



Energy in Your Curriculum

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Energy education is the latest curriculum add-on. It's not well defined, but it's growing, and it's important. Good materials are available.

Energy is a hot topic. In some parts of the country people spent hours during the summer waiting in line for gasoline. We were reminded once again that the sources of energy we have come to depend on, and which only a few years ago we took for granted, are running out. The rising costs of energy contribute to seemingly uncontrollable inflation. Three Mile Island exposed the risk of nuclear power, and plans for greater use of coal threaten environmental pollution. Few agree about what should be done, but many agree with President Jimmy Carter that the situation is "the moral equivalent of war."

As is true whenever our nation faces a major problem, there are new pressures to add to the already crowded curriculum. Administrators are understandably reluctant to sponsor one more add-on, but education must reflect current realities. Energy education is here.

State of the Art

To get a better feeling for the state of the art, I spent a month last year visiting energy/environmental education projects in 11 states from the Rockies to Maine, attended a one-week USOE school for related project directors, read, went to conferences on the subject, and talked with do-ers in energy education. I offer the following observations.

- *Energy education is not well defined.* With general statements that energy education is vital, interdisciplinary, and for all students at all levels, some people are rushing to do *something*. But this new curriculum emphasis, like many previous ones, is amorphous. Some large energy education projects have little leadership from either experienced teachers or experts in energy content knowledge; their aim is to influence attitudes toward conservation and in some



cases to establish guilt. Some use more slogans than facts.

• *Despite that, energy education is growing.* Some states have doubled the number of energy institutes they conduct and increased the number of teachers involved. So many proposals for new projects are being submitted to the Department of Energy (DOE) and the Office of Environmental Education (OEE) that four out of five are rejected. The OEE tilt, incidentally, has been toward curriculum development projects and away from personnel development, while DOE, the National Science Foundation, and many other agencies emphasize teacher institutes.

I have been surprised to find that a large portion of the growth in energy education is not tied to Washington, D.C. Federal sources have relatively fixed budgets and require complicated paperwork, so a lot of successful energy educators have turned to local and private funding sources for flexibility. I asked project directors to nominate leading U.S. energy and environmental education specialists, and two names stood out. They are Joseph Chadbourne, Jr., president

of the Institute for Environmental Education in Cleveland, Ohio, and Kenneth E. Wiggins, professor of curriculum at Oklahoma State University at Stillwater. Another capable source is Jonathan Gorham of Cornerstones Shelter Technology in Brunswick, Maine. Chadbourne and Wiggins manage or serve as advisors to 14 related projects, most not funded by federal agencies. Experienced producers in energy education have apparently switched themselves and their organizations away from the energy inefficient D.C. circuit.

• *Energy literacy is low.* Most educators know little about energy. In 1975, I found that more than half of 271 randomly selected Indiana teachers did not know terms like *hydrocarbon*, *precipitator*, *gasification*, and *scrubber*; 15 percent believed that the state got most of its electricity from waterfalls and rivers.¹ Check your own energy literacy:

1. In schools, the following fraction of all energy used goes for lights:

- a) 1/16 b) 1/4 c) 1/3 d) 1/2

2. The AASA "Ten Schools Project" and similar school facility modifications show that costs of energy-saving changes in schools are typically recovered within

- a) 5 years b) 12 years
c) 20 years d) 30 years

3. The U.S. has 6 percent of the world's population, and uses approximately _____ percent of the world's energy.

- a) 6 b) 18 c) 30 d) 48

4. In 1990, most U.S. energy is expected to come from

- a) nuclear + solar
b) oil + gas
c) coal + biomass
d) water + wind

Answers: (b,a,c,b)

• *Energy education materials vary widely in quality.* Many are ill-conceived, opportunistic, untested, and outdated, but some are excellent. The contrast in quality is evident in one large university, where four different groups with funding from eight sources are

¹ Chris Bueth. "The Status of Indiana Teachers' Environmental Knowledge and Attitudes." *Terre Haute: Indiana State University, 1975.*

producing materials. The two slick-est sets are tied to highly organized curriculum guides, but are shallow in content and deep in catchy slogans; one plain mimeographed set has been evaluated as accurate and effective by both educators and content experts.

I like the free and/or inexpensive materials that are available from the Department of Energy, Oak Ridge,² and the approach used by the National Science Teachers Association's³ energy-environment-economy publications that are interdisciplinary and level-focused. Noneducation corporations supply some of the best material, such as McDonald's "Ecology and Energy Action Pack"⁴ and 3M's instructional units.⁵ Energy companies produce useful free aids, including Shell's *The Energy Book*⁶ and Exxon's Mickey Mouse comic books.⁷ I find that corporations usually downplay their own special interests, producing materials that please skeptical educators.

• *Communication among energy educators has been poor but may be improving.* Most programs seem to have been established by enthusiastic individuals without much recognition from, or contact with, others. Now Energy and Education Action Center at the U.S. Office of Education is encouraging an information network. The National Science Teachers Association publishes a helpful newsletter, *Energy and Education*.⁸ The ERIC Clearinghouse for Science, Mathematics, and Environmental

Education⁹ is aware of the need for sharing energy education and is helpful. Some professional education groups (ASCD, for example) are recognizing energy education by including it in convention programming. School leaders are reach- for help. I believe these are good signs.

• *Showing people how to save money is more effective than lecturing them about our finite fuel supply.* I don't believe that knowledge of the moral issues will cause many people to change their energy consumption. They may endorse and display virtuous slogans and yet continue to squander energy as before. In the early days of the environmental education movement, I saw a smoking, gas-guzzling car that proudly carried a bumper sticker reading "Ecology Now," whatever that meant. Last winter I visited a university where fluorescent lights had been reduced to dangerous levels in darkened hallways, and students wore "Do it in the dark" t-shirts, but professors left most drapes open on cold nights.

A lot that is happening is hype, public relations, and self-serving noise. Stirring words from Energy Ant, Woodsy Owl, or Superintendent Smith are probably of limited value. Focusing on dollars may accomplish more.

Getting Started

A good way for a school or school district to get started is to name a small volunteer group of committed and informed teachers and curriculum leaders from a variety of disciplines and levels. Supported by appropriately cautious administrators and the board of education, the group can plan what to include and what to exclude from the K-12 curriculum.

If the teachers resist yet another committee and new demands upon their time, support those who

want to implement energy education. Encourage them to concentrate on only the most important concepts and ideas; to do a few things well at each level. But first check to see that they know their content and aren't likely to misinform students or embarrass schools. If they are marginally informed, anti-corporation, and eager to blame, they may do more harm than good. And teachers who model poor energy habits teach badly despite glowing words and sophisticated materials.

Call upon state energy education specialists, university energy researchers, energy corporations, practical technologists, and social scientists. Use curriculum designs that have served you effectively. Borrow liberally from the good ideas and materials that exist.¹⁰ Move deliberately, but don't refuse to act. Raise the energy level of your curriculum.

² Write to DOE Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830 for free copies of excellent booklets like *Tips for Energy Savers*.

³ May be ordered from the DOE Technical Information Center, above.

⁴ Sold by McDonald's Corporation. Attention: Director of Corporate Responsibility, McDonald Plaza, Oak Brook, Illinois 60521.

⁵ May be purchased from 3M Company's Visual Products Division, Box 33100, St. Paul, Minnesota 55101.

⁶ Free from Shell Oil Company. Attention: Sheldon Lambert, P.O. Box 10, Houston, Texas 77001.

⁷ Free in limited quantities from Exxon USA, Public Affairs Dept., P.O. Box 2180, Houston, Texas 77001.

⁸ Contact the National Science Teachers Association, 1742 Connecticut Avenue, NW, Washington, D.C. 20009.

⁹ ERIC Clearinghouse for Science, Mathematics, and Environmental Education, Information Reference Center, Ohio State University, 1200 Chambers Road, Columbus, Ohio 43212.

¹⁰ For example, Duane Toomsen and staff. "Energy Concepts in the Iowa School Curriculum." Des Moines: State of Iowa Department of Public Instruction, 1978.



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