room	900 Watts
Custodial storeroom	1000 Watts
Kitchen	900 Watts
Stage	90 Watts
Locker rooms	2300 Watts
Boiler rooms	425 Watts
Total	8765 Watts saved
HIGH SCHOOL--	
Mrs. Jones' office	170 Watts
Mrs. Ward's office	314 Watts
Mrs. Black's office	157 Watts
Jim's office	314 Watts
Girl's basement, old part	200 Watts
Bookstore	400 Watts
Kitchen	1000 Watts
Total	2555 Watts saved

Fresh air dampers have been closed off completely, except in the following areas of the High School (due to size of classes): music room, library, cafeteria and gym.

All filters were cleaned during Thanksgiving vacation, and boiler tubes were cleaned.

Because the district kept precise records of fuel consumption by building along with annual heating degree day averages for that geographical locale, data could be used to provide the district with valid energy-related information. From this a realistic concept of the costs of energy emerged. More importantly, when calculated and compared to previous spending on energy, it was discovered that the proportion of the budget going directly into energy costs was growing disproportionately to other costs.

DESCRIPTION OF THE ENERGY CONSERVATION PROGRAM

The district began developing a keener sense for the damage done by energy costs to the school district budget. The budgetary future appeared grim. Even though the initial phase of the energy crisis of 1973 had passed, the district recognized that the energy crisis for the district's schools was not over. Therefore, under the direction of the Director of School Facilities and Operations and the Business Administrator, a plan was developed in 1977 to implement a comprehensive energy conservation program for the school district. The Board of Education approved the plan, as did the district voters. The conservation program had six major components:

- flourescent and lower wattage lighting (cost $36,952);
- additional insulation (cost $33,456);
- dropped ceilings (cost $11,652);
- improved heating system (cost $29,400);
- double insulated windows (cost $270,540); and
- other miscellaneous projects (cost $40,000).

The total estimated cost for the program was $422,000, although actual expenses by 1979 totaled $364,469. Expected savings for the first year after completion of the energy conservation measures were to be $82,852, representing an energy savings from 1977-78 of 40.5 percent (5). Before the program began, total fuel oil consumption for the district in 1977-78 was 150,000 gallons. Under the new program that figure was forecasted to shrink to 89,200 gallons in 1980-81. The actual reduction achieved was to 90,389 gallons. Cost avoidance figures, or energy savings, indicated that the project would pay for itself in approximately four years. This would be considerably less if consumption levels continued to decline and/or fuel oil prices continued to rise.

IMPLICATIONS FOR DISTRICT A

A cursory glance at the school district's expenditures in Table 44 for central services in the years 1978-79 through 1980-81 reveals the changes in amounts spent for each categorical purpose. What this shows is that even with the energy conservation measures instituted by the district, energy costs have continued to rise. Other cost items, such as plumbing, repair of equipment, repair of buildings and upkeep of grounds, decreased from 1979-80 to 1980-81. The explanation for this is simple. As energy costs elevated expenditures for other operation and maintenance items had to be reduced so that money would be

TABLE 44

District A: Central Services' Expenditures (6)

Operation and Maintenance of Plant	1978-79	1979-80	1980-81
Salaries	$121,588	$131,033	$138,422
Equipment	-0-	4,820	2,530
Supplies	16,757	18,000	14,587
Other			
Upkeep of Grounds	2,674	3,775	3,095
Repair of Buildings	3,125	3,535	3,363
Heating	2,675	7,432	8,667
Electrical	3,770	4,700	6,030
Plumbing	1,135	2,825	1,944
Repair of Equipment	5,635	10,238	7,887
Service Contracts	11,275	12,934	13,059
Refuse Disposal	1,100	1,200	1,350
Water Rent	750	780	780
Sewer Rent	3,500	3,820	3,350
Fuel Oil	34,690	50,275	121,280
L.P. Gas	600	600	650
Electricity	25,200	29,460	35,640
Telephone	12,000	12,300	12,000
Total Other	108,129	143,874	219,095
GRAND TOTAL	246,474	297,727	374,634

available to pay the fuel bills. Unless the district is willing to increase its budget to keep pace with the costs for energy in the schools, the money must come from other budget lines. Table 44 makes it evident where some of the funds are coming from. Cutbacks are made in services previously earmarked as routine in the operations of the buildings and grounds. In the long run, these cutbacks in maintenance services may do fiscal harm to the district for two reasons.

- With inflation the costs for materials as well as the costs for labor increase each year. As maintainence projects, such as painting, are annually postponed, the costs eventually incurred increase.

- Without routine maintenance and servicing, facilities become dilapidated and unsafe. Even minor repair work, accumulated over an extended period of time, will result in major building repair projects. The result: what was a few years ago a simple, routine task, ends up becoming a major expense item for the district.

The district has, of its own accord, developed and implemented an energy conservation program for its schools. The purpose was to save money and prevent overwhelming energy bills. The results of the conservation program have shown significant cost avoidance figures for the district. Without the program in place, the energy costs for the district during the last two years would have been staggering. Unfortunately, even with such an effective program in operation, the district still faces rising energy costs. Even with consumption cutbacks, the escalating costs for energy are eroding other services. How much these energy costs affect educational programs now and in the future is the real concern for the district.

One option which the district must decide upon is whether or not to close a school building and transport existing students to adjacent schools. Although this alternative is not welcomed by many of the district's residents, the savings resulting from such a move would be considerable. The money figures listed in Table 45 indicate the degree of potential savings.

District A has the difficult task of making educational decisions based on economic necessity, with energy costs acting as one of the prime villians forcing such decisions. District A also must consider if there are any further conservation steps which could be taken to reduce consumption beyond current levels. Often, these additional steps mean large costs with are beyond the district's capacity to finance. Going the "last mile" to assure that the dis-

TABLE 45

Estimated Savings Achieved by Closing Elementary School Building #2 (7)

	Current Cost of Operation	Savings if Sold or Destroyed	Savings if Boarded Up With Minimum Maintenance
Insurance	$ 2,911	$ 2,330	$ 1,856
Heat	39,000	39,000	23,400
Electricity	5,400	5,400	2,700
Telephone	464	464	464
Routine Maintenance	5,000	5,000	3,000
Custodial Supplies	4,000	4,000	4,000
Major Maintenance	2,700	2,700	2,100
Custodial Salary	11,000	9,900	9,900
Secretarial Salary	6,710	6,710	6,710
Cafeteria Salary	8,910	6,710	6,710
Mileage (payment for travel in private cars to and from Guilford)	1,672	1,672	1,672
Cost of School Vehicle Use Between Schools	2,500	2,500	1,800
Duplicated Equipment	4,600	4,600	4,600
Teacher's Salaries (with benefits) (six positions)		$ 74,800	$ 74,800
		$165,786	$143,712
Extra Busing Cost (-)		-4,000	-4,000
		$161,786	$139,712
One extra teaching position (+)		$+12,466	$+12,466
Total		$174,252	$152,178

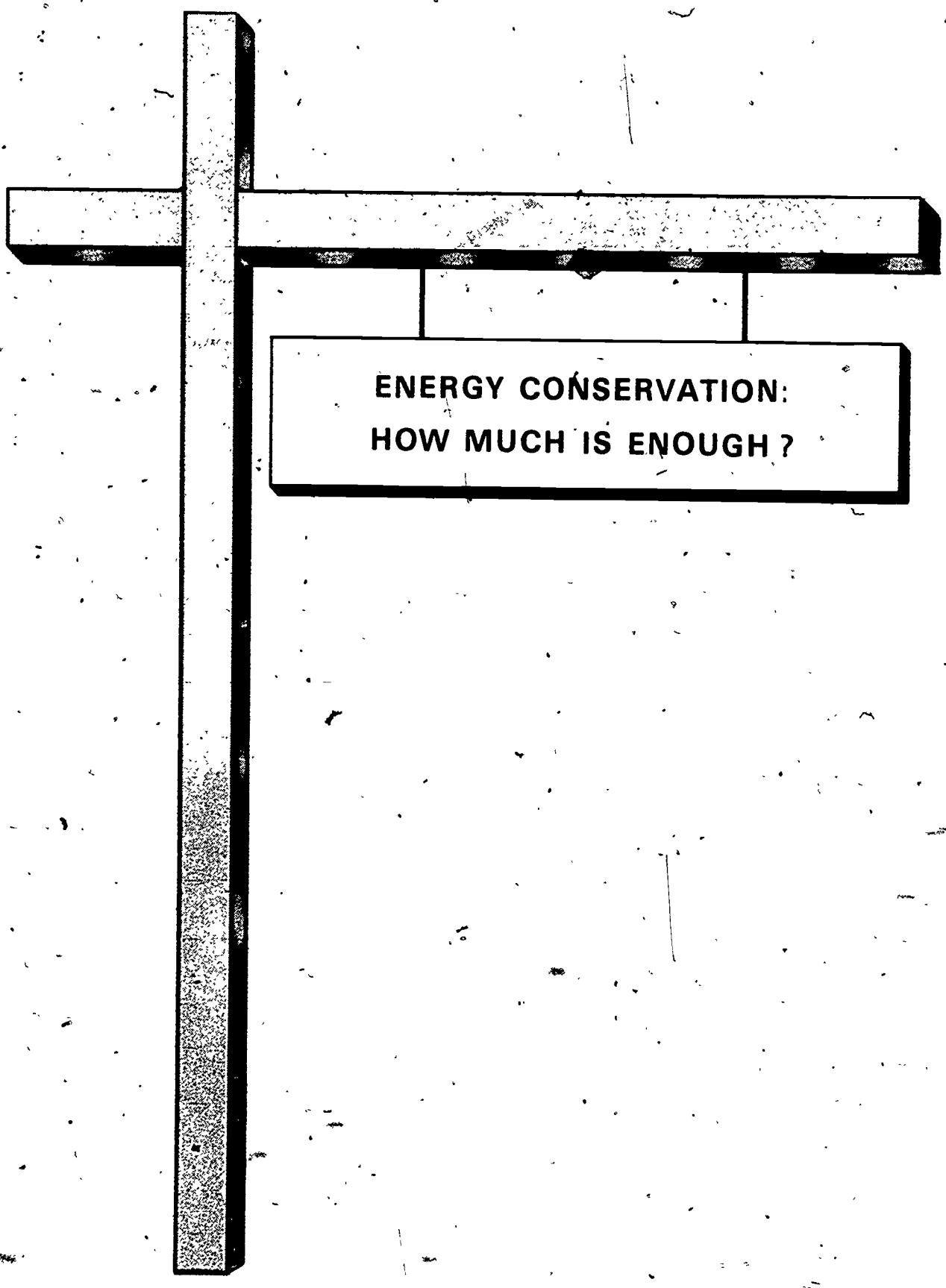
trict is not wasting its limited financial resources on "hot air" may require major retrofitting projects which are often costly and technically sophisticated.

CONCLUSIONS

This section has attempted to illustrate the interrelated parts involved in energy conservation at three levels: state, county and local. Each level has certain advantages which it can use to facilitate energy conservation in schools. States have legislative powers to initiate long-term energy policies and, at the same time, appropriate funds to assist schools in implementing such policies. They also can provide direct support to regional programs through

grants and technical assistance. Counties have the advantage of being big enough to coordinate comprehensive, technical services to schools, yet small enough to make their programs fit local needs. Local conservation programs provide the real key to energy management success. The human factor in energy conservation "fuels" the desire to see energy controlled. No statewide mandate or sophisticated regional management system can substitute for local initiative in effectively solving energy problems. Clearly it is evident that using the best of all three will result in a highly effective energy management system which reflects a solid, realistic commitment towards energy conservation.

The final chapter attempts to outline various ways in which New York State schools can improve their responsiveness to energy conservation. These recommendations are constructed so that the multidimensional aspect of the energy problem is recognized. The recommendations stem directly from the descriptive and statistical findings of this report. They also serve as a beginning point for further analysis on the long-term impact of energy costs on the State's schools. Based on the State's previous energy record, can New York's schools afford to remain uncommitted to energy conservation and continue to let energy drain away valuable State and local dollars?


ENERGY CONSERVATION:
HOW MUCH IS ENOUGH?

ENERGY CONSERVATION: HOW MUCH IS ENOUGH?

COMMITMENT AND COORDINATION ARE THE NECESSARY INGREDIENTS

Page after page of this report reiterates the serious impact that energy has had on the State's school systems since 1972-73. Four points have been stressed.

- There is an ever present energy problem in New York State which carries with it a potentially debilitating power, especially for the State's public school system.
- Energy conservation is a proven method for relieving the overdependence schools have had on energy, particularly fuel oil.
- Although the State's schools have accomplished a minimal level of energy conservation since 1972-73, most of which occurred in the first year following the 1973 Arab oil embargo, more can be done.
- Two vital ingredients are necessary in order to attain effective energy conservation: a firm commitment to resolve the problem and a coordinated statewide energy conservation plan for schools which establishes a solid framework for reaching identified goals.

Based upon these two necessary ingredients--commitment and coordination--what can the schools do to improve their energy conservation record? Single school district action, without assistance from the State or federal government, has produced only marginal results. Commitment and coordination have been fundamental to successful energy conservation efforts, especially when these efforts were integrated with State, local and federal programs. Therefore, any plan to improve the existing energy conservation program in the State's schools should recognize this relationship.

The following recommendations address themselves to the need for an integrated energy conservation system. The recommendations are separated into three categories--State, local and federal initiatives. Various energy problems are discussed in each section and actions necessary to remedy these problems are presented. However, actions at all three levels should occur simultaneously.

STATE LEVEL ENERGY EFFORTS

A coordinated statewide energy conservation program for New York State schools involves a package of important components. Together these components would enhance significantly the chances that the State would save money otherwise wasted on energy. The actions necessary for such a comprehensive package are contingent upon the formation of a statewide Regional BOCES Energy Conservation Task Force to develop, implement and administer a New York State Energy Management Plan for Schools. Under the umbrella of an Energy Management Plan, the other components necessary include:

- regional energy management plans;
- a statewide energy monitoring system;
- statewide technical training of local school personnel in energy management techniques;
- State-sponsored incentives and fiscal support for energy conservation through existing programs, such as School Building Aid, and through a new Innovative Energy Conservation Project Loan Fund;
- broadbased public recognition of schools which achieve applaudable energy conservation records; and
- energy education in schools.

Each of these actions are discussed in the following State level recommendations.

State Energy Management Plan for Schools Administered by A Statewide Regional BOCES Energy Conservation Task Force

Before the infusion of federal monies, the New York State Education Department (SED) responded erratically in its efforts to constrain energy costs in schools. All energy conservation activities had little impetus behind them and all actions by schools were voluntary. Action was crisis-oriented and once the immediate crisis subsided, it was "back to business as usual." In the past, energy management--or what has been called energy conservation--has been perceived entirely as a State level function. This approach has not proven to be highly successful.

- The energy information collected by SED has not been utilized. In addition, little has been done to ensure that the data was complete or valid. No effort has been made to monitor the data collected or to incorporate it into energy management policies.

Finally, schools have received no feedback upon which they could measure their own energy conservation achievements. Likewise, the State Energy Office (SEO) has not filled this statewide energy information void.

- Both SED and SEO have failed to maintain actively operating bureaus which provide schools with technical energy management assistance or to train local school personnel for ongoing energy management.

- Interagency cooperation or interaction between SED and SEO aimed at assisting schools in confronting the energy problem has been nonexistent.

The absence of a clear, consistent, State level or agency level energy management policy is unfortunate. This vacuum has left the State's schools to fend for themselves. As a result, the record shows that school efforts to conserve energy have been erratic. The two primary reasons for this haphazard response have been the obvious omission of a statewide energy management plan for the educational sector and a failure to designate where the responsibility for administering energy management rests. However, in 1977, a statewide energy management plan was presented to SEO, SED and the Board of Regents. Under contract to the New York State Energy Research and Development Authority (NYSERDA), Educational Facilities Laboratories, Inc. (EFL), developed a comprehensive energy conservation program for New York's schools. The ensuing NYSERDA report outlined a two-phase, long-term energy conservation program for the State's schools. The report provided the rationale necessary for a statewide energy management plan for schools along with a suggested framework upon which the plan could be built. Unfortunately, the NYSERDA report and its recommendations have not been acted upon by the Regents or SED.

Successful energy management has many facets. A statewide energy management plan for schools would have to involve extensive management of energy consumption. It also means that schools must begin to assume greater responsibilities for identifying energy problems, prescribing remedies and implementing energy conservation measures. In order for schools to manage energy more effectively, they need to have reliable energy information based on a continuously operating energy monitoring system. Concurrently, they should have access to resource personnel who can assist in correcting problems as well as technical training in energy management for local school personnel.

All of these services can be provided by the State's 14 regional BOCES. The two BOCES examples presented in Chapter 6--Erie 1 BOCES and the Cattaraugus County BOCES--illustrate how effective programs administered by BOCES can be.

Under a regional BOCES organizational plan, as described in the Erie 1 BOCES model, school district energy conservation could be coordinated easily and with minimal cost. A regional approach, in conjunction with SEO and SED, can eliminate much of the confusion and duplication of effort experienced under the existing energy conservation approach. A regional BOCES energy management approach also is ideally suited to:

- providing technical services to school districts quickly and efficiently;
- keeping school districts better informed about energy conservation methods;
- implementing a more efficient energy monitoring system by assisting school districts in reporting consumption data; and
- getting schools more involved in energy conservation activities by providing training programs and other related activities as incentives for encouragement and reward.

Each of these would be an integral part of a state energy management plan.

Therefore, a statewide Regional BOCES Energy Conservation Task Force should be established to design, implement and administer the State Energy Management Plan for Schools. The proposed Task Force would be composed of an Energy Coordinator from each of the 14 regional BOCES and one representative each from SED and SEO. The SEO representative would chair the Task Force. SEO and SED would provide staff assistance to the Task Force as needed. The Task Force also would serve as the general coordinating body for school energy conservation needs and as the primary intervenor for assisting school district efforts in energy management. Most importantly, an Energy Management Plan designed and administered by the proposed Task Force would strengthen the State's commitment to energy conservation in schools by outlining immediate and future energy goals. New York's schools need to be clear about what they should be doing to promote energy conservation as well as how they can conserve more efficiently and effectively.

Recommendation: Establishment of a Statewide Regional BOCES Energy Conservation Task Force to Administer a State Energy Management Plan for Schools.--A statewide Regional BOCES Energy Conservation Task Force should be established. Consisting of 14 regional BOCES Energy Coordinators and one representative each from SED and SEO, the 16 member Task Force would be responsible for designing, implementing and admin-

istering the State Energy Management Plan for Schools. The SEO representative would chair the Task Force. SEO and SED would provide staff as needed.

Recommendation: Submitting a Preliminary State Energy Management Plan for Schools.--A preliminary plan should be presented to the Legislature and the Governor for review within six months of the formation of the Task Force.

Energy Management

Using the goals and objectives set forth in the State Energy Management Plan for Schools, each of the regional BOCES Energy Coordinators should develop a regional energy management program specifically designed to meet the particular needs of the schools in his/her region. These regional plans should be submitted to the statewide Regional BOCES Energy Conservation Task Force for approval.

Like the regional Erie 1 BOCES Energy Conservation Program, each BOCES should solicit participation from schools by showing the potential savings accrued from participation in the program. School participation costs would be partially reimbursable by BOCES aid. Initially, Erie 1 BOCES estimates that program implementation costs would be approximately $1,200 per district. Once the program is in place, the local support provided by participating districts would keep the program operational. As described in Chapter 6, participation in the program pays for itself through the energy cost savings experienced by the district.

Recommendation: Statewide Regional BOCES Energy Conservation Task Force Management Responsibilities.--Using the Erie 1 BOCES program as a prototype, each regional BOCES should develop an energy management system for its school districts under the auspices of the State Energy Management Plan for Schools. All plans would be reviewed and approved by the Energy Conservation Task Force.

Recommendation: Regional Energy Management Costs.--The Task Force should submit to the Legislature and the Governor, along with the preliminary Energy Management Plan for Schools, a report estimating both the initial start-up costs as well as the projected costs and savings of the regional energy management plans.

Energy Monitoring

Since 1972, SED has required all the State's public K-12 school districts to report their energy consumption data. The annual reports are stored in a departmental unit designated for energy coordination--Educational Facilities and Planning. Little has been done to monitor the data or to transcribe the raw data into more readily usable forms. If attempts were made by SED to improve the quality of data, expand the data base or use the data for program development, they were never accomplished.

Strongly emphasized in the EFL report in 1977 was the need for a continuous energy monitoring system for the State's schools. The development of such a system is an essential element of the State Energy Management Plan for Schools. EFL recognized the ineffectiveness of the existing reporting process. Even the quality and the type of data sent to SED was questioned by the study. The Task Force on Critical Problems analysis also shows that the data was incomplete and needed much work before it could be used effectively. To date, no action has occurred within SED to improve its energy data base.

However, since the beginning of the federal Schools and Hospitals Program, SEO has been involved in the energy auditing of the State's schools. According to SEO, complete sets of energy-related data describing the energy usage patterns of the State's schools since 1979 have been compiled. Unfortunately, this data is only for one audit per building and is not regularly updated. It does, however, focus on energy consumption at the building level, where it should be, and not at the district level.

SED has not exhibited the commitment and currently lacks the technical expertise necessary to compile and analyze energy data for the State's schools. Stemming from SEO's role in the federal Schools and Hospitals Program, and its general directive under New York State law to administer energy programs in the State, SEO should be directed to continue and to expand its school energy consumption monitoring role. SEO can provide valuable technical assistance to the Energy Conservation Task Force and to each of its regional components as they evolve. No longer can New York rely on the dwindling federal dollars to sustain energy conservation in its schools.

Recommendation: Statewide Energy Monitoring Program.--SEO should receive State assistance in order to implement a statewide energy monitoring program in the State's schools. Within one year of the initiation of this program SEO and the Regional BOCES Energy Conservation Task Force should submit to the New York State

Legislature and Governor an annual comprehensive energy monitoring report describing and assessing:

- .costs of operations for each year, including training materials, personnel and other program expenditures;
- .projected costs of operations for the next five years along with projected cost savings or cost avoidance, to the State;
- .methods used to share the energy data received with other agencies, particularly SED;
- .reporting procedures to be used which describe and assess how well the State's schools conserve energy; and
- .any additional supporting information that the Task Force feels is necessary for the Legislature and Governor to evaluate the effectiveness of this program.

Energy Training

Effective energy management requires that individuals at the local level be technically competent to monitor energy consumption and to improve energy management efforts in their respective schools. Without such a training program, the entire energy conservation effort could be weakened. Several states, like Ohio and North Carolina, have found training manuals to be a valuable tool in energy management systems. The training manual would be an important component of the State Energy Management Plan for Schools.

SEO sponsored a series of statewide energy training seminars for local school personnel as part of the Schools and Hospitals Program. The training seminars, initially well-received by school personnel, were terminated with the elimination of the auditing portion of the Schools and Hospitals Program. Their original intent was to train individuals in energy auditing. Once that was accomplished, unfortunately, the seminars closed.

Recommendation: Energy Training Manuals.--Energy training manuals should be developed collaboratively by the Task Force, SED and SEO. The manuals should be distributed to all local school plant operators.

Recommendation: Technical Training of Local School Personnel in Energy Management.--Energy training programs including, but not limited to energy training manual supervision, should be available to districts

requiring assistance. These programs should be coordinated by the Energy Conservation Task Force.

Recommendation: Energy Technician Training.--The Regional BOCES Energy Conservation Task Force should examine the need for a high school curriculum designed to train energy technicians through the regular BOCES program. The Task Force should submit such a curriculum to SED for approval.

Incentives and Support for Energy Conservation

A major roadblock in energy conservation development has been the lack of an effective mechanism to fund local school district initiatives. The costs associated with energy conservation can range from minimal to extremely expensive. As the amount of federal assistance to the State shrinks as a result of federal energy program cutbacks, the burden for financing energy conservation will come to rest on the shoulders of the State and local school districts. Whether the State Energy Management Plan for Schools initiates an immediate, comprehensive energy conservation program or a program geared toward more gradual energy conservation adaptations, the State and local school districts must share the financial responsibility. It is mutually benefitting and therefore requires the commitment of both. In order to accomplish this cost-sharing approach, two programs are suggested which can provide both incentive and financial support for school district efforts. These include:

- an expansion of the existing School Building Aid Program to include, exclusively, funding for projects targeted for energy conservation; and
- the creation of a low cost loan program for school districts interested in developing innovative demonstration projects for energy conservation improvement.

Building Aid Program.--New York State Education Law 3602, Section 6(a)(3), provides cost allowances from the State for modernizing school facilities not to exceed 50 percent of the cost allowances for new construction. However, the Commissioner is given the power to waive this requirement if reconstruction reasonably meets the standards established for new construction, including, but not limited to, energy standards. As mentioned in Chapter Two (page 42), the amount of money targeted toward energy projects under the State's general reconstruction purposes is difficult to assess. SED does not specify in its records how much building aid is allocated for energy conservation purposes.

This section of State law suggests that there is in place a mechanism to provide additional monies to schools based upon the existing aid ratio formula for each district for both reconstruction and energy conservation.

On February 8, 1982, legislation (S. 924) was introduced in New Jersey which, if enacted, will provide $100 million of additional State school building aid. At least 60 percent of this, or $60 million, will be dedicated for replacement and for renovation of school facilities. A major criterion for determining which districts will be eligible to receive this additional aid is the degree to which a building requires other refurbishing needs. The more rehabilitation work necessary, the greater the chances for energy conservation retrofitting projects to be funded. Money for this program will be generated from locally initiated bonds with liability incurred by either local school districts, local municipalities or counties. The proposed aid package will pick up debt service and will provide payment for reducing the principal on a proportional basis. New Jersey has been able to fold into one comprehensive building aid program proposal additional monies targeted toward several explicitly identified areas of need: asbestos removal, rehabilitation of structures and energy conservation.

Like New Jersey, New York State must look carefully at ways in which it can promote energy conservation in schools. One such means would be adding supplemental funds to the current Building Aid Program as administered by SED. Such a program would allow school districts to thoroughly assess their existing facilities and, based upon the information provided by the statewide PSECS Auditing program (described on page 43) or other similar assessment procedures, to develop a plan for implementing cost savings strategies. This plan would be submitted to the Energy Conservation Task Force for approval if it meets Energy Management Plan goals, and then to SED for final Building Aid Program approval. This type of program would be directed more toward low cost energy maintenance projects and building retrofitting which result in energy conservation. Schools would estimate the potential savings they expect to incur at the end of a specified time period.

Recommendation: School Building Aid Program Expansion.--SED should prepare immediately to expand the Building Aid Program to cover the increased number of energy conservation grants requested by schools. SED should submit to the Legislature an estimate of the budgetary impact that will occur as a result of increased participation by schools. This would be undertaken in conjunction with SEO and the Regional BOCES Energy Conservation Task Force. The cost for such a program could be borne by locally initiated

funds (50 percent) and a matching grant from the State's Building Aid Program (50 percent).

When an energy conservation project requires a local match, school districts may fail to institute the project because they lack the money. It is becoming increasingly more difficult to pass budgets at the local school district level which request increased budgetary spending. Even if the project is approved for Building Aid, school trustees may shy away from presenting voters with larger budgets for fear of a budget defeat. In order to encourage the conservation of energy in public schools, school trustees should be given the authority to borrow, without a referendum, the funds necessary for an energy conservation program which has been approved by the Energy Conservation Task Force and SED in the Building Aid approval process outlined above. The borrowing could only occur within certain, specified limitations. First, the limitations should include a ceiling on aggregated debt (for instance $50,000). Second, there should be a requirement that annual debt payments shall not exceed expected annual cost savings from the proposed energy conservation project. This requirement could be fulfilled by Energy Conservation Task Force certification during the Building Aid approval proceedings. The availability of money under the proposed expansion of the State's Building Aid Program should generate increased interest by schools in energy conservation. The building aid grants will require a 50 percent match from local funds. Therefore, school trustees need to be unencumbered and assured that a conservation project, once approved for Building Aid, would receive support at the local level.

Dating back to 1977, the New York State Legislature has debated legislation recommending that a new subdivision 1527a of the Education Law be added allowing school trustees to contract and pay for energy conservation projects. In 1977, the Legislature approved, but the Governor vetoed, a bill empowering school trustees to borrow money for energy conservation purposes without voter approval. This legislation has passed the Senate each year since 1979.

Recommendation: Authorization for Energy Conservation Spending.--The Legislature should enact legislation authorizing school trustees to borrow money, without a voter referendum, as the local 50 percent match for energy conservation projects approved for building aid funding. Total funding borrowed without voter approval could not exceed a certain specified ceiling and the annual debt payments could not

exceed the expected annual cost savings due to the proposed energy conservation project.

Innovative Demonstration Projects.--For districts interested in exploring new ways to meet the challenges posed by energy dependence, a State-sponsored innovative energy conservation loan fund could provide important incentives. Under the leadership of SEO and the Energy Conservation Task Force, a low interest loan program could be established which would direct monies toward the exploration of new technologies available for improving school energy conservation.

Recommendation: Innovative Energy Conservation Project Loan Fund.--An Innovative Energy Conservation Loan Fund should be created under the auspices of SEO and the Energy Conservation Task Force. This program would provide low interest loans to school districts involved in major energy conservation projects. The funds would serve to encourage school districts to make use of alternative energy resources. Also, the funds could be directed toward the creation of demonstration projects which show effective energy conservation methods adaptable for other school districts. SEO and the Task Force should submit to the Legislature and the Governor an estimate of the amount needed for initiation of the Fund and of costs for the first three years of operations.

Energy Conservation Recognition

In a speech before the second annual New York State Energy Technology Conference and Exposition on January 26, 1982, Education Commissioner Gordon Ambach praised the State's public schools for their energy conservation efforts since 1972-73. As evidenced throughout this report, schools which have done an applaudable job conserving energy rarely received any recognition for their efforts. In addition, where energy conservation efforts have been successful, other school officials have not been aware of such successes.

Recommendation: Recognition of Exemplary Energy Conservation Programs.--Schools which are responsive to energy conservation should be publicly recognized. One way to accomplish such recognition is to incorporate into appropriate energy or education conferences sponsored by SEO and SED a segment of the program devoted to exemplary districts. These districts would be invited to share their experience and know-how with conference participants.

Recommendation: Commendation Through Publication.--Another mechanism for recognizing a district's meritorious energy conservation accomplishments would be a description in SED, SEO or Energy Conservation Task Force publications. Information describing the program and the cost savings to the district due to energy conservation programs should be included.

Recommendation: Commendation Through Letters.--A school district should be proud of its accomplishments in reducing energy costs and consumption. Receiving a letter jointly written by SED, SEO and the Energy Conservation Task Force commending the district's efforts would be a "feather in the cap." These agencies should start a program of district recognition by congratulating districts which achieve high levels of energy conservation. District voters would be interested in knowing how well their energy conservation dollars are being spent.

Recommendation: Compendium of Successful Projects and Resource Personnel.--The Energy Conservation Task Force should compile a compendium of energy projects undertaken by the State's schools which have been effective. Included in such a compendium would be a list of recommended energy resource personnel available to assist other school districts interested in energy conservation. The Energy Conservation Task Force would be responsible for providing this information to the schools.

Energy Education

Educating New York's residents, young and old, to recognize the need to conserve energy is an SED function. It is a fundamental responsibility of SED to assure the State's citizens that important information regarding the impact of energy on people's lives is being disseminated through the educational system. In 1980 the Commissioner of Education, Gordon Ambach, and the Director of the State Energy Office, James Larocca, jointly announced an interagency agreement signaling the creation of a statewide energy education program for New York. SED and schools both can benefit from such a course of action because energy education programs would inform students and community residents of how energy affects everyone's life as well as the need for conservation. With increased local awareness, the job of improving energy efficiency in school buildings would be easier.

Recommendation: Energy Education.--In accordance with the announcement of a joint Energy Education Program, SED should move quickly to design and implement curricular programs on energy conservation from kindergarten through twelfth grade.

LOCAL INITIATIVES

Soaring energy costs, older buildings, school closings and declining enrollments have resulted in the rapidly rising per pupil energy expenditures experienced by the State's schools since 1972. These factors have played a significant role in forcing the adoption of austerity budgets by an increasing number of school districts. In an era of limited financial resources, school districts across the State need to make critical choices between maintaining the status quo in educational programming and meeting the ever increasing costs of building operations. No longer can schools rely on federal funds to supplement local monies for energy conservation. Conversely, no longer can schools rely on local support for funds to supplement federal monies. Therefore, the burden seems to rest entirely on the shoulders of local school administrators and the State. Faced with increasing budget defeats expected to be as high as 30 percent during the 1980's, can schools realistically expect additional monies budgeted for energy conservation projects to be favorably received by local voters? Several actions can be taken at the local school district and individual school building levels to ensure that wise energy management occurs.

District Energy Conservation Plans

School districts now should have a better understanding of the impact of energy on their programs. Most of the State's schools have participated in the SEO-administered PSECS energy auditing program. According to SEO, the audit provided each participating school and school district with an analysis of how efficiently buildings were operating. From this point, schools need to develop a long-range plan for further reducing their energy consumption. These plans, designed to meet the goals of the State Energy Management Plan for Schools, should be submitted to the Regional BOCES Energy Conservation Task Force for further consideration and approval. Schools need a blueprint of where they are and where they need to go in order to improve their energy conservation records.

Recommendation: District Energy Conservation Plans.--Each school district should design and implement an energy conservation plan approved by the Regional BOCES Energy Conservation Task Force.

Local District Energy Coordinator

Regardless of the level of implementation, successful energy conservation projects have always been the result of single individuals committed to energy control. The human factor in the whole analysis of energy conservation cannot be overlooked. Often, it appears to be the single individual who, whether in a state, regional, county or local effort, is able to organize and coordinate a highly effective energy conservation program.

Recommendation: District Energy Coordinator.--In conjunction with the State Energy Management Plan for Schools, each school district in the State should designate one employee to act as the district's Energy Coordinator. His/her major function as an Energy Coordinator would be to act as a liaison between the regional energy management system and the individual local school buildings. As the primary two-way transmitter of information, the Energy Coordinator is best able to determine how the larger, regional system can adapt to the needs of the district. Conversely, the district then has the advantage of having a readily available, single energy coordinator to assist its schools in improving energy conservation efforts.

Keeping Voters Informed

Between 1977 and 1980, School District A (discussed in Chapter 7) described to district voters through its annual budget proposal pamphlet how its energy conservation program was progressing. Because the district was able to show the budgetary damages inflicted by energy as early as 1977 and what the future had in store, local voters overwhelmingly supported a bond issue for a three-year energy conservation program. Since 1977, the $400,000 project has almost been able to pay for itself in saved costs.

Recommendation: Keeping Voters Informed.--All school districts should be required to publicly display energy expenditures and consumption on a one-, five- and ten-year basis. In addition, recommended energy conservation projects should be explained to the public and discussions should be held on proposed energy-related projects involving the entire school community: faculty, administrators, students and voters.

FEDERAL EFFORTS

The federal effort to provide fiscal and technical assistance to aid schools in controlling energy costs has been limited primarily to the Schools and Hospitals Energy Conservation Program. Originally authorized for three years, the $965 million program was designed to help schools, hospitals and local governments make energy-conserving improvements. The program was extended for one additional year at a significantly reduced level of funding.

The future for this program appears grim. The program is up for reauthorization by Congress in 1982. Under the proposed 1983 budget, the program will receive no funding. Program advocates argue that, although too early to measure specific effectiveness levels, the program has made significant differences in energy conservation in those States participating in the program.

New York State received a total of $19.6 million for its schools and hospitals during the first two funding cycles of the program. Public primary and secondary schools received $4.8 million. Together with the 50 percent local match monies, the State spent $9.6 million for energy conservation projects in the schools. Undoubtedly, this program stimulated SED efforts to maximize New York's participation.

Recommendation: The Effectiveness of the Schools and Hospitals Program.--At the completion of the fourth round of funding in July, 1982, SEO should submit to the Legislature and the Board of Regents, a comprehensive analysis of the impact of the Schools and Hospitals Program on the State's schools. Included in the technical report should be the total cost to the State of the program and the cost avoidance realized by the State as a result of the program. This information will provide a valuable tool that the State can use as leverage to argue the merits of the program to New York State. If the federal government allows the program to expire, this information could be used to justify establishing a similar program at the State level.

Recommendation: Continuing the Schools and Hospitals Program.--SEO, the designated State administrator of the Schools and Hospitals Program, should voice its concern regarding the expiration of this program. Together with SED, a strong message should be delivered to New York's Congressional delegation urging the continuation and strong federal fiscal support of the program. In addition, the New York State Legislature, by means of a joint resolution, should

urge that the program remain a separate, categorical grant so that these monies originally targeted for schools will not be lost within the larger, block grant energy program.

FOOTNOTES

WHAT ARE THE ENERGY PROBLEMS CONFRONTING NEW YORK STATE SCHOOLS?

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3. United States. Department of Commerce. Bureau of the Census. Statistical Abstract of the United States: 1980. Tables 1025 and 1026. 1980. pp. 602-603.

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electricity is imported. (70 percent) x (57 percent) + (3 percent) = 43 percent.

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35. See footnote 29, p. 6.

36. See footnote 29, p. 6.

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2. Phone conversation. Erie I BOCES. Lancaster, New York. January, 1982.

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7. Board of Cooperative Educational Services. Press Release. Olean, New York. January 20, 1982.

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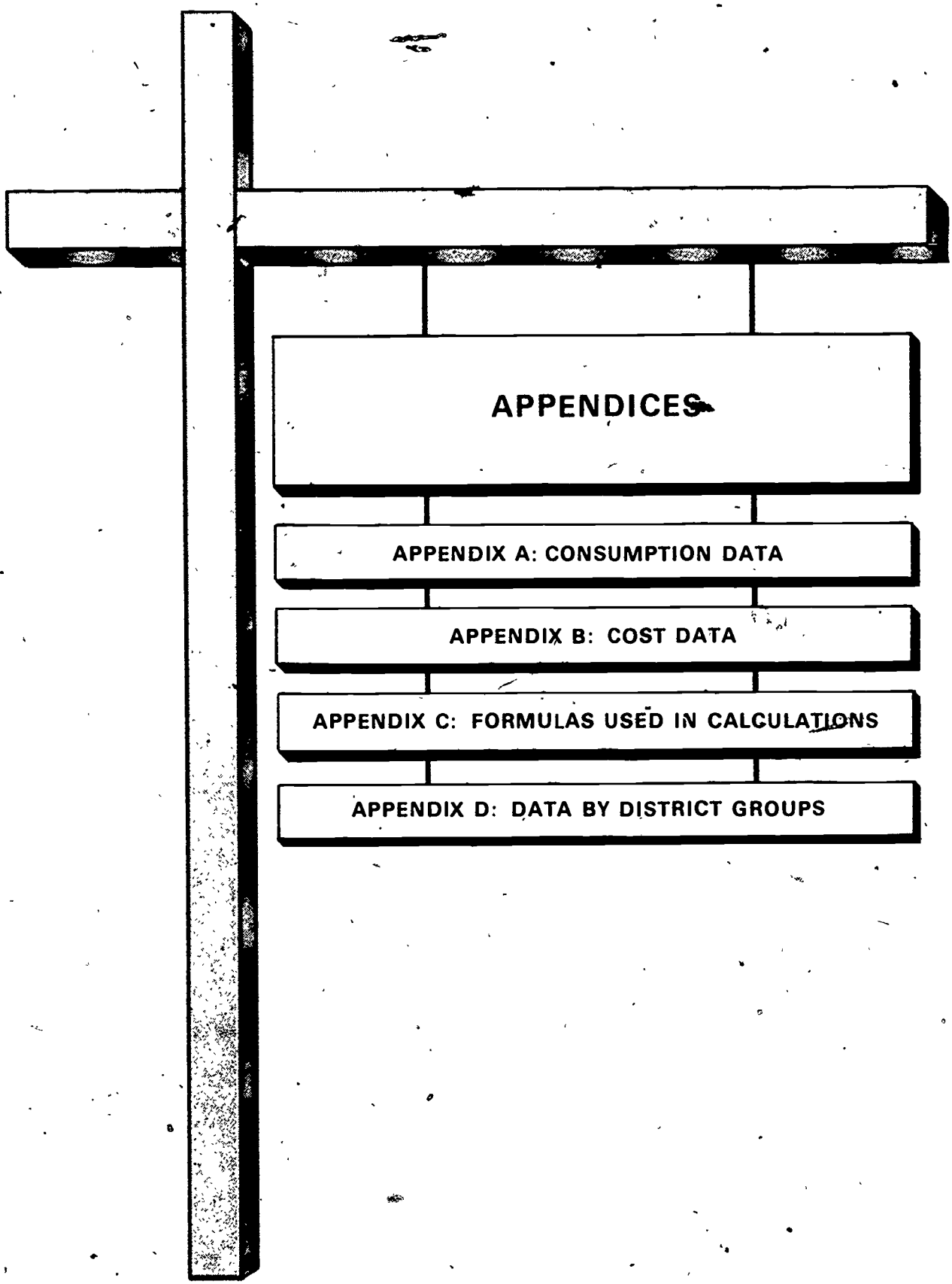
APPENDICES
APPENDIX A: CONSUMPTION DATA
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APPENDIX A: CONSUMPTION DATA

TABLE A-1

Sample of SED's Record of a School District's Energy Consumption Figures as Given to the Task Force

reported by: _____ phone: _____ Name of district: _____

Energy	Unit	1972/73	%	1973/74	%	1974/75	%	1975/76	%	1976/77	%
#2 oil	gal	50,000	12	30,367.7	21	39,799.4	30	32,118.2	41	37,231.	52
#4 oil	gal	80,000	12	47,523	21	68,403	30	79,313	41	61,327.	52
#6 oil	gal	120,000	11	112,269.	20	117,657	29	106,472	40	117,064.	51
total oil	gal	250,000		190,157.7		225,859.4		217,903.2		215,623.	
natural gas	C.F.	–		–		–		–			
coal	T	–		–		–		–			
electric	KWH	2,200,000	10	2,478,267	19	2,541,152	28	2,545,158	39	2,911,223	50

Energy	Unit	1977/78	%	1978/79	%	1979/80	%	1980/81	%	1981/82	%
#2 oil	gal	67,158.2	61	47,251.2	71						
#4 oil	gal	43,506.	61	166,230	70						
#6 oil	gal	137,186.2	60	–							
total oil	gal	247,850.4		213,481.2							
natural gas	C.F.	–		–							
coal	T	–		–							
electric	KWH	2,788,027	59	3,096,059	69						

TABLE A-2

Regional Heating Degree Day Totals

Regional Reporting Station	Annual Heating Degree Day Totals for: 1972-73	73-74	74-75	75-76	76-77	77-78	78-79	County Codes Included In Region (first two digits in School District Code)
Buffalo		6,652	6,536	6,418	7,371	7,337	7,005	06,14,18,67
Rochester	6,284	6,399	6,634	6,257	7,127	7,066	6,960	24,26,40,43,45,55,56,65,68
Angelica	6,857	6,838	6,954	7,335	7,908	7,801	7,335	02,07,57
Syracuse	6,518	6,633	6,666	6,463	7,180	7,213	6,937	05,42,46
Binghamton	7,234	6,801	7,472	7,285	7,890	7,788	7,448	03,11,60,61
Watertown	7,204	7,423	7,345	7,216	8,059	8,111	7,817	22,23,51
Plattsburg	7,442	7,403	7,279	7,392	7,785	7,927	7,606	09,15,16
Hinckley	7,622	7,695	7,788	7,495	8,375	8,411	8,046	17,20,21,27,41
Albany	6,708	5,936	7,123	6,504	7,299	7,198	7,095	01,49,52,53,63,64
Cooperstown	7,216	7,176	7,368	7,371	7,969	7,899	7,621	08,12,25,47,54
Poughkeepsie	5,998	5,936	6,121	5,909	6,934	7,576	6,397	10,13,19,59,62
Central Park	4,739	4,527	4,716	4,604	5,435	5,364	4,764	30,44,48,50,66
Patchogue	5,375	5,200	5,349	5,048	5,913	5,909	5,454	28,58

TABLE A-3

Statewide Raw Energy Consumption Totals by Energy Source: 1972-73 through 1978-79

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Amount Conserved 1972-73 1973-74	1973-74 1978-79	1972-73 1978-79
#2 oil (gallons)	37,391,298.1	31,856,871.5	35,451,765.1	35,627,891.0	40,688,513.3	37,929,744.3	35,535,319.7	14.8	-11.5	5.0
#4 oil (gallons)	93,541,240.4	73,083,645.7	73,718,469.2	70,124,639.4	79,445,477.9	76,173,777.9	69,464,326.5	21.9	5.0	25.7
#6 oil (gallons)	48,519,526.3	38,797,256.5	40,087,893.6	37,189,139.3	41,036,718.8	38,720,279.3	36,140,212.0	20.0	6.8	25.5
Total Oil (gallons)	179,452,064.8	143,737,773.7	149,258,127.9	142,941,669.7	170,710.0	152,823,801.5	141,139,858.2	19.9	1.9	21.5
Natural Gas (cf)	8,531,201,580	7,860,326,830	7,861,768,030	7,731,033,630	7,496,955,400	7,190,397,160	7,459,551,490	7.9	5.1	12.6
Coal (tons)	124,270	108,621	105,266	95,383	104,849	98,073	88,569	12.6	18.5	28.7
Electricity (kwh)	1,805,616,340	1,737,313,560	1,749,172,500	1,843,421,680	1,900,898,240	1,859,471,860	1,929,397,890	3.8	-11.1	-6.9

TABLE A-4

Conversion Figures Used to Convert Raw Energy Consumption to MBtu Consumption

Fuel	Raw Consumption Unit	MBtu Conversion (MBtu/unit)
#2 oil	gallon	0.13869
#4 oil	gallon	0.14100
#6 oil	gallon	0.14969
Natural Gas	cubic foot	0.001025
Coal	ton	25.400000
Electricity	kilowatt hour	0.003413

Conversion factors taken from "Total Energy Consumption, 1972-1980". NYC Board of Education, Energy Conservation Section.

TABLE A-5

Statewide Energy Consumption Totals in MBtu's by Energy Source: 1972-73 through 1978-79

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percentage Change 1972-73 1973-74	Percentage Change 1973-74 1978-79	Percentage Change 1972-73 1978-79
#2 oil	5,185,798.1	4,418,228 6	4,916,804 4	4,941,231 3	5,643,089 1	5,260,475.2	4,928,392.5	-14.8	11 5	-5 0
#4 oil	13,189,310.0	10,304,789 9	10,394,300 2	9,887,570 7	11,201,808 6	10,740,498 7	9,794,666.6	-21 9	-5 0	-25 7
#6 oil	7,262,886 4	5,807,559 3	6,000,755 4	5,566,840.8	6,142,785 1	5,796,036 9	5,409,827 1	-20 0	-6 8	-25.5
Total oil	25,637,994.5	20,530,577 8	21,311,860 0	20,395,642.8	22,987,682.8	21,797,010.8	20,132,686.2	-19 9	-1 9	-21 5
Natural gas	8,744,479.0	8,056,832 1	8,058,309 8	7,924,307 2	7,684,377 3	7,370,154 9	7,646,038 0	-7 9	-5 1	-12 6
Coal	3,156,456.5	2,758,971 8	2,673,755 1	2,422,727.2	2,663,162 9	2,491,053.0	2,249,651.3	-12 6	-18 5	-28 7
Electricity	6,162,566.8	5,929,449.9	5,969,924 5	6,291,597.7	6,487,764 6	6,346,375.2	6,585,033 9	-3 8	+11 1	+6.9
TOTAL STATEWIDE	43,701,496.8	37,275,831 6	38,013,849.4	37,034,274 9	39,822,987.6	38,004,593 9	36,613,409.4	-14 7	-1 8	-16 2

TABLE A-6

Comparison of SED and Task Force Enrollment Figures

1972-73	3,474,000	3,429,836
1973-74	3,427,560	3,383,138
1974-75	3,401,636	3,356,835
1975-76	3,382,369	3,336,602
1976-77	3,307,231	3,261,914
1977-78	3,189,781	3,145,356
1978-79	3,060,911	3,017,632
Percent Change 1972-73 to 1978-79	-11.9	-12.0

APPENDIX B: COST DATA

TABLE B-1

Average Energy Prices in NYS
1973-1979

No. 2 Fuel Oil[1] $/barrel (42 gal)		No. 4 Fuel Oil[2] $/barrel (42 gal)	
1973	.148	1973	.109
1974	.276	1974	.258
1975	.294	1975	.299
1976	.313	1976	.290
1977	.376	1977	.338
1978	.467	1978	.335
1979	.571	1979	.489

No. 6 Fuel Oil[1] $/barrel (42 gal)		Natural Gas[1] $/cu ft	
1973	.115	1973	.00137
1974	.293	1974	.00159
1975	.297	1975	.00200
1976	.293	1976	.00235
1977	.340	1977	.00285
1978	.313	1978	.00332
1979	.485	1979	.00401

Bituminous Coal[3] $/ton		Electricity[1] $/kwh	
1973	13.50	1973	.03343
1974	29.00	1974	.04805
1975	33.00	1975	.05229
1976	30.75	1976	.05504
1977	33.50	1977	.05919
1978	33.90	1978	.05750
1979	38.00	1979	.06440

1 U.S. Department of Energy, State Energy Fuel Prices by Major Economic Sector from 1960 through 1977, July 1979. Updated.

2 N.Y. State Energy Office.

3 Niagara Mohawk Power Corp.

TABLE B-2

Total Statewide Energy Costs: 1972-73 through 1978-79

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
Total Energy Costs ($)	94,990,053	138,165,386	155,051,260	164,974,681	193,528,756	189,444,290	229,325,449
Energy Costs per hdd ($/hdd)	16,510 14	25,262.13	26,906 84	29,412.89	29,964.57	29,422.72	38,524.63
Energy Costs per student ($/student)	27.70	40 84	46.19	49 44	59.33	60 23	76.00
Energy Costs Adjusted for hdd and enrollment ($/hdd/student)	0 48	0.75	0 80	0 88	0 92	0 94	1 28

TABLE B-3

Total Statewide General Fund, Operations and Maintenance Budgets and Energy Costs

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percent Change 1972-73 to 1978-79
Total General Fund ($)	5,601,975,130	6,265,114,100	6,953,711,190	7,180,559,510	7,454,408,650	7,869,147,170	8,145,776,350	45 4
Total O+M Budget ($)	444,054,875	526,589,795	635,761,582	684,589,069	642,195,603	691,319,557	709,535,120	59 8
Total Energy Cost ($)	94,990,053	138,165,386	155,051,260	164,974,681	193,528,756	189,444,290	229,325,449	141 4

APPENDIX C: FORMULAS USED IN CALCULATIONS

TABLE C-1

Formulas Used in Calculations

Conservation Formula

$$\text{1978 adjusted consumption} = \frac{\text{1978-79 Btu consumption}}{\text{(1978 heating degree day) X (1978 enrollment)}}$$

$$\text{1972 adjusted consumption} = \frac{\text{1972-73 Btu consumption}}{\text{(1972 heating degree day) X (1972 enrollment)}}$$

$$\text{amount conserved (\%)} = \frac{\text{(1978 adjusted consumption)-(1972 adjusted consumption)}}{\text{(1972 adjusted consumption)}} \times 100$$

Cost Avoidance Formula

Cost Avoidance for each fuel = (1972-73 consumption) X (1978-79 cost) - (1978-79 consumption) X (1978-79 cost)

Total Cost Avoidance = Total of Cost Avoidance for each fuel

APPENDIX D: DATA BY DISTRICT GROUPS

TABLE D-1

Average District General Fund, Operations and Maintenance Budgets and Energy Costs

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	Percent Change 1972-73 to 1978-79
District General Fund ($)	8,154,260	9,119,530	10,121,850	10,452,050	10,850,670	11,454,360	11,857,030	45 4
District O+M Budget ($)	646,368	766,506	925,417	923,710	934,783	1,006,288	1,032,802	59.8
District Energy Cost ($)	138,268	201,114	225,693	240,138	281,701	275,756	333,807	141 4

TABLE D-2

Upstate/Downstate School District Energy Consumption

	Statewide	Downstate			Upstate
		NYC	Other Downstate	Total Downstate	
Total MBtu Consumption					
1972-73	43,701,482	8,788,048	12,716,714	21,594,762	22,196,720
Percent of Statewide		20.1%	29.1%	49.2%	50.8%
1978-79	36,613,395	7,769,057	9,838,784	17,607,841	19,005,554
Percent of Statewide		21.2%	26.9%	48.1%	51.9%
Amount Conserved	16.2%	11.6%	22.6%	18.1%	14.4%
Active Enrollment					
1972-73	3,429,836	1,122,787	843,714	1,966,501	1,463,335
Percent of Statewide		32.7%	24.6%	57.3%	42.7%
1978-79	3,017,632	996,577	725,848	1,722,425	1,295,207
Percent of Statewide		33.0%	24.1%	57.1%	42.9%
Percent Change	-12.0%	-11.2%	-14.0%	-12.4%	11.5%
Total Consumption Adjusted For hdd and enrollment (btu/hdd/student)					
1972-73	2,241	1,651	2,911	2,192	2,306
1978-79	2,066	1,637	2,589	2,037	2,103
Amount Conserved	7.8%	0.8%	11 1%	7.1%	8.8%
Cost Avoidance	$16,522,238	-$357,808	$12,173,455	$11,815,647	$4,706,590

TABLE D-3

Urban/Rural School District Energy Consumption

	Statewide	Urban			Rural
		NYC	Other Urban	Total Urban	
Total MBtu Consumption					
1972-73	43,701,482	8,788,048	26,785,276	35,573,324	8,128,158
Percent of Statewide		20.1%	61.3%	81.4%	18.6%
1978-79	36,613,395	7,769,057	21,643,077	29,412,134	7,201,261
Percent of Statewide		21.2%	59.15	80.3%	19.7%
Amount Conserved	16.2%	11.6%	19.2%	17.3%	11.4%
Active Enrollment					
1972-73	3,429,836	1,122,787	1,767,241	2,890,028	539,808
Percent of Statewide		32.7%	51.5%	84.3%	15.7%
1978-79	3,017,632	996,577	1,534,625	2,531,202	486,430
Percent of Statewide		33.0%	50.9%	83.9%	16.1%
Percent Change	-12.0%	-11.2%	-8.0%	-12.4%	-9.9%
Total Consumption Adjusted For hdd and enrollment (btu/hdd/student)					
1972-73	2,241	1,651	2,609	2,237	2,262
1978-79	2,066	1,637	2,323	2,053	2,134
Amount Conserved	7.8%	0.8%	11.0%	8.2%	5.7%
Cost Avoidance	$16,522,238	-$357,808	$18,259,769	$17,901,961	-$1,379,724

TABLE D-4

Energy Consumption by Wealth Groups--Assessed Property Value

	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest)		
					NYG	Other	Total Group 4
Total MBtu Consumption							
1972-73	43,701,490	2,255,225	4,234,232	7,326,805	8,788,052	21,097,175	29,885,227
Percent of Statewide		5 2%	9 7%	16 8%	20 1%	48 3%	68 4%
1978-79	36,613,405	1,933,926	3,823,629	6,179,390	7,769,061	16,907,399	24,676,460
Percent of Statewide		5 3%	10 4%	16 9%	21.2%	46 2%	67 4%
Amount Conserved	16 2%	14 2%	9 7%	15 7%	11 6%	19 9%	17 4%
Total Consumption Adjusted for Weather (MBtu/hdd)							
1972-73	7,686	326	624	1,794	1,855	3,687	5,542
1978-79	6,234	263	532	963	1,631	2,844	4,475
Active Enrollment							
1972-73	3,429,837	137,738	275,831	502,121	1,122,788	1,391,359	2,514,147
Percent of Statewide		4 0%	8 0%	14 6%	32 7%	40 6%	73 3%
1978-79	3,017,632	127,103	248,787	450,612	996,577	1,194,553	2,191,130
Percent of Statewide		4 2%	8 2%	14 9%	33 0%	39 6%	72 6%
Percent Change	-12 0%	-7 7%	-9 8%	-10 3%	-11 2%	-14 1%	-12 8%
Total Consumption Adjusted for Weather and Enrollment (Btu/hdd/student)							
1972-73	2,241	2,367	2,262	2,378	1,652	2,650	2,204
1978-79	2,066	2,069	2,138	2,137	1,637	2,381	2,042
Amount Conserved	7 8%	12.6%	5 5%	10 1%	0 9%	10 2%	7 4%
Cost Avoidance							
1972-79	$16,522,238	$1,009,423	-$2,399,790	$3,259,841	-$357,808	$15,010,571	$14,652,763

TABLE D-5

Energy Consumption by Wealth Groups--Income

	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest) NYC	Other	Total Group 4
Total MBtu Consumption							
1972-73	43,701,490	1,861,917	4,186,507	7,430,174	8,788,052	21,434,840	30,222,892
Percent of Statewide		4 3%	9 6%	17 0%	20 1%	49 0%	69 2%
1978-79	36,613,405	1,602,913	3,796,270	6,281,866	7,769,061	17,163,294	24,932,355
Percent of Statewide		4 4%	10 4%	17 2%	21 2%	46 9%	68 1%
Amount Conserved	16 2%	13 9%	9 3%	15 5%	11 6%	19 9%	17 5%
Total Consumption Adjusted for Weather (MBtu/hdd)							
1972-73	7,686	271	629	1,215	1,854	3,717	5,571
1978-79	6,234	220	538	988	1,631	2,856	4,487
Active Enrollment							
1972-73	3,429,837	111,839	262,020	520,879	1,122,788	1,412,311	2,535,099
Percent of Statewide		3 4%	7 6%	15 2%	32 7%	41 2%	73 9%
1978-79	3,017,632	103,376	239,518	465,659	996,577	1,212,502	2,209,079
Percent of Statewide		3 4%	7 9%	15 4%	33 0%	40 2%	73 2%
Percent Change	-12 0%	-7 6%	-8 6%	-10 6%	-11 2%	-14 1%	-12 9%
Total Consumption Adjusted for Weather and Enrollment (Btu/hdd/student)							
1972-73	2,241	2,423	2,401	2,333	1,651	2,632	2,198
1978-79	2,066	2,128	2,246	2,122	1,637	2,355	2,031
Amount Conserved	7 8%	12 2%	6 5%	9 0%	0 8%	10 5%	7 6%
Cost Avoidance							
1972-79	$16,522,238	$758,440	-$2,140,235	$1,985,505	-$357,808	$16,276,335	$15,918,527

TABLE D-6

Energy Consumption by Wealth Groups--Tax Rate

	Statewide	Group 1 (lowest)	Group 2	Group 3	Group 4 (highest) NYC	Other	Total Group 4
Total MBtu Consumption							
1972-73	43,701,490	4,353,379	6,648,448	10,770,345	8,788,052	13,141,266	21,929,318
Percent of Statewide		10 0%	15 2%	24 6%	20 1%	30 1%	50 2%
1978-79	36,613,405	3,913,209	5,674,838	8,895,030	7,769,061	10,361,267	18,130,328
Percent of Statewide		10 7%	15 5%	24 3%	21 2%	28 3%	49 5%
Amount Conserved	16 2%	10 1%	14 6%	17 4%	11 6%	21 2%	17 3%
Total Consumption Adjusted for Weather (MBtu/hdd)							
1972-73	7,686	647	999	1,689	1,854	2,496	4,350
1978-79	6,234	550	799	1,319	1,631	1,935	3,566
Active Enrollment							
1972-73	3,429,837	304,167	426,392	695,614	1,122,788	880,876	2,003,664
Percent of Statewide		8 9%	12 4%	20 3%	32 7%	25 7%	58 4%
1978-79	3,017,632	268,881	373,811	610,529	996,577	767,834	1,764,411
Percent of Statewide		8 9%	12 4%	20 2%	33 0%	25 4%	58 5%
Percent Change	-12 0%	-11 6%	-12 3%	-12 2%	-11 2%	-12 8%	-11 9%
Total Consumption Adjusted for Weather and Enrollment (Btu/hdd/student)							
1972-73	2,241	2,127	2,343	2,428	1,651	2,834	2,171
1978-79	2,066	2,046	2,137	2,160	1,637	2,520	2,021
Amount Conserved	7 8%	3 8%	8 8%	11 0%	0 8%	11 1%	6 9%
Cost Avoidance							
1972-79	$16,522,238	-$2,073,792	$3,143,833	$4,278,344	-$357,808	$11,531,660	$11,173,852

TABLE D-7

Energy Consumption by Size Groups--1978-79 Enrollment

	Statewide	Group 1 (lowest)	Group 2	Group 3	* Group 4 (highest) NYC	Other	Total Group 4
Total MBtu Consumption							
1972-73	43,701,490	1,708,751	4,054,469	7,105,273	8,788,052	22,044,944	30,832,996
Percent of Statewide		3.9%	9 3%	16 3%	20.1%	50.4%	70 6%
1978-79	36,613,405	1,467,673	3,611,419	6,077,737	7,769,061	17,687,515	25,456,576
Percent of Statewide		4 0%	9 9%	16.6%	21 2%	48 3%	69 5%
Amount Conserved	16.2%	14.1%	10 9%	14.5%	11 6%	19 8%	17 4%
Total Consumption Adjusted for Weather (MBtu/bdd)							
1972-73	7,686	255	636	1,162	1,854	3,779	5,633
1978-79	6,234	208	535	955	1,631	2,904	4,535
Active Enrollment							
1972-73	3,429,837	102,486	256,481	489,999	1,122,788	1,458,083	2,580,871
Percent of Statewide		3.0%	7 5%	14 3%	32 7%	42 5%	75 2%
1978-79	3,017,632	93,796	230,011	433,446	996,577	1,263,802	2,260,379
Percent of Statewide		3 1%	7 6%	14.4%	33 0%	41 9%	74 9%
Percent Change	-12 0%	-8 5%	-10.3%	-11 5%	-11 2%	-13 3%	-12.4%
Total Consumption Adjusted for Weather and Enrollment (Btu/bdd/student)							
1972-73	2,241	2,488	2,480	2,371	1,651	2,592	2,183
1978-79	2,066	2,218	2,326	2,203	1,637	2,298	2,006
Amount Conserved	7 8%	10 9%	6 2%	7.1%	0 8%	11 3%	8 1%
Cost Avoidance							
1972-79	$16,522,238	$394,226	-$1,750,558	$2,760,373	$857,808	$15,476,005	$15,118,197

TABLE D-8

Energy Consumption by Schools and Hospitals Program Groups

	Statewide	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6	Category 7 NYC	Category 7 Other	Category 7 Total	Category 8	Category 9
Total MBtu Consumption												
1972-73	43,701,490	15,757,403	3,552,264	2,440,463	4,567,786	1,295,748	3,539,436	8,788,052	936,842	9,724,894	2,533,865	289,631
Percent of Statewide		36 1%	8.1%	5.6%	10.5%	3.0%	8.1%	20.1%	2.1%	22 3%	5 8%	0.7%
1978-79	36,613,405	13,265,431	2,864,641	2,205,102	3,770,479	951,915	2,777,139	7,769,061	742,003	8,511,064	2,032,826	234,808
Percent of Statewide		36 2%	7 8%	6 0%	10.3%	2.6%	7.6%	21 2%	2 0%	23 2%	5.6%	0 6%
Amount Conserved	16 2%	15 8%	19 4%	9 6%	17 5%	26.5%	21 5%	11.6%	20.8%	12 5%	19.8%	18 9%
Total Consumption Adjusted for Weather (MBtu/hdd)												
1972-73	7,686	2,579	600	389	798	220	620	1,854	145	1,999	434	46
1978-79	6,234	2,069	462	332	637	156	474	1,630	109	1,739	329	36
Active Enrollment												
1972-73	3,429,837	1,028,270	239,844	185,694	313,883	80,843	228,171	1,122,788	49,172	1,171,960	161,134	20,038
Percent of Statewide		30.0%	7.0%	5.4%	9 2%	2.4%	6 7%	32 7%	1.4%	34 2%	4.7%	0.6%
1978-79	3,017,632	906,411	207,192	163,475	280,827	66,637	206,773	996,577	41,126	1,037,703	130,585	18,029
Percent of Statewide		30.0%	6 9%	5.4%	9.3%	2.2%	6.9%	33.0%	1.4%	34.4%	4.3%	0.6%
Percent Change	-12 0%	-11.9%	-13.6%	-12.0%	-10.5%	-17.6%	-9.4%	-11 2%	-16.4%	-11.5%	-19.0%	-10.0%
Total Consumption Adjusted for Weather and Enrollment (Btu/hdd/student)												
1972-73	2,241	2,508	2,502	2,095	2,542	2,721	2,717	1,651	2,949	1,706	2,693	2,296
1978-79	2,066	2,283	2,230	2,031	2,268	2,341	2,292	1,636	2,650	1,676	2,519	1,997
Amount Conserved	7.8%	9.0%	10.9%	3.1%	10.8%	14.0%	15.6%	0.9%	10.1%	1.8%	6.5%	13.0%
Cost Avoidance												
1972-79	$16,522,238	$4,221,052	$2,935,022	$1,178,291	$1,685,685	$1,282,167	$3,247,940	-$357,808	-$107,418	-$465,226	$2,197,782	$239,525

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