We no longer have a choice about energy-conserving facilities. Necessity has replaced preference as a motive for eliminating wastefulness.

energy-conscious schools

By Dwayne E. Gardner

Dwayne E. Gardner obtained his Ph.D. degree from the University of Nebraska in 1961. He spent several years in the U.S. Office of Education as a school facility specialist. In 1971, he became executive director of the Council of Educational Facility Planners, International. Gardner is also an assistant professor and co-ordinator of field services at Ohio State University.

To regard the current high costs and scarcity of energy as temporary inconveniences is delusory. To regard these same conditions as problems for others to cope with is irresponsible. And yet, as we now prepare for a third winter in which the energy crisis will be a big ecological and economic issue, unless one is immediately and unpleasantly affected, it is all too easy and human to ignore the problem. Nevertheless, the somber reality persists in rising fuel costs, cutbacks and rationing. Schools, as major consumers of energy, must begin or continue to conserve in earnest.

The purpose of this article will be to provide an overview of the following issues:

- how did schools arrive at this predicament
- why is conservation in schools imperative
- what measures can schools take to conserve energy

Schools and Energy Use

That schools are consumers of massive quantities of energy is certainly not a unique institutional trait. Because we as a nation have become adjusted to plenty of everything, and have traditionally used more than we have needed, the careless and wasteful consumption of energy in educational facilities—while a distinct problem—is representative of widespread practices and attitudes.

Until recently, frugal energy use was a low priority concern for school planners. They were preoccupied with providing enough space for anticipated numbers of students and with designing the types of space to best support educational programs. Size and program considerations were reconciled with financial capability, and design decisions were made. Interestingly, the initial building cost—rather than long-range cost—was a predominant consideration. Rarely did anyone investigate how much the operation and maintenance of the plant would cost. This emphasis on first cost has proved troublesome because it has resulted in the construction of building shells and installation of equipment that use excessive quantities of energy and are expensive to operate.

An additional contributor to the predicament is the inefficiency with which schools often operate their equipment. The resultant waste is due to inadequate understanding of sophisticated equipment by the operators. The complexity of some HVAC systems, for example, can be

---

Susan K. Gwynn collaborated with Gardner in producing this article. She is a full-time research associate for the Council of Educational Facility Planners in Columbus, Ohio.

confusing and unintentional maladjustment of controls is not uncommon.

Finally, the energy crisis in schools—and elsewhere—has been aggravated by the absurd expectations we have developed regarding the built environment (it is silly to expect instant and constant thermal comfort), and our alienation from nature (we don't always make full use of natural light, heat and cooling sources in planning buildings).

The Importance of Conservation

Energy conservation in schools is vital for a variety of reasons. Primarily, the energy sources we have carelessly plundered are finite. Developing energy consciousness and effecting changes in the design and use of schools has ceased to be a matter of choice. Moreover, whether we consider ourselves to be the losers in games played by profit-seeking industries or antagonistic oil-producing nations is quite irrelevant. Since necessity has replaced preference as a motive for eliminating wastefulness, national attention is clearly focused on avoiding escalation of the energy crisis. Schools can play a significant role. If responsible educational policy makers proceed with extensive energy-conserving practices, their efforts will serve as an encouraging model to others.

The built environment (its construction, use, and replacement) consumes approximately 30 per cent of the energy the nation as a whole uses. Because schools constitute approximately 7 per cent of the built environment, they represent a significant user category. (Stein: 73) Therefore, when schools develop their full energy conservation potential, it will indeed make a difference in terms of the nation's resources and the economy of school operation.

How Schools Can Conserve Energy

Others have written extensively and informatively about ways schools can conserve energy. It is not possible to reiterate those concepts here. However, several points should be emphasized.

It has been demonstrated that 10 per cent decreases can be made in the estimated 25-50 per cent energy waste in schools (statistic verified by the National Bureau of Standards) with no capital investment. This 10 per cent reduction can be achieved simply by changing the way the building and equipment are operated, i.e., by turning off unneeded lights, setting the thermostat for moderate temperatures, lowering illumination levels, properly servicing equipment, and so forth. These modifications will not inconvenience users because they simply entail the elimination of habits which serve no beneficial purpose. For instance, students in the United States work with a recommended 70 foot candles of illumination whereas in England the average school lighting level is 10 foot candles! It is difficult to believe that the intellectual development of British children is being thwarted by lower levels of illumination; perhaps a change in our own practices is suggested.

In order to effect additional energy reductions, schools can make further environmental changes: improve building insulation, recover waste heat, convert to fluorescent lighting, and refine HVAC systems to mention only five. Such projects would require capital investments, but the expenditure can be justified in terms of dollars saved and the merit inherent in well-managed energy use. The prudence of investing in conservation is easily supported by life-cycle costing calculations.

In the case of new construction, enormous economic benefits are possible. A report by the Educational Facilities Laboratory (1973) states, "with the clearly stated goals of energy conservation and life-cycle costing in the architectural program, a school building's energy consumption can be reduced by up to 50 per cent compared with a conventionally designed building."

If well-managed and consistent, conservation need not result in the curtailment of programs or, as occasionally happens, prevent full use of the facility. To react to high energy costs by closing a school to community groups (for instance, to make a gymnasium unavailable for rental or to eliminate adult education programs) seems ill-advised, especially now when the potential of educational facilities as community resources is being recognized. Every attempt should be made to preserve the integrity of the school's program.

Coping with the Crisis

Given the facts that schools can do a lot to help themselves and that expertise is available to them on highly technical matters, conservation should be accepted as standard school design and operating practice. However, there are activities which would assist energy conservation in schools which lie outside the responsibility of school district policy makers and the design professions. For example, there is no federal program which offers substantial assistance to schools hard-pressed by the economic impact of the crisis. Research and development of new energy sources has not been undertaken on a large scale. Support for demonstration sites should be made available to illustrate the capacity of schools to efficiently use energy and to utilize new technologies. As these activities proceed, our capacity for coping with the energy crisis will be enlarged.

Richard Stein, August,1973, *CEFP Journal Special Report 9, Energy Conservation, A New Challenge for Education.*

The Economy of Energy Conservation in Educational Facilities, 1973. New York: Educational Facilities Laboratories, Inc., p. 48.