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ABSTRACT

This review describes materials (dated 1975 or later) that (1) could be used to teach conservation behaviors that could be implemented by workers in traditional occupations, and (2) address the needs of secondary and postsecondary vocational students with no previous technical training. This list was compiled as a result of a literature search whose purpose was to locate currently available energy use and conservation instructional materials; to determine how well these materials address conservation issues; and to identify the vocational areas in which energy conservation materials are lacking, insufficient, or inappropriate. The materials selected for this review stress on-the-job energy conservation practices in seven vocational education disciplines: agriculture, distributive education, health, home economics, office, technical, and trades and industry. After explaining the search methodology and analyzing the findings, the report provides tables keying the literature described to the seven vocational education areas. The report then provides brief worker conservation behaviors and [illegible]aviors that would require few modifications for use with vocation[illegible] students. An appendix lists bibliographies consulted. (KC)

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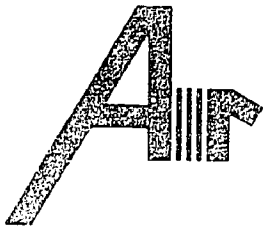

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Energy Conservation Strategies for Tomorrow's Workers:

A Review of Instructional Materials

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January 30, 1981

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Project advisory panel members include the following: Wendell Bakken, Robert Bailey, Ralph Bohn, Rebecca Douglass, Marion Warner Holmes, Larry Johnson, William Knaak, Arnold Nadler, James Richmond, Frank Santoro, David Sutton, and Paul Valentine.

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I. INTRODUCTION

This review of worker-oriented energy conservation materials is divided into three sections. The introduction describes the purpose of the review and the review procedures. A section entitled analysis of findings discusses the significance of the review findings and relates these findings to traditional vocational education curricula. A third section contains brief descriptions of the worker-oriented energy conservation instructional materials we located that would need little modification for use by vocational students.

Purpose of This Review

This review was conducted for a project funded by the U.S. Department of Education entitled Energy Conservation Vocational Instructional Materials. The purpose of the project is to develop short energy conservation instructional units that do not rely on outside readings and that can be used by students in existing vocational programs. These materials, aimed at preparing tomorrow's workers, will stress on-the-job energy conservation practices in the seven vocational disciplines. The seven vocational education disciplines include Agriculture, Distributive Education, Health, Home Economics, Office, Technical, and Trades and Industry.

Our purpose in conducting this review was threefold: 1) to locate currently available energy use and conservation instructional materials; 2) to determine how well these materials address conservation issues and on-the-job conservation behaviors appropriate to workers in the seven vocational disciplines; and 3) to identify the vocational areas in which energy conservation materials are lacking, insufficient, or inappropriate. Therefore, the materials included in this review meet the following criteria.

- They briefly describe conservation behaviors that could be implemented by workers in traditional occupations.
- They address the needs of secondary and postsecondary vocational students with no previous technical training.
- They are dated no earlier than 1975.

Excluded from this review were energy awareness materials dedicated to the presentation of historical, sociological, environmental, or scientific perspectives on the current energy crisis.

Similarly, materials devoted to the development and use of such alternative energy sources as synthetic fuels; gasohol; and nuclear, solar, and geothermal power were omitted. We did, however, include some references to passive solar techniques that are frequently thought of as energy conservation measures.

We included some energy audit materials that stressed specific worker conservation behaviors. However, since our emphasis was on existing occupations, we did not reference materials designed to train such emerging energy specialists as energy auditors and energy conservation and use technicians. (In the course of our review we did locate exemplary materials in these areas including the Energy Conservation and Use Technician Curriculum developed by the Center for Occupational Research and Development in Waco, Texas and the U.S. Department of Energy's Residential Conservation Service Auditor Training Manual.)

The paragraphs that follow present a brief description of the procedures we used to locate the energy conservation instructional materials reviewed in this publication. Although we were unable to locate instructional materials that satisfied all of the goals of this project, certain materials do have important implications for future energy conservation instructional materials development efforts.

Review Procedures

The search for materials included in this review took place between October 1, 1980 and January 15, 1981. Searchers conducted personal interviews, implemented a computerized literature review and examined the appropriate holdings of energy libraries located in the San Francisco Bay Area. Staff members also reviewed numerous energy related bibliographies for references relevant to this review. Each of these procedures is described in more detail below, and the bibliographies we consulted are listed in an appendix.

Personal interviews. Project staff members began their search by contacting key information sources in the U.S. Departments of Education, Energy, and Labor. Searchers also contacted the office of either the State Energy Coordinator or the State Energy Education Contact in all 50 states. Additionally, project staff members initiated contacts with the following people:

- American Vocational Association Vice-Presidents for each of the seven vocational disciplines
- Associate Director of Dissemination and Utilization for the National Center for Research in Vocational Education
- Executive Director of the Mid-America Vocational Curriculum Consortium (MAVCC)
- Executive Director of the Vocational-Technical Education Consortium of the States (V-TECS)
- President of the National Association of Research Coordinating Units
- Regional Directors of the National Network for Curriculum Coordination in Vocational Technical Education (NNCCVTE).

These telephone interviews helped project staff members identify available energy conservation instructional materials.

Computerized literature searches. Project staff members conducted a DIALOG search using the following descriptors: energy conservation, vocational education, instructional materials, worker, employee, and job. Listed below are the data bases accessed through this search and the number of citations uncovered in each data base.

Data Base	Citations
ERIC	140
NTIS	34
COMPENDEX	64
ABI/INFORM	77
ENVIROLINE	18
ENERGYLINE	89
MANAGEMENT CONTENTS	5
	427

Staff members also reviewed a computer search that contained references to 409 energy conservation instructional materials cataloged in the Department of Energy's RECON system. DOE/RECON is the on-line retrieval system for the Department of Energy (DOE) and includes all materials collected by DOE's National Technical Information Center during the past 10 years.

Review of energy library holdings. Project staff members searched three major energy libraries in the San Francisco Bay Area: the Department of Energy's Energy Resource Center in San Francisco, Stanford University's Energy Information Center, and the Energy Information Library at the University of California at Berkeley. Staff members used such key words as energy conservation, retailing, construction, industrial, food, restaurant, dairy, food crop, trucking, hotel, poultry, florist, dealership, worker, employee, training, education, and motivation to guide their search. Although the holdings of these libraries tended to be extremely technical in nature, and therefore inappropriate for our needs, staff members did locate a number of relevant documents as a result of this task.

II: ANALYSIS OF FINDINGS

This section of the review is divided into two parts. It begins with a summary of our findings. Following this summary is a set of tables that link the references reviewed in Section III to traditional vocational education course offerings within the seven vocational disciplines.

Summary

This review was conducted in order to locate short instructional materials that are designed for student use, that do not rely on outside readings, and that could be used to integrate on-the-job worker conservation behaviors into traditional vocational curricula. A secondary goal of the review was the identification of resources that could be used to develop such instructional materials should we be unable to locate any.

As the following tables indicate, the 90 materials we located were relevant to only 33 of the approximately 119 traditional vocational program course offerings. Of these 90 materials, 73 were informational publications designed for use in the workplace and only 17 were designed for classroom use. Over two-thirds of the informational, workplace-oriented materials stressed manager and owner behaviors rather than worker behaviors. Of the 17 classroom materials we located, only 4 were designed for use by students who did not have access to outside reading materials. The other 11 classroom materials presented some information via teacher guides and other information via student workbooks and outside reading assignments. Finally, about three-quarters of the materials we reviewed exceeded 50 pages in length, thus seriously jeopardizing the ease with which they could be incorporated into existing vocational curricula.

Four modules from Navarro College's Energy Conservation Curriculum for Secondary and Post-Secondary Students came close to meeting all of our criteria. These materials do not rely on outside readings, describe some worker behaviors, are clearly written, and have been designed for use with vocational students. However, these modules emphasize domestic rather than commercial and industrial concerns.

The U.S. Department of Energy's 11 audit workbooks for apartments, bakeries, bus stations, die cast plants, hospitals, hotels and motels, office buildings, restaurants, retail stores, and warehouse facilities also came close to meeting our criteria. These workbooks do not rely on outside readings. They are clearly written and they detail specific worker conservation behaviors. However, these workbooks also contain large amounts of information related to the conduct of energy audits and to the financial benefits that owners can realize through energy conservation efforts.

Ten Enersave industrial energy conservation booklets developed in Canada discuss environmental control, process design, production optimization, transportation, heat recovery, and employee motivation. However, these booklets are also directed toward managers and owners, not workers.

Additionally, these materials contain large amounts of technical information.

Therefore, we must conclude that none of the materials we reviewed can be classified as short worker-oriented energy conservation materials designed for use by students who do not have access to outside reading materials. The materials we reviewed do, however, have implications for the scope and content of future materials development efforts.

When determining the vocational education courses for which worker-related energy conservation materials should be developed, educators must carefully evaluate current and anticipated course enrollment and the impact that worker conservation behaviors could be expected to have in each content area. In addition, we suggest that educators take into account the relatively large quantity of workplace-oriented materials that have been developed in the areas of agriculture, food service, building management, and transportation. These materials reflect current workplace concerns that should be dealt with at the classroom level if students are to function effectively in the world of work. Therefore, we strongly suggest that occupations related to agriculture, food service, building management, and transportation be represented in future efforts to develop self-contained, energy conservation materials suitable for use in vocational classrooms.

If this suggestion is followed, materials will reflect the current concerns of agriculture, business, and industry. In addition, the information included in this review should prove to be a rich resource for future developers of instructional materials.

Tables

The tables that follow are organized by vocational disciplines and traditional vocational education course within these disciplines. For each traditional course we have noted relevant references and the pages in this survey on which these references are described in more detail. Additionally, in these tables, we have noted whether the references were designed for use with students, teachers, workers, owners, or managers and whether each reference gives a high, moderate, or low degree of emphasis to worker conservation behaviors. A high degree of emphasis indicates that the large majority of behaviors described were low-cost changes that could be implemented by the worker. A moderate degree of emphasis indicates that about half of the behaviors described could be implemented by workers, and a low degree of emphasis indicates that most of the behaviors discussed were expensive, entailed major building or procedural changes, and would need to be implemented by managers and owners rather than by workers.

As an indication of the ease with which these materials could be incorporated into existing vocational courses, we have also noted the length of each reference. Finally, we have listed traditional vocational education course offerings for which we were unable to locate student level materials that describe on-the-job worker conservation behaviors.

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
AGRICULTURAL MECHANICS	Energy efficiency for automotive instructors	41	Instructors of secondary and postsecondary vocational students	High	21
	The use of synthetic motor oils	32	Auto mechanics instructors	High	16
AGRICULTURAL PRODUCTION	Agricultural energy curriculum development project	50	Farm business management students	Low	32
	The dairy-energy connection	39	Owners	Moderate	126
	A guide to energy savings: For the dairy farmer	35	Managers and owners	Moderate	56
	A guide to energy savings: For the field crop producer	35	Managers and owners	Moderate	65
	A guide to energy savings: For the livestock producer	36	Managers and owners	Moderate	98
	A guide to energy savings: For the orchard grower	36	Managers and owners	Moderate	57
	A guide to energy savings: For the poultry producer	35	Managers and owners	Moderate	56
	A guide to energy savings: For the vegetable producer	36	Managers and owners	Moderate	64
	Energy conservation in the home and on the farm	44	Teachers and students	Moderate	263

Course	Reference Title	Described on Page	Designed for		
	Opportunities for energy savings in crop production				
HORTICULTURE	Energy audit for growers: A self-inspection guide to reduce energy costs				

Traditional Agricultural Course Offerings For Which No Materials

Agricultural Supplies/Services
Agricultural Products
Renewable Natural Resources
Forestry
Other Agriculture

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
AUTO-MOTIVE	Saving energy costs in your dealership	39	Owners	Moderate	27
	Energy audit workbook: Bakeries	36	Managers and workers	High	70
	Energy audit workbook: Restaurants	36	Managers and workers	High	72
	Energy conservation in food service: Course outline and instructional material	35	Teachers training employees and managers	Moderate	122
	Energy cost reduction in the baking industry	37	Owners	Moderate	126
FOOD SERVICES	Energy saving tips: A money saving guide for small business	48	Owners and managers	Moderate	28
	Guide to energy conservation for the food service industry	33	Managers and workers	Moderate	74
	A practical guide to energy management: Electric food service	45	Owners and managers	High	21
	Profitable energy management for retailers and shopping centers	46	Owners and managers	Moderate	200
	Saving money with energy conservation: An energy audit workbook for restaurants	29	Worker	High	37

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
FOOD DISTRIBUTION	Guide to energy conservation for grocery stores	33	Owners and managers	Low	42
	Energy audit workbook: Retail stores	36	Owners and managers	High	70
	Energy audit workbook: Warehouses	37	Owners and managers	High	88
	Energy cost reduction in retailing	37	Owners	Low	76
	Energy saving tips: A money saving guide for small business	48	Owners and managers	Moderate	28
GENERAL MERCHANDISING	First steps to energy conservation for business	44	Managers	Low	21
	Profitable energy management for retailers and shopping centers	46	Owners and managers	Moderate	200
	Saving energy dollars in small business: A manual for Wisconsin retailers	30	Owners and managers	Moderate	45
	Saving money with energy conservation: An energy audit workbook for retail stores	29	Owners and workers	Moderate	33
HOTEL AND LODGING	Energy audit workbook: Hotels and motels	36	Managers and workers	High	70

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
PERSONAL SERVICES	Energy cost reduction in the fabricare industry	38	Owners, managers, and workers	Moderate	40
REAL ESTATE	Energy audit workbook: Apartments	36	Owners and managers	High	84
	Energy cost reduction for apartment owners and managers	37	Owners and managers	Low	61
TRANSPORTATION	Energy audit workbook: Bus stations	36	Owners and managers	High	74
	Energy cost reduction for automotive service facilities	37	Owners and supervisors	Moderate	19
	Energy cost reduction for gasoline service stations	39	Workers and managers	Moderate	23
	Gas savers	50	Drivers	Moderate	30+
	Reducing energy costs in wholesale distribution	38	Owners and managers	Moderate	119
	Saving money through transportation and delivery	31	Management	Moderate	28
	Truckers' guide to fuel savings	45	Drivers and truck company owners	Moderate	20

Traditional Distributive Education Course Offerings for Which No Materials Were Located:

Advertising Services
Apparel & Accessories
Finance & Credit
Floristry
Hardware, Building Materials, etc.
Home Furnishings
Industrial Marketing
Insurance
Recreation & Tourism
Other Retail Trades
Other Distributive Education

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Energy Audit Workbook: Hospitals	36	Workers	High	92
OTHER HEALTH OCCUPATIONS EDUCATION	Total Energy Management for Hospitals	40	Managers	Low	78
	Total Energy Management for Nursing Homes	40	Managers	Low	62

Traditional Health Course Offerings for Which No Materials Were Located:

Dental Assisting
Dental Hygiene (Associate Degree)
Dental Laboratory Technology
Medical Laboratory Assisting
Other Medical Laboratory Technology
Nursing (Associate Degree)
Practical (Vocational) Nursing
Nursing Assistance (Aide)
Other Nursing
Rehabilitation
Radiologic Technology (X-Ray)
Mental Health Technology
Inhalation Therapy
Medical Assistant
Community Health Aide
Medical Emergency Technician

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
CARE AND GUIDANCE OF CHILDREN	Energy management strategies for home economics teachers	48	Teachers	Low	275
	Energy conservation in the home	50	Teachers and students	Low	319
CLOTHING MANAGEMENT, PRODUCTION, AND SERVICES	Energy management strategies for home economics teachers	48	Teachers	Low	275
	Unlimited challenges in a world of limited resources	49	Teachers	Low	7
FOOD MANAGEMENT, PRODUCTION, AND SERVICE	Energy audit workbook: Bakeries	36	Managers and workers	High	70
	Energy audit workbook: Restaurants	36	Managers and workers	High	72
	Energy conservation in food service: Course outline and instructional material	35	Teachers training employees and managers	Moderate	122
	Energy cost reduction in the baking industry	37	Owners	Moderate	126
	Guide to energy conservation for the food service industry	33	Managers and workers	Moderate	74
	A practical guide to energy management: Electric food service	45	Owners and managers	High	21

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Profitable energy management for retailers and shopping centers	46	Owners and Managers	Moderate	200
	Saving money with energy conservation: An energy audit workbook for restaurants	29	Worker	High	37
HOME FURNISHING, EQUIPMENT, AND SERVICES	Energy conservation in the home	50	Teachers and students	Low	319
	Energy management strategies for home economics teachers	48	Teachers	Low	275
INSTITUTIONAL AND HOME MANAGEMENT	California school energy concepts, 1978	42	School district managers and architects	Low	49
	Campus energy management projects	32	Managers and administrators	Moderate	58
	Conservation of utilities	48	Building managers and staff	High	95
	Energy and water conservation suggestions for California's elementary and secondary schools	43	School managers and designers	Low	27
	Energy audit workbook: Hospitals	36	Workers	High	92
	Energy audit workbook: Hotels and motels	36	Managers and workers	High	70
	Energy audit workbook: Schools	37	Custodians	High	77

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Energy conservation: An examination of energy conservation mechanisms as they relate to school districts in Region IX	47	School managers	Moderate	68
	Energy conservation for school custodial and maintenance personnel: Course outline and instructional materials	34	Teachers and custodians in a school setting	High	71
INSTITUTIONAL AND HOME MANAGEMENT (cont.)	Energy management for colleges and universities	33	Facilities managers	Moderate	247
	Energy management plan	41	Coordinators	Low	54
	Energy saving handbook for homes and institutions	45	Managers and workers	Moderate	156
	Schools can save energy dollars	47	Managers	Low	150
	Total energy management for hospitals	40	Managers	Low	78
	Total energy management for nursing homes	40	Managers	Low	62
	Unlimited challenges in a world of limited resources	49	Teachers	Low	7

Traditional Home Economics Course Offerings for Which No Materials Were Located:

Other Occupational Preparation for Homemaking

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
SUPERVISORY AND ADMINISTRATIVE MANAGEMENT	Energy audit workbook: Office buildings	36	Workers, office managers, and custodians	High	88
	Saving money in office practices	30	Managers	High	20

Traditional Office Course Offerings for Which No Materials Were Located:

Accounting & Computing Occupations
Computer & Console Operators
Programmers
Other Business Data Processing
Filing, Office Machines, & General Office
Information, Communication Occupations
Materials Support Occupations
Personnel, Training, & Related
Stenographic, Secretarial, & Related
Typing and Related Occupations
Other Office Occupations

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Award winning energy education activities for elementary and high school teachers	43	Elementary and high school teachers	Moderate	38
	California school energy concepts, 1978	42	School district managers and architects	Low	49
	Energy and water conservation suggestions for California's elementary and secondary schools	43	School managers and designers	Low	27
ARCHITECTURAL TECHNOLOGY	Energy conservation curriculum for secondary and post-secondary students. Module 8: Building construction vs. energy conservation	34	Secondary, post-secondary and adult vocational students	High	79
	Energy conservation in the home	50	Secondary teachers and students	Low	319
	Providing for energy efficiency in homes and small buildings	42	Secondary and postsecondary teachers and students	High	53 (teacher guide) 71 (workbook)
	A workbook on residential passive solar energy efficient design and construction	51	Designers and builders	Moderate	450
AUTOMOTIVE TECHNOLOGY	Industrial energy conservation: 101 ideas that work	46	Supervisors and workers	Moderate	100
	The use of synthetic motor oils	32	Auto mechanics instructors	High	16

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Energy conservation: A full time job	43	Workers	High	24
	Energy conservation curriculum for secondary and post-secondary students. Module 9: Human comfort and energy conservation	34	Secondary, postsecondary, and adult vocational	Moderate	95
ENVIRON-MENTAL CONTROL TECHNO-LOGY	Energy conservation curriculum for secondary and post-secondary students. Module 10: Heating, ventilating, and air conditioning conservation opportunities	34	Secondary, postsecondary, and adult vocational students	High	133
	Energy efficiency for heating, ventilating, air conditioning instructors	41	Instructors of secondary and postsecondary vocational students	High	28
	First steps to energy conservation for business	44	Managers	Low	21
	Heating your home: Consumer information on heating systems	32	Consumers	Low	63
	How to save energy and cut costs in existing industrial and commercial buildings: An energy conservation manual	45	Owners and operators	Moderate	725

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
ENVIRONMENTAL CONTROL TECHNOLOGY (cont.)	Increasing energy efficiency: A program of industrial workshops	42	Industry executives	Moderate	142
	Proven ways to save energy in industrial plants in heating/piping/air conditioning	49	Managers	Moderate	6
	Reducing energy costs in wholesale distribution	38	Owners and managers	Moderate	119
	Saving energy dollars in small business: A manual for Wisconsin manufacturers	29	Owners and managers	Moderate	55
	Saving money in heating, cooling, and lighting	30	Managers	Low	52
MECHANICAL TECHNOLOGY	Basic boiler operations	31	Vocational instructors	High	186

Traditional Technical Course Offerings for Which No Materials Were Located:

Civil Technology
Electrical Technology
Electronic Technology
Industrial Technology
Scientific Data Processing Technology
Commercial Pilot Training
Fire and Fire Safety Technology
Police Science Technology
Other Technical Education
Waste and Waste-Water Technology

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Energy conservation: A full-time job	43	Workers	High	24
AIR CONDITIONING AND OTHER CONSTRUCTION AND AND MAINTENANCE	Energy conservation curriculum for secondary and post-secondary students Module 10: Heating, ventilating, and air conditioning conservation opportunities	34	Secondary, post-secondary, and adult vocational students	high	133
	Energy efficiency for heating, ventilating, air conditioning instructors	41	Instructors of secondary and post-secondary vocational students	High	28
	How to save energy and cut costs in existing industrial and commercial buildings: An energy conservation manual	45	Owners and operators	Moderate	725
	Increasing energy efficiency: A program of industrial workshops	42	Industry executives	Moderate	142

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
AUTO MECHANICS AND AUTOMOTIVE SPECIALIZATION	Energy cost reduction for automotive service facilities	37	Owners and supervisors	Moderate	19
	Energy cost reduction for gasoline service stations	39	Workers and managers	Moderate	23
	Energy efficiency for automotive instructors	41	Instructors of secondary and postsecondary vocational students	High	21
	The use of synthetic motor oils	32	Auto mechanics instructors	High	16
CUSTODIAL	Campus energy management projects	32	Managers and administrators	Moderate	58
	Conservation of utilities	48	Building managers and staff	High	70
	Energy audit workbook: Schools	37	Custodians	High	77
	Energy audit workbook: Hospitals	36	Workers	High	92
	Energy conservation curriculum for secondary and postsecondary students. Module 5: Lighting conservation opportunities	34	Secondary, postsecondary, and adult vocational students	Moderate	33

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Energy conservation curriculum for secondary and post-secondary students. Module 10: Heating, ventilating, and air conditioning conservation opportunities	34	Secondary, post-secondary, and adult vocational	Moderate	133
CUSTODIAL (cont.)	Energy conservation for school custodial and maintenance personnel: Course outline and instructional materials	34	Teachers and custodians in a school setting	High	71
	Energy management for colleges and universities	33	Facilities managers	Moderate	247
	Energy management plan	41	Coordinators	Moderate	54
	Energy saving handbook for homes and institutions	45	Managers and workers	Moderate	156
	First steps to energy conservation for business	44	Managers	Low	21
	Reducing energy costs in wholesale distribution	38	Owners and managers	Moderate	119
	Selected energy management options for small business and local government	51	Workers, managers, and owners	Moderate	36
	Total energy management for hospitals	40	Managers	Low	78
	Total energy management for nursing homes	40	Managers	Low	62

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Award winning energy education activities for elementary and high school teachers	43	Elementary high school teachers	Moderate	38
	California school energy concepts, 1978	42	School managers and architects	Low	49
DRAFTING OCCUPATIONS	Energy and water conservation suggestions for California's elementary and secondary schools	43	School managers and designers	Low	27
	Energy conservation curriculum for secondary and post-secondary students. Module 8: Building construction versus energy conservation	34	Secondary, post-secondary, and adult vocational	High	79
	Providing for energy efficiency in homes and small buildings	42	Secondary and post-secondary teachers and students	High	53 (teacher guide) 71 (workbook)
	A workbook on residential passive solar energy efficient design and construction	51	Designers and builders	Moderate	450

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Commuter van pooling operation guide for employers	43	Employers	High	27
	Energy management guide for light industry and commerce	46	Owners and managers	Low	23
	Energy utilization pamphlet: Supplement I	44	Managers	Low	15
	First steps to energy conservation for business	44	Managers	Low	21
FOREMANSHIP, SUPERVISION, AND MANAGEMENT	Industrial energy conservation: 101 ideas at work	46	Supervisors and workers	Moderate	100
	Industrial energy conservation: Where do we go from here?	49	Plant owners and managers	Moderate	45
	Proven ways to save money in industrial plants in heating/piping/air conditioning	49	Managers	Moderate	6
	Reducing energy costs in wholesale distribution	38	Owners and managers	Moderate	119
	Saving energy dollars in small business: A manual for Wisconsin manufacturers	29	Owners and managers	Moderate	55
	Saving money in heating, cooling, and lighting	30	Managers	Low	52

Course	Reference Title	Described on Page	Designed For Use By	Emphasis on Worker	Number of Pages
	Saving money through efficient people moving	31	Managers	High	24
	Saving money through product optimization	31	Managers	Low	18
FOREMANSHIP, SUPERVISION, AND MANAGEMENT (cont.)	Selected energy management options for small business and local government	51	Workers, managers, and owners	Moderate	36
	Total energy management	47	Owners and managers	Low	46
STATIONARY ENERGY SOURCES OCCUPATIONS	Basic boiler operations	31	Vocational instructors	High	186
	Saving money through combustion control	31	Managers	Low	52
	Saving money through steam and compressed air management	31	Managers	Low	36
TOOL AND DIE MAKING	Energy audit workbook: Die cast plants	36	Plant operators	High	75
UPHOLSTERY AND WOODWORKING OCCUPATIONS	How you can profit from the energy crisis	38	Plant managers and owners	High	106
WELDING, CUTTING, OTHER CONSTRUCTION AND MAINTENANCE	Energy management for industrial operators	47	Plant manager	Low	42

Traditional Trades And Industrial Course Offerings for Which No Materials Were Located:

Appliance Repair
Body and Fender Repair
Aviation Occupations
Commercial Art Occupations
Commercial Photography Occupations
Carpentry
Electricity
Masonry
Plumbing and Pipe Fitting
Diesel Mechanic
Electrical Occupations
Electronics Occupations
Graphic Arts Occupations
Instrument Maintenance and Repair
Maritime Occupations
Machine Shop
Machine Tool Operation
Sheet Metal
Other Metalworking Occupations
Metallurgy Occupations
Cosmetology
Other Personal Services
Plastics Occupations
Fireman Training
Law Enforcement Training
Other Public Service Occupations
Quantity Food Occupations
Refrigeration
Small Engine Repair
Textile Production and Fabrication
Other Trade and Industrial Occupations

III. FINDINGS

This section contains brief descriptions of the instructional materials we located that (1) mention specific worker conservation behaviors and that (2) would require few modifications for use with vocational students. Materials are listed alphabetically by group or individual author. Materials that are part of a series are listed first followed by materials that are not part of a series. When materials have been field tested this fact is noted in the descriptions.

Section II of this survey contains tables that link these descriptions to traditional course offerings within the seven vocational education disciplines.

Materials That Are Part of a Series

- American Institute of Industrial Engineers. The booklets described below are available from the National Technical Information Service; U.S. Department of Commerce; 5285 Port Royal Road; Springfield, VA 22161. Cost: Contact source.

  (a) Saving money with energy conservation: An energy audit workbook for restaurants (DOE/CS-0097).

  This 37-page workbook contains basic energy conservation information for restaurant employees. Topics include food preparation, storage facilities, heating, cooling, lighting, hot water, and ventilation systems. Tips are also included on climate zones and energy usage calculation. The booklet is simply written and would require little adaptation for use with students.

  (b) Saving money with energy conservation: An energy audit workbook for retail stores (DOE/CS-0098).

  This is a 33-page workbook designed for use by retail store owners and workers. Hints are provided for reducing energy waste. Suggested changes concern heating, cooling, lighting, hot water, and ventilation. Both no- and low-cost ideas are presented. Savings calculations, forms, graphs, and charts make this a useful resource for students and workers.

- Department of Business and Management, University of Wisconsin Extension. The products listed below are available from Wesley T. Mott, Editor of Publications, University of Wisconsin, Small Business Development Center; One S. Park Street; Madison, WI 53706. Cost: Contact source.

  (a) Saving energy dollars in small business: A manual for Wisconsin manufacturers, 1979.

  This 55-page booklet is designed to help small manufacturers save energy and money by organizing and implementing energy conservation

programs. Topics covered include the importance of establishing and continually monitoring such a program; methods for performing a comprehensive energy survey; and energy-use checkpoints and conservation tips in the areas of building and grounds, motors and power plants, utility and space-heating efficiency, manufacturing processes, distribution and transportation, and office and sales area efficiency. Energy use and analysis forms and behavior checklists are also included. While this manual is clearly directed toward owners and managers, some of the suggested behaviors could be performed by workers in a variety of work settings.

(b) Saving energy dollars in small business: A manual for Wisconsin retailers, 1978.

This 45-page booklet is designed to help small retailers save energy and money by planning and implementing an energy conservation program. Topics covered include the importance of establishing such a program; methods for conducting a comprehensive energy survey; and energy-saving tips in the areas of exterior and interior lighting, heating, air conditioning, ventilation, maintenance, warehousing, delivery, and refrigeration. Energy use analysis forms, practice exercises in calculating energy savings, and tables of energy use and potential savings are also included. While this manual is clearly directed toward owners and managers, some of the suggested behaviors could be performed by workers in a variety of retail business settings.

- Department of Energy, Mines and Resources. The Enersave industrial energy conservation booklets were published in 1977. They are available from the Conservation and Renewable Energy Branch, Department of Energy, Mines and Resources; 580 Booth St.; Ottawa, Ontario, Canada K1A OE4. Cost: $5.45 for a set of 10 manuals.

Described below are the 7 booklets in this 10-booklet series that discuss on-the-job worker conservation. Each booklet includes conservation case studies and a concise list of energy- and dollar-saving tips. Although directed at management, and sometimes technical in nature, many of the conservation tips included in these booklets could be implemented by workers and adapted for use with students.

(a) Saving money in heating, cooling and lighting.

This 52-page booklet describes in great detail opportunities for and methods of conserving energy in the heating, cooling, and lighting of industrial buildings.

(b) Saving money in office practices.

This 20-page booklet is designed to help management create an energy-efficient office environment. The manual deals with energy-conserving methods of heating, cooling, ventilating, lighting, and providing water in the office setting; changes in office routines such as

flexible or reduced working hours; reduction in the use of office machines and paper consumption; and energy-efficient purchasing practices. Actual conservation case studies as well as a concise list of energy-and dollar-saving tips are also included.

(c) Saving money through combustion control.

This 52-page booklet describes in great detail how to conserve energy and money by maximizing the efficiency of industrial combustion processes. In particular, it deals with the efficient use of furnaces, kilns, ovens, and boilers, and with methods for recovering waste heat.

(d) Saving money through efficient people moving.

This 24-page booklet describes how companies can organize employee carpools and vanpools for more energy-efficient transportation to and from work. In addition to a detailed outline on effective organization procedures, the manual discusses how various incentives can motivate employees to pool rides, and how pooling transportation can benefit both the company and employees.

(e) Saving money through product optimization.

This 18-page booklet is designed to help plant managers reduce energy consumption while maintaining the same production output. The manual deals with controlling production scheduling, modifying production hardware, and maximally utilizing the most energy-efficient equipment.

(f) Saving money through steam and compressed air management.

This 36-page booklet describes in great detail how to conserve energy and money through the effective operation and design of conventional steam and compressed air systems.

(g) Saving money through transportation and delivery.

This 24-page booklet is designed to help management reduce energy consumption in transportation. The manual describes numerous methods of conserving energy in lift truck, delivery dock operations and the transportation of goods.

- Energy Project, Wisconsin Board of Vocational, Technical, and Adult Education. The products listed here are available from the Wisconsin Board of Vocational, Technical, and Adult Education; 4802 Sheboygan Ave.; Madison, WI 53702. Cost: Free.

(a) Basic boiler operations, no date.

This handbook contains 186 pages of information for vocational education instructors. Included are outlines, references, a glossary,

and drawings related to boiler operation, safety, and combustion efficiency. The information is presented in outline form. The outlines refer instructors and students to 12 reference papers and excerpts from three booklets on boilers and their operation and maintenance. These supplementary readings are included with the materials. Safety, not conservation, is the major focus of these materials. However, students could extract information on combustion efficiency from the materials.

(b) Heating your home: Consumer information on heating systems, 1979.

This 63-page handbook, designed for instructors and home owners enrolled in consumer education courses, explains the services that a homeowner should expect from a heating service technician. The handbook describes various furnace retrofitting devices and presents information on buying an energy-efficient furnace. Although the handbook is not directed toward workers, it is clearly written in lively, colloquial language and it contains much material that could be presented to secondary students preparing for careers as heating service technicians.

(c) The use of synthetic motor oils, 1978.

This 16-page booklet was designed as a resource for instructors in auto mechanics courses. It presents general background material on synthetic motor oils, their advantages and disadvantages, and a cost comparison with regular motor oils. A final chapter enumerates eleven specific ideas for auto mechanics including how to check for problems, whether to recommend synthetic oils, and how to communicate with car owners about motor oils, ratings, and weights. An annotated reference list of articles dealing with synthetic motor oils is included. The text is clearly written and is appropriate for vocational education students at the secondary and postsecondary levels. While the information is limited to one aspect of conservation open to auto mechanics, it could be incorporated into a broader presentation.

- Energy Task Force. The publications listed below are available from the National Association of College and University Business Officers; One Dupont Circle, Suite 510; Washington, D.C. 20036. Cost: Contact source.

(a) Campus energy management projects, 1979.

Interventions currently in effect to conserve energy at postsecondary institutions are discussed in this 58-page booklet. Cost analyses, final results, and a discussion of problems are provided for each example cited. Insulation, electrical systems, and heating and cooling systems are covered. Information was obtained from more than 60 colleges and universities in the United States and Canada. An index of the institutions involved is included for individuals seeking additional information. This publication is directed toward

managers and administrators, but the interventions are, for the most part, to be performed by workers.

(b) Energy management for colleges and universities, 1977.

This 247-page, soft-bound book was prepared to promote institution-wide energy conservation. While written primarily for facilities managers, maintenance personnel, and business officers working on campuses, the information is applicable to persons with similar jobs in many different types of facilities. Organizational incentives are included to motivate campus personnel. A chapter entitled "Evolutionary Approach to Energy Conservation" and one of the appendices, "Energy Saving Measures," contain many practical suggestions for a variety of workplaces, and would be appropriate for inclusion in vocational education curricula.

- Federal Energy Administration, Office of Energy Conservation and Environment. The booklets described below are available from the U.S. Government Printing Office; Washington, D.C. 20402.

(a) Guide to energy conservation for the food service industry, 1977, (DOE 041-018-00127-1). Cost: $2.25.

This 74-page booklet discusses energy use and cost in the food service industry. Chapters address topics such as food preparation and storage, lighting, heating and cooling, and sanitation. Each chapter discusses potential for energy savings, operation, maintenance, and planning. A final chapter discusses how to manage conservation and monitor energy usage. A chart is included for this purpose. Suggestions are included on how to motivate employees through education. Although directed towards food service operators (fast food, coffee shop, restaurant, cafeteria, and hotel/motel), the information is appropriate for students. The equipment survey forms, activity checklists, and usage chart would be particularly useful for students. References are included.

(b) Guide to energy conservation for grocery stores, 1977, (DOE 041-018-00127-1). Cost: $1.90.

This 42-page booklet contains energy conservation and cost savings information for store owners and managers. Chapters are included on environmental control, building structure, and lighting. There is also a special information section for bakeries and delicatessens. Each chapter covers operation, maintenance, and planning. Suggestions are quite detailed. Also included are checklists, worksheets, a reference list, a glossary, and a fold-out chart for recording monthly energy use. No- and low-cost procedures are cited, as well as those requiring larger investments. An employee training program and reward system are described to help motivate workers. With some modification, the information is appropriate for infusion into vocational curricula. However, some suggestions and energy-use figures may be out of date.

- Navarro College. Energy conservation curriculum for secondary and post-secondary students. Corsicana, TX: Author, 1979. Available from the Texas Education Agency; Austin, TX. Cost: Contact source.

  This is a series of 11 self-contained instructional units designed to teach students to recognize energy conservation opportunities at home and on the job. Each instructional unit or module contains student activities appropriate for secondary and postsecondary students. In addition to the modules described below, this series features modules related to energy awareness and to domestic energy conservation opportunities.

  (a) Module 5: Lighting conservation opportunities (ERIC No. ED 177 351).

  This 33-page module includes units on lighting efficiency and on estimating lighting requirements.

  (b) Module 8: Building construction versus energy conservation (ERIC No. ED 177 354)

  This 79-page module discusses construction considerations, building site and design implications, and weatherization.

  (c) Module 9: Human comfort and energy conservation (ERIC No. ED 177 355).

  This 95-page module is divided into three units that describe the nature of thermal comfort in humans, how natural climates and artificial environments are defined, and the control of buildings for thermal comfort.

  (d) Module 10: Heating, ventilating, and air conditioning conservation opportunities (ERIC No. ED 177 356).

  This 133-page module describes the fundamentals of heating and cooling, heating systems, cooling systems, and duct work.

- North Carolina Department of Community Colleges. The materials described below were developed in 1979 and are available from the Program Development Section, North Carolina Department of Community Colleges; Raleigh, NC 27611. Cost: Contact source.

  (a) Anderson, C. E. Energy conservation for school custodial and maintenance personnel: Course outline and instructional materials.

  This 71-page loose-leaf notebook for school maintenance personnel is divided into two sections: a teacher course outline and a student handbook. Topics cover building inventory, energy consumption, boiler maintenance, plumbing, lighting, preventive maintenance, audits, and record keeping. Charts and worksheets are included with the text. Simple planning activities and a slide narrative are also

included. The format is straightforward, and the text is concise and easy to understand. This resource is well suited for use with students and workers.

(b) Forrest, L. C. Energy conservation in food service: Course outline and instructional materials.

A 122-page loose-leaf binder and accompanying instructor's guide present 20 one-hour lesson plans for community college food service students who will become employees (10 lessons) or managers (10 lessons). Each lesson plan details the change to be achieved, equipment needed, resources, and implementation suggestions. Assignments and tests are also included. Worker motivation issues are discussed, as are strategies for managers to use when monitoring conservation practices. The resource is well suited for use with students and workers.

- U.S. Department of Agriculture. The booklets listed here are available from the National Technical Information Service; U.S. Department of Commerce; 5285 Port Royal Road; Springfield, VA 22161. Cost: $5.25 per booklet.

These booklets are designed to help managers and owners assess energy use patterns and implement conservation measures. Revision of the language and some of the content would be required to accommodate the student and the worker.

(a) Benson, V. M. A guide to energy savings: For the poultry producer, 1977. (NTIS No. PB-270-072) (ERIC No. ED 168 898)

This 56-page booklet is designed to help the poultry producer implement energy savings in the areas of brooding, lighting, ventilation, feeding, watering, waste removal, coop design, and maintenance.

(b) Frank, G. G. A guide to energy savings: For the dairy farmer, 1977. (NTIS No. PB-270-074) (ERIC No. ED 168 894)

This 56-page booklet is designed to help the dairy operator implement energy savings in the areas of solar preheating, insulation, and routine maintenance.

(c) Schrenbein, A. A guide to energy savings: For the field crops producer, 1977. (NTIS No. PB-270-071) (ERIC No. ED 168 895)

This 65-page booklet is designed to help the field crops producer implement energy savings in the areas of fertilization, irrigation, grain and tobacco drying, and tractor and truck usage.

(d) Van Arsdale, R. A guide to energy savings: For the livestock producer, 1977. (NTIS No. PB-270-073) (ERIC No. ED 168 896)

This 98-page booklet is designed to help the livestock producer implement energy savings in the areas of equipment, feed preparation, range and herd management, heating, lighting, and irrigation.

(e) Wynn, N. A. A guide to energy savings: For the orchard grower, 1977. (NTIS No. PB-270-075) (ERIC No. ED 168 897)

This 57-page booklet is designed to help the orchard grower implement energy savings in the areas of fertilization, irrigation, weed and pest management, frost protection, and equipment.

(f) Wynn, N. A. A guide to energy savings: For the vegetable producer, 1977. (NTIS No. PB-270-074) (ERIC No. ED 168 899)

This 64-page booklet is designed to help the vegetable producer implement energy savings in the areas of weed management, fertilization, pest management, irrigation, equipment, and greenhouses.

- U.S. Department of Energy. The 11 energy audit workbooks listed below were written in 1978 and are available from the National Technical Information Service; U.S. Department of Commerce; 5285 Port Royal Road; Springfield, VA 22161. Cost: $9.50 per workbook.

These workbooks suggest no- and low-cost maintenance and operational changes that can help workers and managers conserve energy. Instructions for energy auditors are also included. The workbooks would require little adaptation for use with students.

(a) Energy audit workbook: Apartments (NTIS No. DOE/CS-0041/1)--84 pages.

(b) Energy audit workbook: Bakeries (DOE/CS-0041/10)--70 pages.

(c) Energy audit workbook: Bus stations (DOE/CS-0041/8)--74 pages.

(d) Energy audit workbook: Die cast plants (DOE/CS-0041/5)--75 pages.

(e) Energy audit workbook: Hospitals (DOE/CS-0041/3)--92 pages.

(f) Energy audit workbook: Hotels and motels (DOE/CS-0041/4)--70 pages.

(g) Energy audit workbook: Office buildings (DOE/CS-0041/6)--88 pages.

(h) Energy audit workbook: Restaurants (DOE/CS-0041/7)--72 pages.

(i) Energy audit workbook: Retail stores (DOE/CS-0041/11)--70 pages.

(j) Energy audit workbook: Schools (DOE/CS-0041/2)--77 pages.

(k) Energy audit workbook: Warehouses (DOE/CS-0041/9)--88 pages.

- U.S. Department of Energy, Small Business Energy Cost Reduction Program.

(a) American Bakers Association and Retail Bakers of America. Energy cost reduction in the baking industry. No date. Available from the American Bakers Association; Suite 850; 2020 K Street N.W.; Washington, D.C. 20006, or from the Retail Bakers of America, Presidential Building,.Suite 250, 6525 Belcrest Road, Hyattsville, MD 20782. Cost: $5.00.

This 126-page booklet includes units on transportation, lighting, heating, and energy audit. Worker incentive plans are discussed. The format is simple, and the text is easy to understand. Humorous cartoons are used to illustrate the units. Minimal adaptation would be required if these materials were to be used with workers and students.

(b) American Retail Federation. Energy cost reduction in retailing. No date. Available from the American Retail Federation; 1616 H Street, N.W.; Washington, D.C. 20036. Cost: $2.50.

This 76-page booklet was prepared to help retail store owners recognize and control energy waste in lighting, heating, cooling, maintenance, merchandise warehousing, delivery, and refrigeration. The text is easy to understand and includes self-assessment forms, projections of cost savings, and case studies. The 27 suggested activities are especially appropriate for students and workers.

(c) Automotive Service Councils, Incorporated. Energy cost reduction for automotive service facilities. Elmhurst, IL: Author, no date. Available from Automotive Services Councils, Inc.; 188 Industrial Drive, Suite 112; Elmhurst, IL 60126. Cost: $1.50.

This 19-page booklet, prepared for automotive service owners and supervisors, contains examples and implementation strategies for six specific energy cost reductions, and additional general recommendations. Examples are very practical, and the resource is clearly written. All suggestions have been tested in service shops and proven to be relatively inexpensive. This booklet would require little adaptation for use with students.

(d) Institute of Real Estate Management. Energy cost reduction for apartment owners and managers. Author, 1977. Available from the National Association of Realtors; 430 W. Michigan Avenue; Chicago, IL 60611. Cost: $3.00.

This 61-page booklet contains information on low-investment energy conservation modifications and maintenance in apartments. All suggestions are practical, easy to implement, and presented in a clear

format. Chapters cover such motivational issues as decreased tenant turnover and savings on hot water, lighting, heating, and cooling. Each chapter contains energy cost-reduction recommendations, suggestions for implementation, and examples from actual energy audits. While written specifically for apartment house owners and managers, the glossaries, charts, and suggestions are appropriate for vocational students and workers.

(e) International Fabricare Institute. Energy cost reduction in the fabricare industry. Joliet, IL: Author, no date. Available from International Fabricare Institute; P. O. Box 940; Joliet, IL 60434. Cost: $2.50.

This 40-page booklet is directed toward owners and operators of dry cleaning and laundry firms. It describes energy use reduction as a good investment and discusses 16 energy use reduction recommendations that can be implemented without engineering help and without lowering the quality of the work done. Emphasis is on ideas that save both money and energy, and a savings summary chart is presented showing the cost, and first year and 10-year savings for each recommendation. Some suggestions are applicable to any business establishment (relamp plant, set back night temperature) and others are specifically appropriate to cleaning establishments (test steam traps, lower washer water levels, recover dryer heat). Blank forms are included for recording energy cost reduction implementation and monthly energy use and expenditures. The material is non-technical and is appropriate for either students, workers, or managers.

(f) National Association of Furniture Manufacturers and Southern Furniture Manufacturers Association. How you can profit from the energy crisis. 1979. Available from the Southern Furniture Manufacturers Association; P.O. Box 2436; High Point, NC 27261. Cost: $10.00.

This 106-page guide for furniture manufacturers contains helpful tips for plant managers and owners. The writing and format are clear, and illustrative graphics are included. Many of the maintenance behaviors could be implemented by workers, although the text would need to be simplified for use with students.

(g) National Association of Wholesale-Distributors. Reducing energy costs in wholesale distribution. Washington, D.C. Author, 1979. Available from National Association of Wholesale-Distributors; 1725 K Street, N.W., Washington, D.C. 20006. Cost: $10.00.

This 119-page handbook is based on information gathered during a series of on-site visits and energy audits of wholesale distributors representing a variety of commodity lines and serving a wide range of commercial and industrial customers. Following a chart showing dollar savings estimates of all recommendations and an energy cost reduction checklist, separate sections of the booklet are devoted to recommendations and implementation suggestions on lighting, heating, building shell, and transportation. A brief case study example is given for each recommendation. Liberally illustrated with figures

and cartoon drawings and written in non-technical language, the material is appropriate for owners and managers and could be adapted for use by workers and students.

(h) National Automobile Dealers Association. Saving energy costs in your dealership. Author, 1977. Available from the Accounting Department, National Automobile Dealers Association; 8400 Westport Drive; McLean, VA 22101. Cost: $2.50.

The five chapters in this 27-page booklet contain energy saving tips for car dealerships. Interior and lot lighting, space heating, air conditioning, general plant maintenance, and the setting up of an energy management program are discussed. Cost savings are used to motivate personnel to conserve. Economic projections and a glossary are included. This resource could easily be adapted for use with students and workers.

(i) National Congress of Petroleum Retailers. Energy cost reduction for gasoline service stations, 1977. Available from National Congress of Petroleum Retailers; 2021 K Street, N.W., Suite 301; Washington, D.C. 20006. Cost: $1.00.

This 23-page handbook was developed to help gasoline service station workers and managers reduce their energy costs (and consumption) by conserving energy in interior and exterior lighting, space heating, and general maintenance. The recommendations were developed from energy usage analyses of gas stations around the country. The seven major suggestions all feature a short payback period, wide applicability, and ease of implementation. Each suggestion is followed by a brief description of the situation and implementation, an example is presented, and suggested actions are listed. The handbook also contains a one-page explanation of how to assess energy needs and energy waste and a blank form for recording monthly energy use and expenditures. The materials are presented clearly and at a level appropriate for the intended audience.

(j) National Independent Dairies Association (NIDA). The dairy-energy connection. Washington, D.C.: Author, 1979. Available from NIDA; 1730 K Street N.W., Suite 1302; Washington, D.C. 20006. Cost: $10.

This 126-page booklet contains energy conservation suggestions and cost saving information for the dairy plant owner. Energy conservation is discussed in the areas of transportation, lighting, and heating. Although written for the dairy owner, the information is lucidly presented in a straight-forward format. Worker incentive plans are included. Information is presented that is relevant to students and workers. Minimal adaptation of the text would be required for use with these audiences.

(k) Growers Division, Society of American Florists. Energy audit for growers: A self-inspection guide to reduce energy costs. Alexandria, VA: Author, 1978. Available from the Society of American Florists; 901 N. Washington Street; Alexandria, VA 22314. Cost: $5.00.

This 94-page booklet is designed to help wholesale growers cut energy costs by reducing energy waste in heating, ventilating, soil sterilizing, watering, artificial lighting, efficient use of space, delivery, and refrigeration. Information is presented in four sections: The Greenhouse, Storage and Office Facilities, Refrigeration Units and Buildings, and Delivery Operations. Each part contains several recommendations that involve little or no capital investment and could be implemented by in-house or locally available labor. Each recommendation describes a condition, what techniques to implement to save energy, an example with quantified savings, and suggested followup. A Savings Summary Table synthesizes information on recommendations, implementation costs, and savings. Many of the recommendations would require adaptation for use with students.

- U.S. Department of Health and Human Services. The products listed below are available from the U.S. Department of Health and Human Services; 5600 Fishers Lane; Rockville, MD 20857. Cost: Free.

(a) Enviro-Management and Research, Incorporated. Total energy management for hospitals. Author, 1979. (HRA 80-14516)

This 78-page booklet was prepared for hospital managers and contains practical suggestions for conserving energy in a number of areas: ventilation, infiltration, heating and cooling, lighting, cafeteria, hot and cold water, and elevators. The material details interventions requiring minimal expense as well as those requiring greater cost outlays. An audit form is also provided. While worker behaviors are discussed, the text is not worker oriented and would require significant adaptation for use with student and worker audiences. Suggestions, however, are appropriate to many trades, not just to those that are health related.

(b) Enviro-Management and Research, Incorporated. Total energy management for nursing homes. Author, 1977. (HRA 77-614)

This 62-page booklet was prepared for nursing home administrators and contains practical suggestions for lowering energy costs in the areas of ventilation and exhaust, infiltration, heating and cooling, transmission, lighting, hot and cold water, service facilities, and elevators. Energy audit is discussed and audit forms are provided. Emphasis is placed on the need for administrators to motivate workers to conserve. While the material is not worker oriented, many of the interventions can be performed by workers; however, the text would require adaptation for use with a worker or a student audience.

- Scharmann, L., & Lay, G. (Eds.). The products listed here are available from the Nebraska Energy Office; Box 95085; Lincoln, NE 68509. Cost: Contact Source.

  (a) Energy efficiency for automotive instructors, 1980.

  This 21-page curriculum guide for instructors includes six units that are designed to be incorporated into existing auto mechanics programs. Units are written in outline form, and include rationale, preparation, instructional time required, activities, and references. Units discuss the driver and public awareness, ignition systems, the fuel system, brakes and suspension systems, transmissions, and alternate fuel sources. Unit rationales describe the importance of conservation in each of these areas. The guide is designed for use by instructors teaching postsecondary students, although it could be used by instructors of secondary students if the necessary equipment were available. This resource is being pilot tested and will be available for use during the 1981-82 school year.

  (b) Energy efficiency for heating, ventilating, air-conditioning instructors, 1980.

  This 28-page curriculum guide for instructors contains five units designed to be incorporated into existing HVAC programs. Units are written in outline form and cover rationale, preparation, instructional time required, activities, and references. The intent of the materials is to allow students to maximize the potential energy efficiency of HVAC systems. One unit, entitled "How Energy Conservation Pays," is designed to motivate students to conserve. The materials are most appropriate for instructors of postsecondary students, and are currently being pilot tested. They will be available during the 1981-82 school year.

Materials That Are Not Part of a Series

- Alabama State Department of Education. Energy management plan (Bulletin No. 4). Montgomery, AL: Author, 1980. Available from the State Department of Education; Montgomery, AL 36130. Cost: Contact source.

  This is a 54-page book prepared for energy coordinators in public schools. The purpose of the book is to help coordinators develop an energy management plan and maintain conservation goals. Included are energy management tips for food service, recommendations for conserving energy in home economics and agribusiness classes, suggested savings in school transportation, and tips on general equipment management. Energy audit forms and instructions are provided. Using this resource, schools can reduce energy consumption by up to 20% without capital outlay. The book is not technical. Several sections are appropriate for vocational students who will be working in settings other than schools.

- American Association for Vocational Instructional Materials. Providing for energy efficiency in homes and small buildings. Author, 1980. Available from the U.S. Department of Energy, Technical Information Center; P. O. Box 62; Oak Ridge, TN 37830. Cost: Single print copies free. Media programs are $85 for Part I and $98 for Part III.

  This package consists of three instructional booklets, a teacher guide (53 pages), and a student workbook (71 pages). The booklets have been prepared for use with secondary- and college-level vocational students. Book I is designed to enhance students' understanding of energy conservation in buildings. Worker motivation issues are also discussed in this booklet. Book II focuses on methods for determining energy loss and gain in buildings. Book III discusses the selection and installation of energy-efficient materials and equipment. These materials have been field tested at 30 secondary and postsecondary institutions. Books I and III are accompanied by supplementary media programs.

- American Management Associates. Increasing energy efficiency: A program of industrial workshops. 1976. Available from the U.S. Department of Energy; Technical Information Center; P. O. Box 62; Oak Ridge, TN 37830. Cost: Contact source.

  This 142-page workbook was prepared for industry executives attending conservation workshops. Supplementary reading materials accompany the workbook. Suggestions are straightforward and practical. The purpose of the workbook is to help executives determine methods of conserving energy when working with boilers, compressors, dryers, HVAC, insulation, kilns, lighting, pumps, and steam systems. The workbook could be used in conjunction with a workshop or as a separate reference book. Many interventions are suitable for workers, although adaptation of the text would be required.

- Askin, R.J. et al. California school energy concepts, 1978. Sacramento, CA: Bureau of School Planning, California State Department of Education, 1978. (ERIC No. ED 165 341). Cost: $.85.

  This 49-page publication discusses energy conservation factors to consider when planning a new facility. It also presents energy conservation suggestions for existing schools in the areas of lighting, heating, ventilation, air conditioning, maintenance, transportation, water use, and other equipment use. Solar energy applications are briefly discussed. The materials are illustrated with photographs, drawings, and tables. The text was designed for use by school district managers and architects. It is written in a simple, straightforward manner appropriate for students.

- Bureau of Business Practices, Inc. Energy conservation: A full time job. Waterford, CT: Author, 1979. Available from the Bureau of Business Practice; 24 Rope Ferry Rd.; Waterford, CT 06386. Cost: Contact source.

  In response to the federal regulations mandating maximum heating settings and minimum cooling settings for workplaces, this 24-page mini-booklet was prepared to provide workers with tips on keeping comfortable while conserving energy. Topics covered include heating and cooling, machinery and equipment usage and maintenance, recycling, transportation, and "in the home." Suggestions are practical and clearly presented. Although the booklet is not job specific, many of the tips could be adapted to vocational areas.

- California State Department of Education. Energy and water conservation suggestions for California's elementary and secondary schools. Sacramento, CA: Author, 1977. (ERIC No. ED 166 031). Cost: Contact source.

  This 27-page publication stresses energy conservation in school design and school transportation services. Although it was written for school management personnel and school designers, many of the suggestions could be adapted to student and worker needs.

- Carey, H. H. (Ed.). Award winning energy education activities for elementary and high school teachers. Washington, D.C.: National Science Teachers Association (NSTA), 1977. Available from NSTA; 1742 Connecticut Avenue N.W.; Washington, D.C. 20009. Cost: Free.

  This 38-page illustrated booklet provides descriptions of classroom activities for teachers at the elementary and secondary level. One of the units, "Designing an Energy-Efficient House," is appropriate for high school architectural drafting students. Activities and learning materials are designed to be integrated into the regular architectural drafting curriculum. Other units described in this publication are not applicable to vocational classrooms.

- Chrysler Corporation. Commuter van pooling operation guide for employers. Detroit, MI: Author, September 1980. Available from Mr. Thomas J. McDonald; Van Pool Services; Chrysler Corporation; P.O. Box 1057; Detroit, MI 48288. Cost: Free.

  This 27-page booklet describes in five pages how to organize, administer, promote, implement, and evaluate a company-sponsored van pool for employees. The remainder of the guide consists of relevant forms and manuals on matching employees, orienting them to the program, keeping a van pool log, and other necessary agreements and reports. While the illustrations and text are somewhat slanted toward Chrysler products, the booklet is clearly written and could be adapted for project use.

- Construction Industry Manufacturers Association (CIMA). Energy utilization pamphlet: Supplement I. Milwaukee: Author, 1979. Available from CIMA; 111 Wisconsin Ave.; Milwaukee, WI 53202. Cost: Contact source.

  The purpose of this 15-page pamphlet is to assist manufacturers and managers of construction companies in organizing energy conservation programs. Energy projects are described that require little or no expense, moderate cost outlays, and expenditures exceeding $10,000. No implementation instructions are provided for the over 150 ideas presented. Students might use this resource to identify the cost savings that could be realized through various energy projects.

- Department of Agricultural Education, Pennsylvania State University and Pennsylvania Farm Electrification Council. Energy conservation in the home and on the farm. University Park, PA: Author, 1980. Available from Pennsylvania Agricultural Education Instructional Materials Center; University Park, PA 16802. Cost: $3.00

  Both the Teacher's Guide (149 pages) and the Student Manual (114 pages) are organized around four units: the need for energy conservation, energy conservation in the home, energy conservation on the farm, and a plan for a state and national energy conservation contest and awards program. Each unit in the Manual contains a listing of educational objectives, a glossary of energy terms, student information sheets listing facts and figures in outline form, and student activities sheets. The Teacher's Guide provides film information; objectives; and teacher information sheets containing student and teacher activities, background information, transparency masters, assignment sheets, and test items. The materials are appropriate for use with secondary level students.

- Department of Energy, Mines and Resources. First steps to energy conservation for business. Ottawa, Ontario, Canada: Author, 1977 (revised). Available from the Conservation and Renewable Energy Branch; Department of Energy, Mines and Resources; 580 Booth Street; Ottawa, Ontario, Canada K1A OE4. Cost: Contact source.

  This 21-page booklet is designed to help business management design a general energy conservation program that involves the participation and cooperation of management and employees alike. It emphasizes procedures for conducting a comprehensive energy audit and includes detailed charts and checklists to be used in such an audit. While these sections are aimed at management, numerous suggestions for possible energy conservation measures are also provided, and might be adapted for use with students.

- Dubin, F. S., Mindell, H. L., & Bloome, S. How to save energy and cut costs in existing industrial and commercial buildings: An energy conservation manual. 1976. Available from Noyes Data Corporation; Park Ridge, NJ 07656. Cost: Contact source.

  This 725-page manual consists of two parts: a Building Owners and Operators Manual; and an Engineers, Architects, and Operators Manual. The latter is quite technical; the first manual is more appropriate for a vocational student audience. It provides a set of guidelines and procedures for reducing energy use through more effective operation of buildings and their mechanical and electrical systems. Heating, ventilation, hot water, cooling, refrigeration, lighting, and power are discussed. A chapter entitled "Energy Conservation Opportunities" is especially useful for students and workers, since the measures described do not require new equipment or systems.

- The Electrification Council. A practical guide to energy management: Electric food service. Washington, D.C.: Author, 1977. Available from The Electrification Council; 1111 19th Street N.W.; Washington, D.C. 20036. Cost: $1.25.

  This 21-page booklet contains an eight-page checklist for analyzing energy management in commercial kitchens, tips on cost savings, and information photographs. The goal of the materials is to train workers to analyze and improve energy management in the kitchen. The text, however, is directed toward kitchen managers, food service owners, and equipment manufacturers. If the booklet were to be adapted to meet worker needs, the text would need to be simplified.

- Federal Energy Administration. Trucker's guide to fuel savings. Author, 1976. Available from the U.S. Department of Energy; Technical Information Office; P. O. Box 62; Oak Ridge, TN 37830. Cost: Free.

  This 20-page booklet, illustrated with graphs and diagrams, discusses 14 ways that truckers can save fuel. While some tables may be too complex for a student audience, the text is clearly written and easy to understand. Suggestions related to maintenance, driving style, and speed would be useful for drivers. Cost savings are used to encourage workers and owners to conserve. This resource is appropriate for infusion into vocational education curricula.

- Feldman, E. B. Energy saving handbook for homes and institutions (1,000 ways to conserve our most essential resource). 1979. Available from Frederick Fell Publishers, Inc.; 386 Park Avenue South; New York, NY 10016. Cost: Contact source.

  This 156-page book contains energy conservation ideas related to plant and kitchen management, lighting, vehicles, appliances, and equipment. The lucid and practical style of this book would require minimal modification for use with students.

- Fulweiler, J. W. Profitable energy management for retailers and shopping centers. New York: Chain Store Publishing Company, 1975. Available from the publisher; 2 Park Avenue; New York, NY 10016. Cost: $13.50.

  This 200-page hardcover book presents practical recommendations and examples for store managers to assist them in getting full return on energy expenditures. The author's premise is that profits in merchandising will increasingly depend upon control of expenses, and that energy consumption is a large but controllable expense. Separate chapters treat utility management, lighting, HVAC (heating, ventilating, and air-conditioning), supermarket energy needs, restaurant energy needs, shopping center energy use, location of new shopping centers, and customer shopping habits. A 23-page glossary is included. The text approaches energy conservation from a point of view sympathetic to the needs of the independent retailer, whose expertise is seen as a valuable contribution to the government agencies that mandate energy policy. The information is presented at a level appropriate for managers and retail store workers.

- General Motors Corporation. Industrial energy conservation: 101 ideas that work. Detroit, MI: Author, 1977. Available from Energy Management Section; General Motors Corporation; 3044 West Grand Boulevard; Detroit, MI 48202. Cost: Free.

  This 100-page paperback book, prepared for supervisors and workers in automobile industry plants, is designed to reduce costs in an automobile plant. Areas covered include product specification changes, heat recovery applications, central control and monitoring systems, improved equipment controls, and air supply and exhaust systems. A simple format lists the idea, the situation prompting the idea, the means by which energy waste was reduced, cost, and savings. The text is clear and readable and could be used by students. Examples are derived from more than 1,200 case histories compiled at General Motors since 1973. Some of the ideas would be appropriate for industries other than automobile plants.

- Kelnhofer, W. J., & Wood, L. A. Energy management guide for light industry and commerce. (NBS Handbook 120). Washington: U.S. Department of Commerce, December 1976. Available from the U.S. Government Printing Office; Washington, D.C. 20402. Cost: $.70.

  One of a series of EPIC Energy Management publications, this 23-page booklet is directed toward managers of small businesses, such as motels, food stores, job shops, and small assembly plants. It presents information on how to create an energy management program and conduct an energy audit. A checklist is included for reducing energy usage in buildings and grounds, electricity, equipment, and vehicles. Cost analysis procedures and sources of outside help are described. An appendix presents eight cost saving opportunities (CSOs) with mini-case studies. The material is presented in a style that is generally inappropriate for students and workers, but some sections, such as the CSOs, could serve as resources.

- Kerns, M. Energy conservation: An examination of energy conservation mechanisms as they relate to school districts in region IX. St. Paul, MN: Educational Cooperative Services Unit, Minnesota University, 1977. (ERIC No. ED 164 297) Cost: Contact source.

  This 66-page report is designed for school managers. It contains a large section on survey and audit procedures as well as 22 pages of energy conservation measures that supervisors and custodians might implement in the areas of heating, air conditioning, ventilation, plumbing, electricity, and structural concerns. The measures are in check list form and could be easily understood by students and workers.

- Minnesota Energy Agency. Energy management for industrial operators. St. Paul, MN: Author, no date. Available from the Minnesota Energy Agency; 980 American Center Building; 150 East Kellogg Boulevard; St. Paul, MN 55101. Cost: Contact source.

  This 42-page booklet, written for the plant manager, consists primarily of a checklist of conservation measures. Areas discussed include air conditioning, boilers, hot water, compressed air, electricity and lighting, gas turbines, materials handling, paint line operations, process and manufacture, and welding. While most of the measures described could not be initiated by the worker, workers would be involved in their implementation. This booklet would have to be adapted for use by workers and students enrolled in vocational education courses.

- National Electrical Contractors Association, National Electrical Manufacturers Association. Total energy management: A practical handbook on energy conservation and management (2nd ed.). Washington, D.C.: Authors, 1976. Available from the National Electrical Contractors Association; 7315 Wisconsin Ave.; Washington, D.C. 20014. Cost: $2.50.

  This 90-page booklet contains instructions and forms for analyzing building energy use. Written for building owners and managers, the text contains concrete suggestions for improving the efficiency of personnel involved in building maintenance. Strategies to obtain worker commitment and cooperation are discussed, although the text is not worker oriented.

- New York State Energy Office. Schools can save energy dollars. Albany, NY: Author, no date. Available from New York State Energy Office; Agency Building 2; Rockefeller Plaza; Albany, NY 12223. Cost: Contact source.

  This workbook was developed to help private schools (K-12) conduct energy audits. It contains a section on program management, 34 pages of energy survey worksheets, and over 100 pages of energy-saving suggestions and modifications in such areas as ventilation, hot water heating, lighting, and insulation. Instructions for calculating energy savings are presented. Worker behaviors are discussed, but the publication is

directed toward school administrators. The contents are somewhat technical and very detailed. Suggestions could be adapted for use in any large plant.

- Office of Buildings Management. Conservation of utilities. Washington, D.C.: General Services Administration, Public Buildings Service, no date. Cost: Free.

  This 95-page booklet, prepared for building managers and staff, presents conservation ideas in the areas of electricity, heat, and water. The text and the many charts, figures, and illustrations included in the booklet are presented at an elementary level. Ideas require no capital investment and are all suitable for workers to implement. Very little adaptation would be required for use with a student audience. The information is appropriate to those vocational areas in which building maintenance is a concern.

- Pacific Gas & Electric Company (PG&E). Energy saving tips: A money saving guide for small business. San Francisco: Author, 1980. Available from Energy Conservation and Services Department; PG&E; 77 Beale Street, San Francisco, CA 94601. Cost: Contact source.

  This liberally illustrated, two-color booklet contains 28 pages of energy saving options, practices, and worksheets. Energy conservation in lighting, heating, ventilating, cooling, water heating, and food preparation and storage are discussed in terms of operation, energy-saving improvements, and maintenance tips. All the suggestions can be implemented without altering normal business procedures. The material is presented in non-techrical terms suitable for workers or managers.

- Public Service Company of Colorado, Energy & Man's Environment, and Colorado State Board of Commnity Colleges and Occupational Education. Energy management strategies for home economics teachers. Denver: Public Service Company of Colorado, no date. Available from Georgia Doherty, Program Development Coordinator; Public Service Company of Colorado; 550 15th Street, Room 676; Denver, CO 80202. Cost: Contact source.

  Designed for use by home economics teachers, this 275-page handbook presents general energy conservation and awareness classroom units and activities in the areas of food and nutrition, clothing, textiles, housing and home furnishings, child development, and personal and family relations. The material is presented in "unit" format, each with a list of objectives, background information and resources, suggested student activities, evaluation techniques, and, in some cases, a teacher's guide. The activities described are appropriate for junior and senior high school students and are more oriented toward students as consumers than toward students as workers in a job situation.

- Reese, A. Industrial energy conservation: Where do we go from here? New York, NY: Inform, Inc., 1977. Available from Inform; 25 Broad Street; New York, NY 10004. Cost: $10.00.

  This 45-page booklet includes a 16-page policy/research report on conservation and motivation within industry and associated resource materials. The materials contain workplace conservation activities that would require adaptation for use with students.

- Roberts, J. Unlimited challenges in a world of limited resources. Bellingham, WA: Western Washington University, 1980. Available from State Superintendent of Public Instruction; Division of Vocational-Technical & Adult Education Services; Home and Family Life Education; Olympia, WA 98504. Cost: Free.

  This 7-page resource for home economics teachers focuses on a number of resource conservation issues, including energy. Examples of teaching activities are presented in the areas of human development and relationships, food and nutrition, consumer management, clothing and textiles, family leisure and recreation, home furnishings, and housing. A bibliography of materials that relate to scarcity of resources is included. Scarcity of resource statistics and a discussion of the conservation ethic are used to motivate readers. This pamphlet is not job specific and is prepared for teachers.

- Robinson, K. E. Proven ways to save energy in industrial plants, in heating/piping/air conditioning. May 1975, pp. 58-63. Reprint available from Reinhold Publishing Company, Inc.; Penton/IPC; 2 Illinois Center Building; Chicago, IL 60601. Cost: Contact source.

  This highly motivating article describes steps needed to set up an energy conservation program in an industrial plant. This introduction is followed by a list of about 25 "fast possibilities" for showing immediate results in energy conservation, and by about the same number of "long-range possibilities" that involve installing equipment or modifying operations. The article is written in a readable style and would need minimal adaptation for use by students or workers.

- Subcommittee on Advanced Energy Technologies and Energy Conservation; Committee on Science and Technology; U.S. House of Representatives. Opportunities for energy savings in crop production. Washington, D.C.: Author, January 1978. Available from the Environment and Natural Resources Policy Division, Congressional Research Services, Library of Congress. Cost: $3.75.

  This 269-page book presents a detailed discussion of opportunities for savings in three major energy-using crop production activities: nitrogen fertilizer production, crop drying, and irrigation. This publication presents a thorough discussion of the energy conservation options open to the large- or small-scale farmer and could be adapted for use by students.

- U.S. Department of Energy, Office of Conservation and Solar Energy. Gas savers. Washington, D.C.: Author, 1980. Cost: Single copies free.

  The various materials in this unbound portfolio are designed to be used or adapted as needed by any transportation-business or industry. Included in the packet are (1) a description of DOE's Driver Energy Conservation Awareness Training program (DECAT); (2) How to Save Gasoline and Money (brochure with camera-ready copy for reproduction); (3) 1980 MPG Ratings/Annual Fuel Cost chart; (4) a set of peel-off labels for recording gas mileage, car maintenance, etc.; (5) two bumper stickers and camera-ready reproduction art; (6) Routes to Fuel Economy, a five-page brochure covering trip planning techniques, vehicle selection, driving skills, and vehicle maintenance (original and camera-ready copy for reproduction); and (7) Starting a Driver-Owned and Operated Van Pool, a 22-page manual providing step-by-step guidance for setting up van pools. The text of the materials is clearly presented and is suitable for use by students or workers.

- University of Tennessee Environment Center and College of Home Economics; Knoxville, Tennessee. Energy conservation in the home: An energy education/conservation curriculum guide for home economics teachers. Oak Ridge, TN: Department of Energy, 1977. Available from U.S. Department of Energy; Technical Information Center; P. O. Box 62; Oak Ridge, TN 37830. Cost: Contact source.

  This 319-page loose-leaf guidebook is designed to help home economics teachers and students understand the problems, options, and costs involved in conservation of energy resources. Following an overview of the energy situation in the U.S., home energy conservation practices are presented in divisions corresponding to the commonly used curriculum divisions from home economics: housing, food, clothing, and personal care and entertainment. Each section is introduced with objectives, and then related factual information is presented. All statistical data are fully referenced. A separate section describes 26 student activities that can be conducted in class and at home. An appendix presents instructional material for teachers on basic facts of energy technology. A glossary and lengthy bibliography are included. The materials are appropriate for teachers or for students to use for self-instruction. They are not directly concerned with the worker.

- Wacholz, M. Agricultural energy curriculum development project. St. Paul, MN: Minnesota State Department of Education, Division of Vocational and Technical Education, 1979. (ERIC No. ED 174 780). Cost: Contact source.

  This 32-page paper describes and contains in an appendix energy instructional units designed to fit into each year of a three-year farm business management curriculum. The four curriculum units included focus on fertilizer management in crop production. The curriculum stresses efficient use of commercial fertilizer, applying animal and sewage waste, implementing proper cultural practices, crop rotations, use of intercropping, and supporting crop development. Statistics on energy use in

farming and fertilizer production are presented to promote energy conservation practices. The materials are very brief and illustrated with a few simple tables. They are appropriate for use with students.

- Waterford School District, Michigan State University, and North Oakland County Builders Association. A workbook on residential passive solar energy efficient design and construction. 1980. Available from the Office of Occupational Education; Waterford School District; Box 547; Waterford, MI. Cost: $25.

  This 450-page loose-leaf book was created for vocational building trades and architectural drafting instructors, homebuilders, developers, and design and construction professionals attending passive solar construction seminars. The text details specific and general suggestions for builders. Topics cover design, financial evaluation, marketing, landscaping, cooling, interior design, and solar access and layout. Motivational issues, such as cost, ease, reliability, comfort, and performance, are discussed. Most of the information is appropriate for secondary construction trades students.

- Wert, J. M., & Worthington, B. K. Selected energy management options for small business and local government. University Park, PA: The Pennsylvania State University, 1978. (ERIC No. ED 159 065). Cost: Contact source.

  This 36-page publication provides a checklist of over 250 potential energy saving practices that could be implemented by workers, managers, or owners. Many options would cost little or nothing to implement. Options are listed under the headings of management, buildings, lighting, water, waste operations, equipment, transportation, and food preparation. Neither a rationale for nor a description of each suggested practice is provided. Therefore, these materials would need to be modified for use with workers and students.

IV. APPENDIX: BIBLIOGRAPHIES CONSULTED

1. Allen, J., & Picus, L. Northwest energy education survey: Final report (prepared under contract with the Bonneville Power Administration). Portland, OR: Northwest Regional Education Laboratory, 710 S.W. Second Avenue, 1979.

   The goal of this study was to identify current and developing energy education programs in four states and to determine areas where materials are needed. Included in the 83-page report are results of the initial survey, descriptions of 22 programs that are currently available, and recommendations for the future of energy education in the Northwest.

2. Coon, H. L., & Bowman, M. L. Energy activities for the classroom: Volume 2 (prepared under contract with the National Institute of Education). Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, December 1978.

   This 164-page book contains 78 energy-related activities for students in elementary and secondary schools. It also includes an annotated list of 53 teaching resources and publications available through ERIC microfiche collections.

3. Coon, H. L., & Disinger, J. F. Energy education programs: High school programs and resources (prepared under contract with the National Institute of Education). Columbus, OH: ERIC Clearinghouse for Science, Mathematics and Environmental Education, April 1979.

   In this booklet, ERIC has combined examples of energy education programs submitted by 12 high schools with an annotated bibliography of 52 resources containing learning activities and background information. This 39-page booklet was designed for use by teachers who want to initiate or improve energy education programs.

4. Crowell, M. R. Energy-related activities in two-year post-secondary vocational-technical institutions. Washington, D.C.: U.S. Department of Energy, November 1978.

   This is an 87-page preliminary report of a larger study designed to assess the state-of-the-art of energy education in two-year postsecondary educational institutions. Included within the report are descriptions of 21 current energy-related occupational programs in 15 institutions in 12 states, 14 planned programs in 10 institutions in 7 states, and 117 short courses currently offered by 63 vocational-technical schools.

5. East Central Curriculum Management Center. ECCMC special bibliography in vocational and career education--Energy. Springfield, IL: Illinois State Board of Education, April 1980.

This is a 20-page annotated bibliography of 162 books, reports, conferences, activity packages, and instructional units in the field of energy that are available on loan from the ECCMC.

6. Energy and Man's Environment. Energy education instructional materials samples. Beaverton, OR: Author, 7874 S.W. Nimbus Avenue, 1979 and 1980.

These are 17- to 22-page promotional booklets containing 24 samples of the energy and conservation instructional materials offered by EME for elementary and secondary schools.

7. Energy Extension Service. Publications--Grades K-12. Lansing, MI: Michigan Department of Commerce, P.O. Box 30228, no date.

This pamphlet lists 58 energy education curriculum guides, activities, and fact sheets available to teachers in elementary and secondary schools.

8. Energy Institute. Energy education materials inventory (2 vols., prepared for U.S. Department of Energy under contract no. EC-77-C-01-8685). Springfield, VA: National Technical Information Service (NTIS), May 1978 and August 1979.

Included in two volumes totaling 736 pages are abstracts of 730 audiovisual materials, 75 activity packages, 670 publications, and 130 energy information sources suitable for use in elementary and secondary schools.

9. Georgia Office of Energy Resources. Georgia Office of Energy Resources: Annual report 1979. Atlanta, GA: Author, 270 Washington Street, S.W., 1980.

This 21-page report outlines 19 programs ranging from residential to governmental applications of such topics as energy conservation, fuels management, and renewable resources.

10. Hill, C. L. Vocational instructional materials available from federal agencies (8 vols., prepared by Human Resources Management, Inc., for the U.S. Department of Education under contract no. 300-79-0420). Washington, D.C.: U.S. Government Printing Office, 1980.

These volumes range from 30 to 65 pages, with each volume containing 300 to 600 annotated references to materials developed by federal

agencies since 1975. There is one volume for each of the seven vocational education disciplines plus one volume addressing special needs groups.

11. JRB Associates. The resource file: Practical publications for energy management, edition 3 (prepared under contract with the U.S. Department of Energy). Springfield, VA: National Technical Information Service (NTIS), March 1980.

This is a 320-page comprehensive list of 142 publications and 24 audiovisual materials offering practical energy conservation methods for agricultural facilities, commercial establishments, office buildings, industrial plants, power generation, residences, health care institutions, transportation, and general application.

12. Missouri Department of Natural Resources. Energy education materials directory. Jefferson City, MO: Author, Energy Clearinghouse, P.O. Box 1309, 1980.

This 24-page booklet lists 34 activities developed by 19 states as well as numerous reference materials, games, and audiovisual free-loan materials suitable for classroom use.

13. Missouri Department of Natural Resources. Energy publications. Jefferson City, MO: Author, Information Clearinghouse, no date.

This pamphlet lists 19 booklets describing practical energy conservation projects and energy facts for residential application.

14. Murray State University, Center for Environmental Education. Teacher's guide to energy resources in Kentucky. Murray, KY: Author, June 1979.

Resources offering services to classrooms are listed in this 75-page book. Listings include 123 regional and 126 national institutions, agencies, organizations, and individuals.

15. National Council for Resource Development. Energy resource guide. Washington, D.C.: Author, 1979.

This is a 176-page outline of possible sources of financial assistance for energy-related programs at the community college level. Over 140 federal, regional, corporate/utilities, and private foundation resources are listed.

16. National Science Teachers Association. Free classroom materials on energy. Washington, D.C.: Author, 1742 Connecticut Avenue, N.W., no date.

This 10-page bulletin describes a series of 46 energy activity packets and 20 fact sheets on energy technologies for use in elementary and secondary schools.

17. Priddy, M. D., Kearns, M. D., & Bingaman, J. W. (Eds.). Energy conservation education resource guide. Greensboro, NC: Guilford County School System, July 1978.

The teachers of Guilford County School System developed this 167-page resource guide in order to integrate energy conservation into their existing K-12 curriculum. The guide consists of 54 energy concepts supported by numerous activities from a variety of sources. Included are annotated bibliographies by grade level of 288 books and audiovisual materials, as well as a list of 110 organizations that offer further information and services.

18. Puckett, K., Moore, L., McDuffie, C., Kennedy, D., Costello, C., & Davey, D. Resource guide for energy conservation education 1980--Idaho, Montana, Oregon, Washington. Boise, ID: Bonneville Power Administration, 1980.

Resources and sources of information available to citizens of the Pacific Northwest are listed in this 113-page guide. Listings include 260 agencies and organizations, 21 bibliographies, 33 curriculum guides, 61 audiovisual materials, and numerous games, charts, displays, booklets, and periodicals.

19. Rhode Island Collaborative Effort. Energy resource catalog--K-12 curriculum and energy management (revised edition). Providence, RI: Rhode Island College, Center for Evaluation and Research, September 1980.

This 42-page booklet lists 40 agencies that provide information on energy education and 50 resources available to teachers.

20. Rinehart, M., Howe, R. W., & Kozlow, M. J. Environmental education information report--Energy education (prepared under contract with the National Institute of Education). Columbus, OH: ERIC Clearinghouse for Science, Mathematics and Environmental Education, no date.

Abstracts of 650 science education documents announced in Resources in Education (RIE) between 1966 and 1978 are cross-indexed by subject, author, and institution in this 152-page bibliography.

21. SMEAC Information Reference Center. Energy conservation/education fact sheet--No. 4. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1980.

This six-page pamphlet presents 18 journal citations and 16 document abstracts addressing the issues of energy conservation and retrofitting in the schools.

22. U.S. Department of Education. A selected bibliography of energy and education materials. Washington, D.C.: Author, May 30, 1980. This is a 12-page annotated bibliography of 41 energy education materials.

23. U.S. Department of Energy. Activities of the U.S. Department of Energy in education--Annual status report. Springfield, VA: National Technical Information Service (NTIS), April 1980.

The following educational activities administered by DOE are described in this report: 16 curriculum packages, 5 program assessment studies, 6 workshops and conferences, 7 general resource materials, and 20 programs involving the development of energy skills and institutional resource enhancement.

24. U.S. Department of Energy. Directory of faculty development projects in energy education--1980. Oak Ridge, TN: Author, Technical Information Center, April 1980.

This 32-page booklet describes 98 energy education workshops sponsored by DOE for elementary, secondary, and college teachers in 43 states.

25. U.S. Department of Energy. Education publications. Washington, D.C.: Author, October 1980.

DOE periodically distributes a five-page bulletin announcing its current education publications. The most recent bulletin lists 31 energy curriculum materials, 4 general resources for teachers, and 8 educational reports.

26. U.S. Government Printing Office. Government periodicals and subscription services. Washington, D.C.: Author, Summer 1980.

This is a 45-page list of periodicals published by the United States government. It includes 30 that are energy-related.

27. U.S. Government Printing Office. Subject bibliography--Energy conservation and resources. Washington, D.C.: Author, May 7, 1980.

This is a 63-page bibliography of approximately 700 energy-related publications currently available from the GPO.

28. Vermont State Energy Office. Directory of Vermont: Energy information sources. Montpelier, VT: Author, April 1980.

This is a 21-page booklet listing 75 organizations that provide energy information and services pertaining to conservation.