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**The Resource File:
Practical Publications For
Energy Management,
Edition III**

**A REFERENCE GUIDE TO HANDBOOKS,
CURRICULA AND AUDIOVISUAL MATERIALS**

March 1980

Prepared for:

U.S. Department of Energy

Assistant Secretary for Conservation
and Solar Energy

Office of State and Local Programs
Energy Extension Service

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**A REFERENCE GUIDE TO HANDBOOKS,
CURRICULA AND AUDIOVISUAL MATERIALS**

March 1980

Prepared Under Contract By:

JRB Associates
8400 Westpark Drive
McLean, Virginia 22102

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Prepared for:

U.S. Department of Energy
Assistant Secretary for Conservation
and Solar Energy
Office of State and Local Programs
Energy Extension Service

PREFACE TO THE THIRD EDITION

This edition of *The Resource File* marks the third time that the Department of Energy has surveyed the field of practical energy conservation publications to provide a current and comprehensive list for use by organizations and institutions serving the American public.

Since the project began, the evolution of energy conservation outreach activities has been rapid, including not only the Energy Extension Service but other efforts within the Department of Energy, such as the Residential Conservation Service, the Regional Solar Energy Centers, and the Appliance Labeling Program. These, in turn, are reflected through the pilot EES activities in several states and the outreach programs conducted by specialized organizations. Accompanying this evolution has been significant growth in the number and variety of practical materials. The degree of refinement and innovativeness in materials for popular use has increased as well.

As these efforts continue to expand, it is important that the means of finding the kind of energy conservation information most suited to individual needs be readily available. *The Resource File* is one such means. In addition, many organizations have now had several years' experience as comprehensive resources for providing energy conservation help. Some of them are listed in the Introduction. Others are reflected by those cited as resources for materials in the body of *The Resource File*.

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INTRODUCTION

The Resource File: Practical Publications for Energy Management, Edition III is an in-depth bibliography of practical and action-oriented energy conservation publications and materials. It is a reference tool, designed for Federal, state, and local energy managers or people who are asked to recommend "how-to" conservation guides to the public, or who wish to select guides for themselves. Managers, facility engineers, building owners and operators, staff development coordinators, consumer affairs professionals, architects, educators, extension agents, librarians, and technical information specialists are among those who will find this an extremely useful guide to the literature of energy conservation. It should be especially valuable to Energy Extension Service (EES) program managers or to State Energy Conservation Program (SECP) staff in responding to public inquiries.

The Resource File is an expanded version of *Practical Materials for Teaching Energy Management: A Resource File, Edition I*, first published by the Department of Energy in the fall of 1977, and reissued as *Edition II* in 1978. Like the earlier versions, *The Resource File* has been developed to share practical materials about energy conservation among all levels of government and the private sector, and reflects the substantial body of energy conservation expertise that has been built up in both sectors. The entries are more than brief descriptions of documents; they are short reviews, developed in sufficient detail to permit users to choose the manuals, study-guides, films, and pamphlets best suited to their specific needs.

Each listing describes a publication's intended audience and provides a chapter-by-chapter summary of its contents. Entries close with a brief reviewer comment, including information on obtaining a copy of the publication. The reader should note that publications may have gone out of print after *The Resource File* was completed.

The Resource File describes primary references, those which can be used alone as practical guides to energy conservation. Included are operations and maintenance manuals, life-cycle costing handbooks, home insulation manuals, films on fuel-saving driving techniques, and courses devoted exclusively to home weatherization.

For the person who has learned the lessons of high-priced energy and has determined that increased energy efficiency is a matter of practical, everyday necessity, the problem becomes one of choosing the right guide, manual, or workbook. Faced with the proliferation of these aids, a reference such as this volume can be extremely useful.

Consistent with Federal policy, this catalog does not endorse one publication over another. The catalog is designed to provide enough information about the content and intended audience of each publication to enable the reader to make an informed, objective selection. Every effort has been made to include all practical guides to energy conservation that could be identified while this catalog was in preparation.

USING THE CATALOG

The Resource File is organized as follows:

- Primary Resources
- Title Index
- Key Word Index

A user who already knows the title of a particular resource can simply look it up in the Title Index. The Key Word Index can be used to find descriptions of resources according to the topics they cover. Following each topic in the index is a series of hyphenated letter-number combinations which refer to the individual resources listed in the book. The letters used and the general topic areas they represent are indicated in the following table:

<u>Letter</u>	<u>General Topic Area(s) Covered</u>
A	Agricultural facilities and operations
C	Commercial establishments, office buildings
G	General materials that are applicable to a number of different topic areas
I	Industrial plants and processes, power generation
R	Residential, health care institutions, other housing
T	Transportation, mobile equipment
V	Films, filmstrips, videotapes

Each topic area, e.g., Industrial plants and processes, is arranged by year of publication. This system makes it easy to keep *The Resource File* current.

OTHER SOURCES

Every effort has been made to include a comprehensive listing of materials in this edition. Nevertheless, it is possible that some materials may have been overlooked or that new materials may be published before this edition becomes available to the public. Moreover, ad hoc seminars, workshops, special courses and services are continually being announced. Therefore, readers may wish to contact the following sources of information and assistance, which provided input to *The Resource File*:

Center for Energy Policy and Research
New York Institute of Technology
Old Westbury, New York 11568
(516) 686-7578

Established to inform public and private sectors about efficient energy utilization and conservation. Conducts information research and dissemination activities; provides an information library and clearinghouse.

Center for Renewable Resources
1001 Connecticut Avenue, N.W.
Suite 510
Washington, D. C. 20036
(202) 466-6880

Conducts policy research, provides educational materials, and offers technical assistance to grass-roots organizers.

Citizens Energy Project
1110 Sixth Street, N.W.
Suite 300
Washington, D. C. 20001
(202) 387-8998

Research and advocacy organization working primarily in energy conservation, solar technologies, and promotion of alternatives to nuclear energy. About 150 publications on these topics.

Mid-American Solar Energy Center
8140 Twenty-sixth Avenue South
Bloomington, Minnesota 55420
(612) 853-0400

A private, not-for-profit corporation which promotes the accelerated commercialization of solar energy in the 12-state region. Directed toward builders, manufacturers, lenders, appraisers, educators, architects, planners, and developers, among others.

National Center for Appropriate
Technology (NCAT)
Post Office Box 3838
Butte, Montana 59701
(406) 494-4572

Research, development, and promotion of low-cost, small-scale efficient energy devices, plus information on nutrition and health and food production (greenhouses). Publications, including national newsletter.

National Solar Heating and Cooling
Information Center
Post Office Box 1607
Rockville, Maryland 20850
Toll-free: (800) 523-2929
(800) 462-4983 (PA)
(800) 523-4700 (AK, HI)

Northeast Solar Energy Center
70 Memorial Drive
Cambridge, Massachusetts 02142
(617) 661-2500

Solar Energy Research Institute
(SERI)
Information Center
1617 Cole Boulevard
Golden, Colorado 80401
(303) 231-1415

Southern Solar Energy Center
61 Perimeter Park
Atlanta, Georgia 30341
(404) 458-8765

Western Solar Utilization Network
(Western SUN)
Pioneer Park Building
715 Southwest Morrison Street
Portland, Oregon 97205
(503) 241-1222

Additional sources are:

- Department of Energy regional offices
- State energy offices
- Colleges and universities (especially schools of Engineering and departments of Continuing Education)
- Vocational and technical schools

Service facility for information on any aspect of solar heating/cooling. Categorized mailing list; detailed information (names of architects, builders, solar equipment manufacturers, speakers on the subject of solar energy).

Established to accelerate transition to renewable energy sources in nine-state-region. Conducts a wide range of solar activities in the areas of market development, information and education, technology development and planning, and systems analysis. Offers extensive information to general public, state and local governments, the solar industry, etc.

Conducts energy research and demonstration programs. Provides information on all aspects of solar energy.

Established to foster the more rapid commercialization of solar technologies in the 19 jurisdictions which comprise its region. Programs concentrate on those technologies which offer the greatest potential for market penetration by the year 2000.

Programs focus on passive solar applications, active solar heating/cooling, agricultural and industrial process heat applications, small wind energy conversion systems, and wood combustion. Outreach services to the public include technical/design assistance, training, education, information, business/financial consultation, and marketing.

- Local utility companies
- U.S. Department of Energy
Technical Information Center
Post Office Box 62
Oak Ridge, Tennessee 37830
(FTS-850-4352)
- Equipment manufacturers (Detailed information and training regarding the selection, operation, maintenance, and retrofit of specific equipment should be obtained from manufacturers.)
- Commercial energy management firms (A growing number of companies are offering seminars in various aspects of energy management.)
- Professional and trade associations
- National Referral Center
Science and Technology Division
Library of Congress
Ten First Street, S.E.
Washington, D. C. 20540
- Local architecture and engineering firms
- State and local building code administrators
- Libraries

OBTAINING MATERIALS

Every description in *The Resource File* includes the name of the agency or source to contact for a copy of the material and the price, if any. For Government-produced items, it is advisable to check with the originating agency, if time permits, before contacting either the Government Printing Office or the National Technical Information Service. Remember to contact an agency's regional office. In some instances, the agency may have a supply of free copies on hand or may be able to provide information about a later edition or a new item. In other instances, publications may have gone out of print. Prices for all materials are subject to change without notification. The prices quoted are for single copies; for bulk rates, contact the source listed.

The addresses and telephone numbers for the Government Printing Office and the National Technical Information Service are:

Superintendent of Documents
Government Printing Office
Washington, D. C. 20420
(202) 783-3238

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
(703) 557-4650

TO THE RESOURCE FILE USER:

Are there publications you believe should be added to *The Resource File*?

Have you discovered that a publication is no longer available?

Please let us know by entering the necessary information below and mailing this page to:

U.S. DEPARTMENT OF ENERGY
CONSERVATION AND SOLAR ENERGY
ENERGY EXTENSION SERVICE, CS-74
FORRESTAL BUILDING
WASHINGTON, D. C. 20585

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(Author)

(Publisher or Sponsoring
Agency)

(Comments and Additional Information)

O P T I O N A L

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(Address)

(Telephone)

SECTION I
PRIMARY RESOURCES

**AGRICULTURAL FACILITIES
AND OPERATIONS**

SAVING ENERGY ON THE FARM

PACIFIC GAS AND ELECTRIC COMPANY

1979

A booklet designed to provide the farmer with ideas that will increase the efficient use of energy on the farm. (16 pp.)

CONTENTS

Section 1 Irrigation - Conserving Water Conserves Power gives basic ideas on how to conserve water. Equations to calculate the amount of water needed are provided as well as data that compare irrigation pump drive efficiencies. A list of crops and their respective water requirements is included.

Section 2 Water Supply System discusses how to calculate pump energy needs and provides energy-saving checklists on:

- How to Determine the Energy Requirements of an Agricultural Pumping Plant
- Pump Test Report Formulas
- Pump Test Measurements
- Deep Well Turbine Power Balance
- Relationship Between Overall Plant Efficiency and Kw Hours

Section 3 Heating and Lighting graphically illustrates heat loss from uninsulated pipes and tanks, and discusses motor use, air compressors, lighting, space heating, and boilers, providing energy-saving tips on each.

Comments: This guide provides a concise explanation of farm energy conservation ideas and tools and includes space for calculations and notations.

Price: Free.

Available

From: Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106

A GUIDE TO ENERGY SAVINGS FOR THE DAIRY FARMER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for operators and managers of dairy farms. Operating energy costs can be reduced in buildings and in the use of farm equipment. (50 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer. It emphasizes the importance of saving energy on the farm.
- Section 2 Energy and Its Use in Dairying provides an overview of energy expenditures in dairy farming.
- Section 3 Water Heating discusses sources of energy loss in heating water and lists energy-saving tips for correcting the losses.
- Section 4 Ventilation and Supplemental Heat discusses the energy costs of ventilation and heat in dairy barns. It offers tips for retrofit and maintenance of heating and ventilation equipment.
- Section 5 Milk Cooling discusses the use of two different kinds of refrigeration equipment used by dairy farmers —ice builders and direct expansion coolers. It offers energy saving tips for the operation and maintenance of each.
- Section 6 Vacuum Pumps offers energy saving tips for the operation and maintenance of the two types of vacuum pumps commonly used in milking operations—the rotary vane and the centrifugal water displacement pump.
- Section 7 Electric Motors discusses motor performance and farm equipment requirements. It offers tips for operating and maintaining equipment efficiently.
- Section 8 Tractors, Trucks, and Engines recommends a thorough analysis of work done to determine the best use of farm vehicles. It offers tips for major changes and routine maintenance procedures that should save energy.
- Section 9 Lighting explains the units used to measure lighting levels. It provides a table of recommended lighting levels for efficient use of lighting energy. Tips for major changes in lighting practices and for routine maintenance of lighting fixtures are offered.
- Section 10 Recordkeeping provides charts which assist the dairy farmer in determining his monthly and annual fuel use. An explanation for using the charts is provided.

References A list of the seventeen publications used to produce the guide is provided. All are dated 1975 or earlier.

Comments: This guide provides assistance to the dairy farmer in managing dairy operations. Each section of the guide concludes with examples of implemented methods for conserving energy, including economic analyses of each.

Price: \$5.25 (PB270-076)

Available From: National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

A GUIDE TO ENERGY SAVINGS FOR THE FIELD CROPS PRODUCER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for operators of both large and small field crop farms. Operating energy costs can be reduced in soil tilling, planting, fertilizing, cultivating, irrigating, spraying, harvesting, and drying. (58 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer and emphasizes the importance of saving energy on the farm.
- Section 2 Energy and Its Use in Field Crop Production reviews the energy requirements for various crop production activities and equipment.
- Section 3 Reduced Tillage Practices presents several alternatives to conventional tillage. Energy savings can be realized by following a variety of reduced tillage methods.
- Section 4 Fertilizer Use reviews the present use of fertilizers on field crops. Suggestions for the most effective and economical applications of fertilizers are offered.
- Section 5 Irrigation discusses surface and sprinkler irrigation methods and lists several ways to reduce fuel and electricity consumption in irrigating field crops.
- Section 6 Grain Drying discusses the operation, maintenance, and planning of grain drying operations. It provides an energy conservation checklist for operators and managers.
- Section 7 Tobacco Drying offers tips for reducing fuel consumption in tobacco curing operations including the firing-up, yellowing, leaf drying, and stem drying phases.
- Section 8 Forage Production offers tips for operating and maintaining harvest and baling equipment efficiently.
- Section 9 Tractor and Truck Use provides suggestions for modifying present operation and maintenance practices to reduce fuel consumption in farm vehicles.
- Section 10 Gasoline and Diesel Engines provides a checklist for saving energy in the operation and maintenance of gasoline and diesel engines.

Section 11 Recordkeeping presents a methodology for recording energy consumption by type and user. Several examples, tables, and worksheets are provided to facilitate the process.

References A list of the twenty-three publications used to produce this guide is provided. All but two are dated before 1976.

Comments: This guide provides assistance to field crop producers in determining where savings can be realized in his operations. Each section of the guide concludes with examples of implemented methods, including economic analyses. These examples give the field crop producer a general idea of what his savings can be.

Price: \$5.25 (PB270-071)

Available National Technical Information Service
From: 5285 Port Royal Road
 Springfield, Virginia 22161

A GUIDE TO ENERGY SAVINGS FOR THE LIVESTOCK PRODUCER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for operators and managers of facilities for cattle, sheep, lamb, and hog operations. Operating energy costs can be reduced in building and in the use of farm equipment. (78 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer. It emphasizes the importance of saving energy on the farm.
- Section 2 Using Energy in Livestock Production reviews relative energy expenditures in the different livestock operations.
- Section 3 Selecting and Using Field Equipment offers tips for efficient operation and maintenance of the tractors, trucks, and cars used in livestock operations. It also discusses the factors to consider when purchasing new equipment and when planning or designing new facilities.
- Section 4 Grinding and Preparing Feed suggests many ways to save energy in the grain processing phase of livestock production. Efficient operation, maintenance, and planning practices are recommended.
- Section 5 Managing Range and Herd discusses ways of reducing the frequency of supplemental feedings to reduce fuel consumption by range vehicles.
- Section 6 Ventilating and Heating discusses ways to reduce heating and ventilating requirements in confined livestock housing systems. It covers operation, maintenance, planning, and insulation procedures that can save energy.
- Section 7 Lighting suggests ways of reducing lighting energy consumption by using more efficient light bulbs and reducing lighting levels.
- Section 8 Drying Grain offers recommendations for potential energy savings in this operation.
- Section 9 Irrigating with Sprinklers discusses better water management in efficient sprinkler irrigation.
- Section 10 Recordkeeping provides tables and worksheets which assist the livestock producer in determining where and in what quantities energy is used in his operation.

Section 11 Estimating Energy Use provides tables and procedures for estimating energy use by type (electricity, LP and natural gas, gasoline, and diesel fuel.)

Comments: This guide provides useful tips and techniques for saving energy in livestock operations. Each section of the guide concludes with examples of implemented methods for conserving energy, including economic analyses of each. The section on estimating energy use is supported by a detailed series of tables for making estimations.

Price: \$6.00 (PB270 - 073)

Available National Technical Information Service
From: 5285 Port Royal Road
 Springfield, VA 22161

A GUIDE TO ENERGY SAVINGS FOR THE ORCHARD GROWER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for all orchard growers, including citrus, grapes, nuts, and apples. Operating energy costs can be reduced in irrigation and pesticide/fertilizer application. (49 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer and emphasizes the importance of saving energy on the farm.
- Section 2 Energy Use in Orchard Crop Production reviews the major energy uses in orchard grove and vineyard operations including frost protection, fertilization, pesticide applications, tillage, pruning, harvest operations, and irrigation. An overview of fuel use by type is also presented.
- Section 3 Fertilization offers suggestions for the most efficient and economical application of fertilizers.
- Section 4 Irrigation discusses the flood, furrow, sprinkler, and trickle irrigation methods and lists several ways to reduce fuel and electricity consumption in irrigating orchard crops.
- Section 5 Weed Management presents several alternatives to disk cultivation as methods of reducing energy consumption in orchard operations.
- Section 6 Pest Management reviews the methods used in applying pesticides and discusses operating tips for using these methods most effectively and efficiently.
- Section 7 High Density Crops suggests the replacement of large orchard plants with dwarf plants to increase yield per acre and to decrease production costs.
- Section 8 Frost Protection discusses the efficient operation and maintenance of wind machines, orchard heaters, and sprinklers for fuel conservation.
- Section 9 Tractor and Truck Use discusses the potential energy savings through efficient operation and maintenance practices. Methods of achieving these savings are presented.
- Section 10 Gasoline and Diesel Engines offers engine operation and maintenance tips that can save fuel without changing the amount of work or the way the work is done.

References A list of publications used in preparing this document is provided. All but one are dated before 1976.

Appendix Detailed Energy Use Recording provides several tables, blank charts, and worksheets for determining orchard energy use and for recording these data.

Comments: This guide provides useful information for efficient management of all orchard operations. Each section of the guide concludes with examples of implemented methods, including economic analyses. These examples give the orchard grower a general idea of what his/her savings can be.

Price: \$5.25 (PB270-075)

Available From: National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

A GUIDE TO ENERGY SAVINGS FOR THE POULTRY PRODUCER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for operators and managers of facilities for turkeys, hens, chickens, ducks, and other poultry that will reduce operating energy costs in buildings and in the use of farm equipment. (46 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer. It emphasizes the importance of saving energy in farm operations.

- Section 2 Energy and Its Use In Poultry Operations presents an overview of energy use by type in the broiler, turkey, and egg industries. Other poultry—ducks, geese, guineas, and pheasant—are also included.

- Section 3 Brooding lists energy conservation measures which can lead to substantial fuel savings in the operation of gas brooders. Energy-saving tips for more efficient and economical operation and maintenance of brooders are also provided.

- Section 4 Lighting provides a table of recommended illumination levels in poultry operations which assist the poultryman in matching the amount of light provided to the amount of light required for a particular task. It provides additional tips for saving lighting energy.

- Section 5 Ventilation makes recommendations for selecting fan systems for ventilating poultry houses. Some considerations include type and age of birds, manure-handling methods, inside and outside temperatures and humidities, and incidence of gases.

- Section 6 Feeding, Watering, and Waste Removal suggests ways to reduce mechanical energy expenditures of feeders, waterers, egg collectors, pumps, and waste removers.

- Section 7 Housing Design, Construction, and Maintenance discusses the savings potential through insulation installation, infiltration elimination, and proper poultry house maintenance.

- Section 8 Keeping Records of Energy Use provides recordkeeping charts which assist the poultryman in tracking energy expenditures by type of energy. The charts also relate number of birds on hand to the amount of energy used.

References A list of 52 publications dated before 1976 used to produce this guide is provided.

Comments: This guide provides usable tips and techniques for saving energy in poultry operations. Each section of the guide concludes with examples of implemented energy conservation measures including economic analyses of each.

Price: \$5.25 (PB270-072)

Available From: National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

A GUIDE TO ENERGY SAVINGS FOR THE VEGETABLE PRODUCER

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL ENERGY ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
1977

Practical ideas for operators and managers of fresh and processing vegetable farms. Operating energy costs can be reduced through better control of fertilizer, weed/pest management, irrigation, harvesting, tillage, and vehicle operation practices. (54 pp.)

CONTENTS

- Section 1 Introduction discusses the impact of the energy shortage and increased fuel costs on the farmer. It emphasizes the importance of saving energy in farm operations.
- Section 2 Energy Use in Vegetable Production reviews the relative energy used by cultural operation and by form of energy used in producing fresh vegetables and vegetables for processing.
- Section 3 Fertilization discusses the most economical ways of increasing fertilizer efficiency and reducing fuel expenditures in fertilizer application.
- Section 4 Weed Management presents methods for reducing energy costs through equipment maintenance and efficient seedbed preparation.
- Section 5 Inset Pest Management describes the integrated pest control approach to reduce the frequency of pesticide applications and to increase fuel efficiency.
- Section 6 Irrigation offers suggestions for reducing fuel and electricity consumption by better managing irrigation operations.
- Section 7 Harvesting and Other Cultural Practices discusses methods for increasing crop yields per acre rather than reducing fuel consumption per acre to achieve overall fuel conservation.
- Section 8 Tractor and Truck Use discusses the role of proper maintenance and operation of field equipment in achieving energy savings.
- Section 9 Tractor Tires discusses the relation of tire type, size, and use to possible energy savings.
- Section 10 Gasoline and Diesel Engines offers tips for engine operation and maintenance that can reduce energy costs.
- Section 11 Saving Energy in Greenhouses provides a checklist of options for improving the efficiency of the greenhouse structure and heating/cooling systems. A methodology for calculating and comparing annual fuel costs is provided.

Section 12 Keeping Records of Energy Use assists the vegetable producer in estimating his energy costs by operation and by fuel type.

References A list of the fifteen publications used to produce this guide is provided. All but one are dated before 1976.

Comments: This guide to energy management for the vegetable producer offers suggestions that can effect significant energy savings. Each section of the guide concludes with examples of implemented energy conservation measures including economic analyses of each.

Price: \$5.25 (PB270-074)

Available National Technical Information Service
From: 5285 Port Royal Road
 Springfield, Virginia 22161

ENERGY AUDIT FOR GROWERS--
A SELF-INSPECTION GUIDE TO REDUCE ENERGY COSTS

U.S. DEPARTMENT OF ENERGY
 SOCIETY OF AMERICAN FLORISTS
 1978

The handbook, designed for wholesale growers, shows what process modifications can be made, why they are necessary, and calculates estimated savings and payback time. (126 pp.)

CONTENTS

Introduction	The introduction contains a summary, in chart form, of energy-saving modifications, the cost of implementing the changes, the payback period, first-year savings and ten-year savings.
Section 1	<u>The Greenhouse</u> includes twenty-six specific recommendations for greenhouse modifications. The changes range from installing plastic air curtains to repairing steam traps.
Section 2	<u>Storage and Office Facilities</u> includes four ways to reduce energy consumption, from caulking and weatherstripping to using efficient lighting.
Section 3	<u>Refrigeration Units and Buildings</u> describes methods of saving energy including proper maintenance and replacement of worn refrigerator seals.
Section 4	<u>Delivery Operations</u> describes six ways of reducing truck delivery and maintenance energy-related costs. Improvements cited are divided into two areas: improvements in the truck fleet, such as replacing bias ply with radial tires, and driver and dispatcher improvements, such as careful route planning.
<u>Comments:</u>	Within each section of the handbook, recommendations for saving energy are listed and described. Implementation suggestions and case study examples are included for each recommended procedure.
Price:	\$5.00
Available From:	Society of American Florists 901 N. Washington Street Alexandria, VA 22314

PRODUCING YOUR OWN POWER

CAROL HUPPING STONER, EDITOR
RODALE PRESS, INC.

1974

A book for organic gardening and farming, etc. Chapters are written by engineers, scientists, architects and educators, and show how, on a small scale, alternate power-producing systems can be built, utilizing nature's sources of energy. Included are ways to tap wind, water, organic matter and solar energy. (322 pp.)

CONTENTS

- Part I** Electric Power From the Wind explains the mechanism of wind-powered generators. The wind-driven power plant, like other plants, is driven by a rotating generator. This section describes how much electricity can be produced using a propeller which is geared to the generator itself. Consideration is given to sizing, calculating, measuring the varying wind velocities and outputs, over time in particular locations. Also described are storage systems, conversion devices and back-up systems. An operable Turk wind electric system is described along with the means by which power is battery-stored. There are procedures for building or rebuilding one's own generator, and calculating power needs. There are tables available to use which give sample power consumption data, and illustrations of existing models with descriptions of elements such as rotors, tails commutators, towers, and batteries.
- Part II** Water Power lists factors (such as local laws and costs) to consider before building hydraulic turbine structures which harness water power for homesteads or communities. The equipment needed, methods to measure water level and the amount of power needed once site has been determined are explained, as well as data required before building. There are illustrations to aid in calculations of flow measures and channel head losses in different channel construction materials. There are descriptions and illustrations of earth dams, crib dams, and concrete masonry dams, and the uses for each type. Whether purchasing or building water turbines, regulating the flow for peak use and storage of power during non-peak times is necessary, and methods for this are described. There are several figures which illustrate the construction of impulse turbines, as well as pumps as alternatives to turbines to produce AC or DC electricity. Water wheel designs for certain uses are pictured. Manufactured turbines are scarce, but existing sources are cited. The hydraulic ram, which uses falling water to raise water levels, is featured, along with construction instructions, assembly, installation and adjustment tips. A checklist is provided for faulty mechanisms.

Part III Wood Power describes the author's use of Ralph Waldo Emerson's Concord House Plan as a model for his own house and for prospective wood heating systems builders. Considered in detail are walls, floor, roof, insulation, solar exposure, and the wood-turning apparatus. There are illustrations of floor plans from north-south and east-west views. The types of wood burners are described, including stoves, ranges and furnaces. The fundamentals of building wood heaters are presented with illustrative examples. Managing and growing wood lots on a "sustained-yield" basis is mentioned for the interested builder. There are tables to calculate the amount available per pound and by wood type.

Part IV Methane Power is produced by fuel from organic wastes. The value of this resource is explained along with the percentage of substitute supply. The system which can be built is described in terms of the "digester system," and is considered for a homesteader with local waste resources for conversion.

There is explanation of the biological process of digestion of the de-oxygenized or "anaerobic" waste. The pH symbol for measuring the material's condition, and buffering mixtures, temperature levels, and related problems are discussed.

There are available tables for calculating ratios of carbon and nitrogen, and illustrations of the fuel value of gas from the various types of waste. The various types of digesters and the uses for the product and the nondigested sludge are considered. An in-operation bio-gas plant is described along with possibilities for the future.

Part V Solar Power discusses ideas for the potential small-scale builder, or for those interested in adaptations for solar heating. Plans for already existing solar houses are featured. There are diagrams describing heating distribution and heat collectors, and comparative designs, as well as such considerations as heat needs and costs. Methods are described for estimating heat output using basic mathematical principles. A large section is devoted to solar water heaters, including design illustrations.

Appendix I Combining Alternate Energy Systems describes how, by using the previously described power sources, one can produce interacting, converted energy depending on need. These needs can be calculated, and a procedure is available.

Appendix II Conservation of Energy in Existing Structures describes how one can save energy in homes which are energy-wasting.

Appendix III Source Listing

Appendix IV Conversion Tables

Comments: Producing Your Own Energy is a practical source of information for the small-scale homesteader or community interested in taking actions to make use of natural energy resources. Each section is authored by experienced producers with accompanying bibliography notes and glossary.

Price: \$8.95

Available Rodale Press, Inc.
From: Book Division
 Emmaus, Pennsylvania

COMMERCIAL ESTABLISHMENTS;
OFFICE BUILDINGS

ENERGY CONSERVATION SEMINARS

HONEYWELL INC.

A series of seminars is offered on subjects of interest to those involved in building energy conservation. The workshops provide opportunities for the exchange of information between participants and for the practical solution of energy management problems. Instructors are drawn from the Honeywell professional staff and supplemented as necessary by consultants. Complete sets of study materials are provided. The seminars are held at Bloomington, Minnesota, on a varying schedule, from six to ten times a year.

CONTENTS

- Seminar 1 Energy Conservation Management Workshop is a three-day workshop providing participants with a practical knowledge of energy conservation management methods and applications. Course content is designed to train the attendee to apply a proven program of energy conservation management to his own facility.
- Seminar 2 Air Conditioning Control Fundamentals is a four and one half-day workshop providing participants with a fundamental knowledge of air conditioning processes and then expanding these concepts into areas of control technology, operational procedures, and control system operation.
- Seminar 3 Advanced Air Conditioning Controls is a four and one half-day course providing participants with a working knowledge of controls and energy management considerations for their comfort control systems.
- Seminar 4 Fundamentals of Electric Controls is a four and one half-day course that provides the participants with the bases of electric control theory and air conditioning processes. Then it applies these concepts to typical control systems using two-position and/or modulating controls and controlled devices.

Price: For information on price and availability, contact:

Honeywell Inc.
Professional Development Center
8200 Normandale Boulevard
Bloomington, Minnesota 55437
Phone: (612) 830-3560

ENERGY MANAGEMENT GUIDE

SUPER MARKET INSTITUTE

A guide for the supermarket industry, suggesting specific measures a company can take to ensure more efficient energy usage. (14 pp.)

CONTENTS

Management of Energy provides a checklist of ideas to alert managers to effective energy usage centering on thermostat control, water usage, ventilation, and personnel training.

Maintenance of Energy in Existing Stores describes energy conserving techniques for refrigeration, lighting, housekeeping (cleaning and repairing), and insulation.

Alterations to Conserve Energy in Existing Stores suggests numerous possible alterations and improvements in roofing, insulation, ventilation placement, humidity control, food displays, heat reclaiming, disposal of solid waste, and electricity.

Energy "Conservation" Not Recommended addresses ideas mistakenly believed to conserve energy but which, in fact, consume more.

Comments: In checklist style, this is a useful reference for store managers. The ideas are presented clearly.

Price: \$1.00

Available From: Super Market Institute, Inc.
303 East Ohio Street
Chicago, Illinois 60611

TECHNICAL OPTIONS FOR ENERGY CONSERVATION
IN BUILDINGS

NATIONAL CONFERENCE OF STATES ON BUILDING CODES
AND STANDARDS

AND

NATIONAL BUREAU OF STANDARDS JOINT EMERGENCY WORKSHOP
ON ENERGY CONSERVATION IN BUILDINGS

1973

The purpose of this document is to provide reference materials on the technical options available for energy conservation in buildings. Options for both existing and new buildings are considered. Throughout the document, emphasis is placed on technical options — the economic implications of these options are not covered in any detail. (184 pp.)

CONTENTS

- Chapter 1 Summer Cooling - Existing Buildings suggestions are provided for reducing the cost of energy for summer cooling. Some of the suggestions can be implemented with little or no cost, while others will require investment in materials, equipment and labor. The suggestions include the raising of thermostat and humidistat levels, reduction of cooling loads produced by lights and appliances, the utilization of outside air for cooling, the reduction of ventilation, and proper maintenance. Items that would require some investment include the provision of solar shades, the addition of insulation, the installation of automatic controls on appliances, lights and fans, and basic modifications to cooling systems such as the installation of new types of cooling equipment. The information is summarized in a series of charts.
- Chapter 2 Winter Heating - Existing Buildings suggestions are provided for lowering the cost of winter heating through actions that require no cost and those that require expenditure of funds for equipment, materials and labor. In the first group the suggestions are quite simple, including lowering thermostats, wearing heavier clothing, closing off unused rooms and modifying ventilation schedules.
- The extra cost items include the provision of timed controls for thermostats, the addition of insulation and the installation of heat recovery and conservation devices. The information is summarized in a series of charts, including a chart showing potential percentage savings through night thermostat setback for various cities in the United States.

- Chapter 3 Energy Conservation Features - Insulation the value of proper insulation as an energy saving measure is discussed. Graphs are provided which show the potential energy and cost savings from thermal improvements for the national stock of residential buildings over the next 25 years.
- Chapter 4 Energy Conservation Features - Fenestration the impact of windows on the heating and cooling loads imposed on building equipment is discussed both in the text and in diagrams. Suggestions, together with graphs of heat gain/loss, are provided to show building owners how negative aspects of windows may be compensated. The measures discussed include shading, the use of different types of glass, window placement in buildings and exposure orientation effects.
- Chapter 5 Energy Conservation Features - Lighting the energy consumption of lighting and its effect on the cooling load of air conditioning equipment is discussed. It is suggested that the energy required for lighting can be reduced by as much as 25 percent through some simple measures. These include simply turning off lights that are not in use, using lighter color paints on walls, the application of more efficient light sources, and improved design of lighting fixtures. A chart is provided that shows the relative efficiency of different light sources.
- Chapter 6 Energy Conservation Features - Appliances typical appliances used in a modern home are listed together with their approximate annual Kw-Hr energy usage. Suggestions are provided for reducing the energy consumption of cookers, refrigerators, dishwashers, television sets, washers, dryers and freezers. The majority of the suggestions are concerned with proper maintenance and use.
- Chapter 7 Energy Conservation Features - Domestic Hot Water suggestions for reducing energy consumption for hot water heating include reduction of the hot water temperature, reducing water waste, repair of leaky faucets, the use of cold water detergents and shutting off the hot water circulating line pump at night if one is fitted.
- Chapter 8 Energy Conservation Features - Human Comfort many of the methods recommended to save energy can possibly result in some form of human discomfort — too hot, too cold, too drafty, too humid. This section provides an excellent discussion of the various indices that have been developed over the years to describe the interaction between man and his environment. Information is provided showing how the various data in the charts were developed. The ASHRAE Standard 55-66 is discussed in some detail.

- Chapter 9 New Buildings - Building Design this section discusses steps that can be taken to conserve energy in new buildings at the design phase. Through a series of charts and discussion, it is shown that considerable energy savings potential exists through the proper use of insulation and the proper design of fenestration. Additional savings are possible through the use of outdoor air for natural cooling, the relaxation of rigid temperature limits and the proper sizing of mechanical equipment.
- Chapter 10 New Buildings - Building System Design this section discusses many of the areas that should be considered in the selection of equipment for a new building. Computer simulations of ducting systems are discussed and an example is provided. Some of the other subjects covered include thermal recovery systems, solar energy systems, waste heat reclamation, building occupancy scheduling, and the reduction of building electrical loads through demand limiters and power factor correcting condensers. No technical data is provided.
- Chapter 11 Mechanisms for Implementation of Energy Conservation Technology in Buildings - by Paul R. Achenbach this technical paper commences with the premise that energy conservation is desirable and economically sound. It addresses the important question of "How can energy conservation technology be implemented in our present inventory of buildings and new buildings that are being added each year?"
- The prerequisite to implementation includes acceptance of the energy conservation potential by the public, builders, manufacturers, financial institutions and regulatory bodies. The mechanisms for implementation are broken down into three groups: Educational, Financial and Regulatory. The author discusses the implications of each, gives examples and mentions several developments that should lead to standards or specifications for energy conservation in buildings.
- The remainder of the paper centers around the establishment of criteria for limiting energy use in buildings. The standards developed and promulgated by HUD, FHA and the State of New York are illustrated both by discussion and in table form. The author concludes that no single set of criteria now exist and suggests participation of all segments of the building industry in developing equitable guidelines for energy use in buildings.
- The paper is summarized in chart form.
- References: A total of 15 references are given, all dated before 1974.

Comments: This non-technical book is well written and fairly exhaustive in its approach to saving energy in buildings. It may be used as a starter text for professionals.

Price: \$2.35 (Catalog Number: C13.46:789)

Available From: Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

GUIDELINES FOR ENERGY CONSERVATION IN EXISTING BUILDINGS

SHEET METAL AND AIR CONDITIONING CONTRACTORS'
NATIONAL ASSOCIATION, INC.

1974

A guide to familiarize sheet metal and air conditioning contractors with the potential for conserving energy in existing structures. (12 pp.)

CONTENTS

- Chapter I Introduction states the purpose of the guidelines in providing the contractor with the knowledge necessary to plan the building systems evaluation.
- Chapter II Existing Building Evaluation explains the procedure for conducting an evaluation and provides a sample checklist.
- Chapter III Human Comfort Needs recommends desirable temperature, humidity, and ventilation standards to maintain human comfort.
- Chapter IV Energy Conservation Basics points to operational modifications such as temperature setback, structural modifications such as insulation, and good preventive maintenance as basic considerations in an energy management program for existing buildings.
- Chapter V Energy Conservation Systems suggests elimination of systems which are inherently large energy wasters, and recommends those which are more efficient as replacements.
- Chapter VI Sample Building Evaluation outlines the steps to be taken in determining the baseline state of a building.
- Comments: The document is brief; no details are included. It serves as an introductory guide to building owners and contractors in the energy-conservation evaluation process.

Price: \$5.00

Available SMACNA, Inc.
From: 8224 Old Courthouse Road
 Tysons Corner
 Vienna, Va. 22180

ENERGY CONSERVATION DESIGN GUIDELINES FOR
NEW OFFICE BUILDINGS - 2ND EDITION

GENERAL SERVICES ADMINISTRATION
PUBLIC BUILDINGS SERVICE
1975

This manual presents an approach to the design of an energy efficient office building based upon the experience of the GSA in design of the Norris Cotton Federal Office Building in Manchester, New Hampshire. The level of technical detail is only moderate and should be useful to building owners or managers contemplating the construction of an office building. (275 pp.)

CONTENTS

- Section 1 Energy Goal presents the rationale for the GSA energy goal of 55,000 Btu/sq ft and explains how to develop a goal which considers the pertinent factors.
- Section 2 Design Criteria presents design criteria which should provide a reasonable, yet reduced, standard of performance. Factors considered include user needs, climate (both internal and external), illumination and domestic hot water.
- Section 3 Climate explains the impact of climate on energy use and building design considerations such as the building envelope, configuration, orientation, fenestration, and wall materials, color and mass. Discusses the effect of site, energy load demands, diurnal variations of temperature, heat storage, solar radiation, wind and snow.
- Section 4 Site presents some of the more desirable features to strive for in site selection and site development.
- Section 5 Building discusses some of the more important design considerations of the architectural and structural features of a building; including configuration and orientation; interior planning; structure; roof; opaque walls; glass walls, windows and doors; and floors.
- Section 6 Lighting provides a discussion of energy efficient lighting design, including such important consideration as daylighting, interior design, total lighting systems, selective task lighting, switching, lamps and luminaires, and security lighting.

- Section 7** Power discusses the basic factor to consider in designing a buildings power system, including system sizing, load leveling, power factor, and large motor selection.
- Section 8** Heating, Ventilating, and Air Conditioning presents the major factors of HVAC design for energy efficiency, including system selection, ventilation, humidity, air distribution systems, hot and chilled water distribution systems, free cooling cycle, adiabatic cooling, heat recovery and waste heat systems, total energy systems, heat pumps, reheat systems, heat of light systems, variable air volume systems, and roof top systems.
- Section 9** Domestic Water gives important concepts for designing domestic water systems, including quality and temperature control, system design, heating with waste heat, and solar heat source.
- Section 10** Vertical Transportation gives some general considerations for vertical transportation as well as discussing elevators and escalators.
- Section 11** Solid Waste briefly discusses concepts of solid waste systems, including off-site facilities and alternative solutions.
- Section 12** Operation and Maintenance presents some ideas and consideration for building maintenance on energy use for the following areas: building envelope, electrical systems and heating, ventilating, and air conditioning systems.
- Appendix A** Energy Conservation Computer Software provides information on existing software networks, minimum program requirements, existing software deficiencies, potential software network, program contacts.
- Appendix B** Alternative Energy Sources includes solar energy, wind energy, total energy systems and other alternatives.
- Appendix C** Solar Energy Utilization provides an introduction, general theory, collection characteristics, materials, system integration and a bibliography.
- Appendix D** Life Cycle Cost Analysis discuss the major concepts and considerations of this important technique for determining the least overall cost alternative.
- Appendix E** Summary of Energy Conservation Opportunities provides prioritized check lists of energy conservation opportunities for general factors, siting, building, lighting, power, HVAC, domestic hot water, vertical transportation, solid waste and operation and maintenance.

Appendix F Project Team includes those who contributed to the preparation of the guidelines.

Appendix G Bibliography.

Price: \$2.00

Available GSA Business Service Centers located in:
From:

Boston	Ft. Worth
New York	Kansas City
Washington (D.C.)	Denver
Atlanta	San Francisco
Chicago	Seattle

ENERGY CONSERVATION GUIDELINES FOR
EXISTING OFFICE BUILDINGS

GENERAL SERVICES ADMINISTRATION
PUBLIC BUILDINGS SERVICE
1975

Guidelines for use primarily by GSA in the remodeling, maintenance, and operation of buildings in its inventory. This document has been made available to other Federal agencies, the construction industry, and other interested groups. (175 pp.)

CONTENTS

- Section 1 Program Analysis discusses the steps involved in reducing energy consumption in buildings. Specifically, these are: 1) a programmatic evaluation of existing buildings for reducing energy usage, 2) establishing an energy goal, and 3) determining a methodology for obtaining the maximum energy reduction in existing buildings.
- Section 2 Site recommends possible modifications to the existing landscape setting and pavement areas that may stabilize the interior building conditions and reduce energy consumed by the building's HVAC equipment.
- Section 3 Building suggests several ways to take advantage of the positive effects of climate, site and geographic location on the interior conditions of the building and offers precautions against the negative effects, as well as several trade-off alternatives. After the general discussion of these factors, it then details the considerations involved in the modification of the building envelope to further reduce energy consumption.
- Section 4 Lighting examines this major consumer of electrical energy in office buildings and explains the steps involved in determining the power goal for the building and achieving this goal.
- Section 5 Power briefly describes an electrical power system and the efficiency of the power distribution system. It offers a few rules to follow in order to minimize power loss through the power generating and distribution systems.
- Section 6 Heating, Ventilating and Air Conditioning evaluates the design criteria and the energy relationships which must be considered in retrofitting and revising systems to reduce energy consumption. It also lists energy conservation opportunities which should be investigated in the planning stages.

- Section 7 Plumbing suggests ways to conserve energy by more efficiently regulating the heating and cooling of the building's water.
- Section 8 Vertical Transportation lists the major considerations in planning the renovation of escalator and elevator systems.
- Section 9 Solid Waste suggests alternatives to off-site waste disposal that may result in energy savings.
- Section 10 Operation and Maintenance presents ideas for energy conservation through efficient operation of equipment and preventive maintenance. Important to these concepts is the training of personnel in this area.
- Appendix A Life Cycle Cost Analysis describes the techniques used in determining the least overall cost alternative.
- Appendix B Summary of Energy Conservation Opportunities, in checklist form reviews all the energy conservation opportunities mentioned throughout the manual.
- Appendix C Bibliography.
- Appendix D Project Team.
- Comments: With this document, a building administrator can easily survey his building and determine where energy savings can be fully realized. The layout of the manual, with a column on each page designated for notes, lends itself to this type of use.

Price: \$2.00

Available GSA Business Service Centers located in:
From:

Boston	Ft. Worth
New York	Kansas City
Washington (D.C.)	Denver
Atlanta	San Francisco
Chicago	Seattle

GUIDELINES FOR ENERGY CONSERVATION SYSTEMS IN NEW BUILDINGS

SHEET METAL AND AIR CONDITIONING CONTRACTORS'
NATIONAL ASSOCIATION, INC.

1975

A condensation of conservation information combined with good industry practices as it relates to the design of building environment systems. These guidelines are for use by designers of building systems and equipment. (50 pp.)

CONTENTS

- Chapter I Introduction provides a statement of purpose and emphasizes the role of the totally integrated project design approach in the reduction of the energy requirements of a building.
- Chapter II Energy Conservation Management discusses controlling energy flow and distribution, maximizing performance efficiency of equipment and processes, and design analysis of energy sources and costs. Diagnostic checklists are included in this section.
- Chapter III All-Air Systems describes the operation of all-air systems as efficient energy users in primary treatment of the occupant media-air, maximum flexibility requiring minimal energy consumption for changes in temperature, humidity, and ventilation requirements, and easy adaptation to heat recovery and economizer cycles.
- Chapter IV All-Water Systems explains the energy-conserving features of all-water systems including economical uses of sources of wasted heat and minimal occupancy of space to energy conveyed ratio.
- Chapter V Control Systems concentrates on the long term energy cost savings and increased system efficiency offered by the control systems described.
- Chapter VI Heat Recovery and Conservation Systems discusses the availability of recoverable waste heat, the economic possibility of enthalpy exchange, and the transfer of unneeded heat to spaces requiring heat.
- Chapter VII Heat Pumps covers the theory behind heat pump operation, different varieties of heat pumps and their applications.
- Chapter VIII Primary Energy Sources is concerned primarily with basic energy reserve supplies and uses, and the necessary future considerations.
- Chapter IX Total Energy Systems discusses the efficiency and pollution aspects of total energy systems.

Chapter X Life Cycle Costing explains the increased life expectancy and decreased long-term costs (i.e., life cycle costing) in more efficient systems.

Chapter XI Building Operation and Maintenance stresses the importance of good maintenance practices in efficient energy use.

Comments: Concise manual, good as a primary source in building design.

Price: \$7.50

Available Sheet Metal and Air Conditioning
From: Contractors' National Association, Inc.
8224 Old Courthouse Road
Tysons Corner
Vienna, Va. 22180

INTERIM DESIGN CRITERIA: TECHNICAL GUIDELINES FOR ENERGY
CONSERVATION IN EXISTING BUILDINGS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
1975

This manual sets specifications for upgrading existing buildings to conform to new building standards. Its primary audience is engineers, and secondarily, facilities managers in DoD facilities. (175 pp.)

CONTENTS

- Chapter 1 Updating of Design Parameters ventilation, infiltration and building envelope are discussed in terms of specific retrofit and operations changes that may be employed to bring these building characteristics up to current standards. Guidelines are set forth for measuring thermal characteristics for input to computerized building analysis programs.
- Chapter 2 Energy Conservation Checklist provides a fairly exhaustive series of steps for surveying a building for energy conservation opportunities.
- Chapter 3 Systems and Recovery Techniques 1) Conversion, additions or modifications to existing HVAC systems to improve energy efficiency. Areas discussed include radiation, elimination of reheat, reheat of secondary energy, conversion of low pressure ductwork, and conversion of refrigeration equipment. 2) Heat balance. The method for conducting a heat balance analysis is set forth, along with procedures for creating a heat balance diagram, and calculating breakeven temperature. 3) Energy reclamation components are examined, including exhaust air heat recovery, refrigeration heat recovery and storage tanks. Each heat recovery system is shown in diagram form in a typical installation. 4) Other technical guidelines and mandatory requirements for energy conservation are dealt with, including economizer/enthalpy cycle, mechanical drive systems, control valves, pumping, cascade refrigeration system, series flow through chillers, heat recovery boilers, split system air conditioning, window units, insulation, low resistance filters and others. 5) Energy sources, solid waste heat recovery and total energy systems are described and explained, but no guidelines or requirements are set forth.

- Chapter 4 Modification of Existing Controls for Energy Conservation this section provides for the tabulation of information about the building and its operation, and the analysis of those tabulations for the purpose of determining what changes to make to existing control systems.
- Chapter 5 Computer Programs examines several of the available software packages for performing building energy analyses. They include the Energy Systems Analysis Series, AXCESS, ECUBE, MACE, TRACE, and the Westinghouse energy study. Following a general description of the programs, the types of input data are reviewed. An example computer analysis of a building is provided.
- Chapter 6 Electrical Systems looks at lighting design requirements and stipulates lighting intensities for different work areas in facilities, as well as outdoor areas.
- Chapter 7 Operation, Maintenance and Balancing in Existing Buildings an extremely brief review of many of the recommended operation and maintenance suggestions provided throughout the manual.
- Chapter 8 Domestic and Sanitary Water Systems stipulates the use of specific equipment for insulation, temperature control, pump operation and conservation of hot water.
- Comments: The section on computer systems is particularly strong, and should be reviewed for possible use along with energy management courses at the professional level.

For current information on price and availability, write:

Department of the Navy
Naval Facilities Engineering Command
200 Stovall Street
Alexandria, Va. 22332

INTERIM DESIGN CRITERIA: TECHNICAL GUIDELINES FOR ENERGY
MANAGEMENT IN NEW BUILDINGS

NAVAL FACILITIES ENGINEERING COMMAND
1975

Specifications for the design of energy efficient buildings with full consideration of life cycle costs. Its intended audience includes engineers and architects involved in the design of new buildings. (201 pp.)

CONTENTS

- Chapter 1 Design Parameters includes considerations for siting and orientation, outdoor design conditions, indoor design conditions, ventilation and infiltration rates, solar screening, building envelope, insulation factors, and methods for calculating heating and cooling loads.
- Chapter 2 Heat Balance describes and diagrams the heat balance analysis including the six following internal heat-contributing parameters: envelope conduction load, ventilation load, light and power load, occupancy load, equipment load, and solar load.
- Chapter 3 System Types describes types of environmental control systems and the advantages and disadvantages of each. These systems include: variable air volume; closed loop heat pump; all air constant volume reheat; constant volume variable air temperature bypass system; dual air duct; multizone units; dual air conduct system; and split systems (air and hydronic). Energy reclamation components are examined, including exhaust air heat recovery, refrigeration heat recovery and storage tanks. Each heat recovery system is shown in diagram form in a typical installation. Other technical guidelines and mandatory requirements for energy conservation are dealt with, including economizer/enthalpy cycles, mechanical drive systems, control valves, pumping, cascade refrigeration systems, series flow through chillers, heat recovery boilers, split system air conditioning, window units, insulation, and low resistance filters.
- Chapter 4 Energy Sources, Solid Waste Heat Recovery and Total Energy Systems discusses the use of conventional energy sources (coal, oil, natural gas) and municipal refuse and industrial waste by-products to satisfy building energy requirements. It also discusses waste heat recovery from boilers, engines, and turbines, and total energy systems.

- Chapter 5 Computer Programs examines several of the available software packages for performing building energy analyses. They include the Energy Systems Analysis Series, AXCESS, ECUBE, MACE, TRACE, and the Westinghouse energy study. Following a general description of the programs, the types of input data are reviewed. An example computer analysis of a building is provided.
- Chapter 6 Economic Evaluation stipulates the method of economic evaluation of alternative fuel sources and environmental systems for buildings (life-cycle cost analysis) and of factors for discount and inflation rates.
- Chapter 7 Electrical Systems examines lighting design requirements and suggests lighting intensities for different work areas in facilities, as well as outdoor areas.
- Chapter 8 Miscellaneous Items provides a brief review of many of the recommended system operation, maintenance, and balancing suggestions given throughout the manual. It stipulates the use of specific equipment for insulation, temperature control, pump operation and conservation of domestic and sanitary water. It also covers energy conservation through the optimization of building control systems.

Comments:

This manual is useful in planning the construction of new buildings. It may also be of some use to the building manager or operator who needs to know about building systems. The section on computer systems is particularly detailed.

For current information on price and availability, write:

Department of the Navy
Naval Facilities Engineering Command
200 Stovall Street
Alexandria, Virginia 22332

PROFITABLE ENERGY MANAGEMENT FOR RETAILERS AND SHOPPING CENTERS

JOHN H. FULWEILER

1975

A guide for managing energy used in commercial lighting, heating, air conditioning, ventilation, and maintenance operations. (211 pp.)

CONTENTS

- Chapter 1 The Case for Utility Management describes effective utilities management programs.
- Chapter 2 Lighting describes the importance of lighting in retailing and analyzes its role in energy expenditures. Major types of lighting are reviewed. Lighting recommendations along with an economic analysis of each are provided. Lighting economy is also discussed from the point of view of remodeling and new construction.
- Chapter 3 Heating, Ventilating, and Air-Conditioning (HVAC) illustrates comfortable and efficient temperatures which should be maintained in summer and winter. The author discusses retailers' complaints and offers some solutions. It emphasizes the importance of knowing a store's HVAC needs. It explains how to use what is available more efficiently and presents new concepts for HVAC system design.
- Chapter 4 Special Supermarket Energy Needs discusses the maximum degree of economy available in the operation of refrigeration equipment. Special problems are raised and alternate methods are outlined.
- Chapter 5 Restaurants and the Energy/Cost Crisis assesses the impact of rising energy costs on restaurants. Conservation tips are presented in a problem/solution format.
- Chapter 6 Open and Enclosed Shopping Centers presents shopping mall utility charges as a percentage of total operating expenses. Practical means of reducing high energy costs are explored, with emphasis on the compatibility of conservation with profit objectives.
- Chapter 7 Effect of the Energy Crisis on New Shopping Center Locations shows the changes that have come about in the size of shopping malls. Reasons for failure of bus services to affect mall traffic are outlined and options for expansion of these services are discussed.
- Chapter 8 Serving Energy-Conscious Customers suggests that mall operators encourage their patrons to use car pools and public transportation.

Appendix A How To Read Your Utility Bill explains the meaning of each element in the bill, emphasizing the relationship between rate structures and energy costs.

Comments: This is a comprehensive guide for the retail manager or operator. It addresses the energy problems, solutions, and ideas of similar concerns throughout the nation. A stimulating guide for the experienced or prospective manager. A glossary and an index are provided.

Price: \$11.95

Available Chain Store Publishing Corporation
From: 2 Park Avenue
New York, New York 10016

BUILDING ENERGY HANDBOOK

VOLUME 1: METHODOLOGY FOR ENERGY SURVEY AND APPRAISAL

VOLUME 2: FORMS FOR ENERGY SURVEY AND APPRAISAL

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

(NOW DEPARTMENT OF ENERGY)

1976

Guidelines for investigating and analyzing energy usage, identifying energy saving opportunities, and evaluating energy conservation measures in buildings. The handbook and its companion volume of forms are intended for use by engineering-oriented management and operating personnel who are familiar with the fundamentals of building energy systems. (292 pp.)

CONTENTS

- Chapter 1 Executive Summary reviews the scope and contents of the handbook and provides a summary covering the selection of buildings, the building energy appraisal, and the survey and appraisal of energy conservation opportunities.
- Chapter 2 Selection of Buildings for Detailed Energy Study describes the step-by-step methodology and the criteria for selecting buildings for energy studies. This includes the synthesis, collection, and analysis of building energy data. The buildings thus selected are those which offer the greatest potential for energy conservation.
- Chapter 3 Building Energy Appraisal discusses the assessment of the building's existing energy configuration taking into account all energy entering the building, establishing the existing use of energy within the building, determining the energy leaving the building (i.e. exhaust air, domestic hot water discharge, etc.), and identifying and selecting for priority analysis those energy components which offer significant energy conservation opportunities. The two key tools recommended for performing a building energy appraisal are a preliminary building energy flow and balance diagram, and a comparison of the actual building energy indices against appropriate standard energy indices. The concept of the energy index is introduced in this chapter. It indicates the energy efficiency of a facility, a building, or an energy system by identifying the total energy consumption and relating it to one or more facility characteristics (e.g. square feet of area, cubic feet of air conditioned or heated space).
- Chapter 4 Survey and Appraisal of Building Energy Conservation Opportunities (ECO's) presents the methodology for conducting a survey, including a technical and economic appraisal of the energy conservation opportunities identified. The ECO survey and appraisal methodology includes additional data collection for the ECO's under investigation, technical feasibility evaluation, economic evaluation and ranking of those ECO's found to be technically feasible.

- Chapter 5 Energy Conservation Opportunities (ECO's classifies and describes building ECO's that apply to all types of buildings, including laboratory-office buildings. These building ECO's are grouped in 12 major categories (primarily systems): general; building skin; building comfort, use and occupancy; electrical systems; heating and cooling systems; plumbing systems; pumping systems; coolant systems; industrial process systems; monitoring, control, and surveillance systems; waste energy recovery and reduction; and operation and maintenance.
- Appendix 1 ECO Related Questions presents those questions that should be considered in the determination of building energy conservation opportunities.
- Appendix 2 Electrical Energy Appraisal contains sets of tables providing guideline values for electrical energy appraisal.
- Appendix 3 Manual Energy Calculation for Building 212 at Argonne National Laboratory demonstrates two alternative procedures for transforming climatic hourly occurrences into acceptable equivalent full load hours.
- Appendix 4 Appendix to Chapter 5 contains tables, figures, and other supporting material for selected ECO's described in Chapter 5.
- Appendix 5 Provides a list of 24 references to materials in this publication.
- Comments: Volume 1 of the handbook provides detailed methods for calculating energy and cost savings for identified energy conservation opportunities. Since it does not provide all the information necessary to perform these calculations, the user is referred to other publications (e.g., Life Cycle Costing Emphasizing Energy Conservation, ERDA-76/130).* The handbook is recommended for use by engineering-oriented management and operating personnel who are familiar with fundamentals of building energy systems. Most of the energy conservation opportunities addressed by the Building Energy Handbook are applicable to all building types; the remainder refer to laboratory-office buildings. Recommended forms for data recording and calculations are listed at the close of each chapter and additional blank forms will be found in the accompanying Volume 2: Forms for Energy Survey and Appraisal.
- Price: \$11.75 Volume 1: Methodology for Energy Survey and Appraisal (ERDA 76/163/1)
- \$ 6.50 Volume 2: Forms for Energy Survey and Appraisal (ERDA 76/163/2)
- Available National Technical Information Service (NTIS)
From: U.S. Department of Commerce
 5285 Port Royal Road
 Springfield, Virginia 22161

*See Index to this volume for location of abstract.

ENERGY MANAGEMENT: A MANUAL FOR USE IN WORKSHOPS

THE ENERGY TASK FORCE OF THE
AMERICAN COUNCIL ON EDUCATION
ASSOCIATION OF PHYSICAL PLANT ADMINISTRATORS
NATIONAL ASSOCIATION OF COLLEGE AND UNIVERSITY BUSINESS OFFICES
1976

A comprehensive and detailed practical approach to energy efficiency in all energy-using systems typical of college campuses. Designed to be used jointly by facilities managers and business officers. (247 pp.)

CONTENTS

- Chapter I Outlook and Overview reviews energy consumption in higher education; its use; and current status, patterns, and trends.
- Chapter II How Energy Is Used and Wasted begins with a case in point, a before-and-after example of energy reduction at an Ohio State University clinical/administrative facility. Primary forms of energy, i.e., fuel, steam, electricity, are reviewed and systems studied such as terminal reheat system, dual duct system, induction system, steam and boiler system. The necessity of having an efficient data base is shown utilizing a sample of universities' use/cost of energy.
- Chapter III Evolutionary Approach to Energy Management considers the methods of conservation based on the experiences of several colleges and universities. The three basic systems comprising any functioning building are discussed in terms of energized systems, non-energized systems, and human systems, all of which can be modified, in evolutionary stages, e.g., quick fix, refit, and systems convert. Energy management techniques range from elementary to highly complex.
- Chapter IV Energy Finance and Investment discusses the necessity for an economic plan including knowledge of funding/capital sources, knowledge and use of economic analysis tools (life-cycle costing, payback and return on investment, present value, etc.), and preparation of proposals to include all accompanying data (e.g., budgetary mechanisms, historical data, etc.).
- Chapter V Analysis of Purchased Utilities is devoted to the need for analysis of utilities, including water, gas, fuel oil, coal, steam, and electricity. The section is devoted mostly to the electricity since it comprises so great a portion of the total utility bill. Taken into account in the analysis should be rate structures services, schedules, riders which can be sought from the utility companies. Knowledge and consideration of the Federal Power Commission and the State's Public Utility Commission's roles are discussed briefly. Considered also are bill computation, power factor problems, data accumulation measures, controls, etc.

Chapter VI Energy Management and Organization Incentives discusses the human system of energy management as the most essential in terms of a successful program. The team of physical plant director and Chief Business Officer devised the program plan, which has goals translated into action mechanisms with supportive/cooperative commitment of the entire institutional hierarchal structure.

Taken into account in the plan are organizational structure, delineating activities, such as monitoring, internal and external communications and educational mechanisms, selecting of projects, etc.

Chapter VII Appendices - This section includes the following:

- I-1 • Energy Flow Pattern in the United States 1950-1990 (5 pps)
 - II-1 • Testing Boilers for Efficiency (9 pps)
 - II-2 • Energy Survey Form (5 pps)
 - II-3 • Operation of a Municipal Housing Project Boiler Plant, A Case History (3 pps)
 - II-4 • Graphing the Data (Weather Effects), A Case History (2 pps)
 - III-1 • Lighting, Ventilation, Infiltration, Reduction of Heat Transmission, Modification of Central Plant Operating Practices, Modification of Distribution Systems, Electric Power Adjustment and Modification of Automatic Controls Domestic Hot Water, Elevators, Improvement of Maintenance Procedures, Water, Space Utilization, Transportation, Modification of Operating Practices of Kitchen and Cafeteria Areas, Energy Conservation in New Building Design (43 pps).
- Topics are discussed in terms of categories "Quick Fix," "Refit," and "Systems Convert."
- III-2 • Bibliography (annotated).
 - IV-1 • Report to Implement Energy Conservation Measures at Hitchcock Hall, Ohio State University.
 - V-1 • Typical Contract.
 - VI-1 • Memorandum to Yale University Community Re: Energy Conservation, 11/28/73.
 - VI-2 • Memorandum to Deans, Directors, Department Chairmen, May 6, 1974 (Re.: Air Conditioning Policy).
 - VI-3 • Purdue University "To All Employees" Bulletin. (Re.: Coop-Effort to Help Save Dollars).
 - VI-4 • Proposal for Student Participation in University Energy Management.

Comments: Because the course is designed for both facilities managers and business officers, it covers the basics of energy systems finance and of energy systems design. There is much of substance for equipment operators and maintenance personnel as well. Because university physical plants encompass so broad a range of end-use systems and building types, much of the course is applicable to many other types of facilities. The most university-specific material is devoted to budget presentation and funding sources, but even this information can be translated to other nonprofit or state-supported institutions.

Price: \$26.00

Available from: The Association of Physical Plant Administrators
of Universities and Colleges (APPA)
Suite 525
1 Dupont Circle
Washington, D.C. 20036

ENERGY MANAGEMENT FOR COMMERCIAL BUILDINGS

MINNESOTA ENERGY AGENCY

1976

An energy management tool for use by those responsible for energy use in commercial business. (17 pp.)

CONTENTS

Introduction Conducting an Energy Audit provides the guidelines for this first step in an energy management program.

Section A Basic Operation, Maintenance and Scheduling for Energy Conservation lists energy saving steps that don't involve the purchase or replacement of equipment.

Section B Remodeling and Modification Design Changes for Energy Conservation lists energy savers to consider when designing a new building or remodeling.

Comments: The list of energy savers does not go into the technical reasoning behind each suggestion. Therefore, supplementary materials are advisable. This pamphlet is being revised in 1980 and will be entitled "Energy Management Guide."

Price: Free.

Available From: Minnesota Energy Agency
Energy Conservation Division
740 American Center Building
150 East Kellogg Blvd.
St. Paul, Minnesota 55101

FIRST STEPS TO ENERGY CONSERVATION FOR BUSINESS

DEPARTMENT OF ENERGY, MINES, AND RESOURCES (CANADA)
1976

A handbook for energy efficiency in business. It addresses the organization of an energy conservation committee and the execution of an energy audit. Programs from larger businesses have been simplified for use by smaller concerns. (35 pp.)

CONTENTS

- Section I The Crisis discusses energy policy, problems, and consumption in Canada from 1961 to 1971.
- Section II Commitment explains how both management and employees benefit from energy conservation. It maintains that jobs will be lost if a great deal of capital and labor are transferred to the risky development of new sources of energy.
- Section III A Conservation Program describes the components of a conservation program for businesses. The initial step is the energy audit, a survey to provide information on total energy usage. The key to establishing a successful energy conservation program is getting the commitment of top management. Managers' and employees' duties are outlined.
- Section IV How to Audit Energy explains how to make a budget for energy and gives an example of an energy budget for one process. Checklists are given for surveys of housekeeping actions, processes, departmental products, processes, and equipment. Return-on-investment (ROI) calculations are detailed.
- Section V Are You Keeping Up With Your Competitors? outlines the activities of 27 companies representing the hotel, restaurant, gasoline, steel, tire, utilities, paper, and lumber businesses. This section also includes charts on conversion factors for survey and budget analysis and a sample energy conservation checklist for tracking monthly energy use.
- Section VI Energy Conserving Ideas Checklist describes opportunities for energy conservation in businesses, in the areas of heating and air conditioning systems, building and grounds, lighting systems, transportation, electrical power, steam, other utilities, heat recovery, heat confinement, combustion, scheduling, materials handling, and process changes.

Appendix A Incentive Programs Available to Support Energy Conservation in Industry illustrates two programs:

- Program for the Advancement of Industrial Technology (PAIT)
- Program to Enhance Productivity (PEP)

Addresses for further information are provided.

Appendix B Example of an Energy Budget Theoretical Calculation shows how to determine the energy consumed by a water wash tank in the plating room. It discusses physical constants (weights and areas) and heat-up requirements.

Comments: This handbook presents a relatively thorough range of suggestions for energy conservation at the easy, practical level, as well as ideas which take more time and effort to implement.

Price: Free.

Available Office of Energy Conservation
From: Department of Energy, Mines and Resources
580 Booth Street
Ottawa, Ontario
Canada

IDENTIFYING RETROFIT PROJECTS FOR BUILDINGS

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1976

This unique handbook is designed to be used by building owners, managers, operators and occupants to identify quick payback retrofit projects in existing buildings. It provides a methodology for non-technical people to survey existing buildings while focusing on proven high-payback options by climate zone and building type, while reducing the technical requirements of the surveyor. The tools are provided to calculate the energy savings, cost savings, capital costs and simple payback periods for the options identified. The handbook suggests a format for writing up the options, energy calculations and reporting the overall retrofit surveys for one or several buildings. (100 pp.)

CONTENTS

- Section 1 Introduction explains the need for emphasizing energy conservation efforts in existing buildings and states that the handbook can be used as a short-cut to the more costly services available from an architect and engineering firm.
- Section 2 Overview of Method for Identifying Retrofits
lays out the four basic steps contained in the handbook methodology for identifying retrofits. The method employed parallels that used in a full-scale engineering survey. However, checklists, reference tables, and simple calculations based on the experience of others are substituted for the more complex analysis and measurements entailed in a full-scale engineering effort. The four tasks contained in the methodology are simplified into the following general steps.
- Step 1 - Collecting Energy Use Data This step provides fuel cost data necessary to calculate cost savings in a later step, and also provides an overall sense of priority for retrofit projects. Fuel forms that account for the largest part of the total fuel bill should receive greatest emphasis in planning retrofit projects.
 - Step 2 - Categorizing Buildings In this step, all of the buildings at a facility are ranked in terms of size, and thus by their probable proportion of energy use; buildings are categorized into types; and the climate zone that corresponds to a facility's location is identified.

- Step 3 - Identifying Retrofit Options In this step, reference tables link appropriate candidate retrofit options with specific energy systems as a function of building type and the climate zone in which the building is located. In addition, retrofit projects already planned can be easily incorporated.
- Step 4 - Evaluating and Ranking Retrofit Projects In this step the energy and cost savings of individual retrofit projects are calculated, along with their associated investment costs. The options are then ranked in terms of the time it would take for them to pay back their investment cost.

Section 3	<u>Method for Identifying Retrofit Projects</u> gives an explanation, in sequence, of the tasks in each of the previously mentioned steps. For each task, either a simple table, reference table, or worksheet is provided. When completed, these materials can be combined to provide reports on retrofit options for individual buildings and for the entire group of buildings that make up a facility. This section gives detailed procedural instruction for the surveyor to follow in accomplishing the survey.
Section 4	<u>Evaluating and Ranking Retrofit Options</u> gives instructions for prioritizing retrofit projects once they are identified in the preliminary part of the survey. Such an exercise provides a picture of which projects identified should be considered first for funding.
Section 5	<u>Reporting</u> gives the surveyor a format for writing a concise report on each facility surveyed. This is particularly useful in standardizing reports from diversified sites, especially when the surveys are being done by personnel previously unexperienced in building retrofit surveys and cost-benefit assessments.
System-oriented Sections	<p>The tabbed sections of the handbook provide the bulk of the text (all but the first 21 pages). Thirty-six retrofit options are presented under the headings of: heating, ventilating, lighting, cooling, water heating and miscellaneous. Each option has specific instructions for the surveyor to accomplish: preliminary data collection; calculations of energy savings, energy cost savings, capital costs and simple payback period.</p> <p>Additional tabbed sections are provided for a section on Energy Management Systems and the Appendices containing worksheets and technical reference materials.</p>

Comments: This handbook is useful in expanding an organization's ability to identify quick payback retrofit projects. It is compatible with any existing program and can be useful to experienced engineers. However, its most important contribution to energy conservation efforts is in its ability to be used by non-technical personnel. This allows the field of people involved in building retrofit analysis to be greatly expanded and results in a corresponding increase in an organization level of effort in energy conservation and energy cost avoidance.

Price: \$3.75 (Stock # 041-018-00129-8)

Available From: Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

SITE ENERGY HANDBOOK: VOLUME 1
METHODOLOGY FOR ENERGY SURVEY AND APPRAISAL

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

An energy handbook which presents guidelines to evaluate energy usage, to identify energy-saving opportunities, and to recommend appropriate conservation measures at ERDA facilities. (137pp).

CONTENTS

Chapter 1	<u>Executive Summary</u> states the purpose and scope of the handbook and presents the approach to site energy conservation on which the handbook is based.
Chapter 2	<u>Approach to Site Energy Survey, Appraisal and Conservation</u> defines the terms used in site energy analysis and details the three major phases of the approach: 1) identification and survey of each site energy and utility system, 2) analysis and evaluation of overall site energy configuration, and 3) identification and evaluation of site energy conservation opportunities.
Chapter 3	<u>Survey Methodology for Site Energy and Utility Systems</u> provides the methodology to be used to identify and record technical characteristics, and usage and cost data for each energy and utility system on the site.
Chapter 4	<u>Methodology for Site Energy Appraisal</u> offers guidelines for analysis and interpretation of that data gathered in the previous chapter. High energy users and apparent energy wasters become highlighted through utilization of these techniques.
Chapter 5	<u>Site Energy Conservation Opportunities</u> is rather detailed in listing energy conservation opportunities in specific site areas as determined by the survey appraisal. The systems examined are gas service and distribution; fuel oil, LPG, and coal; electrical service and distribution; steam condensate return; hot water generation and distribution; chilled water generation and distribution; water supply, treatment and distribution; wastewater collection and treatment; solid waste collection and disposal; compressed air generation and generation; thermal/electric matching; instrumentation, monitoring and controls; operation and maintenance; modification, expansion, and replacement; and industrial processes.
Appendix A	<u>Bibliography</u> lists 61 other sources for information in industrial energy conservation.

Comments: An accompanying publication (Volume 2) contains all the necessary forms referenced in Chapters 1 through 4. The bulk of this text is in Chapter 5 which thoroughly covers energy conservation measures at industrial sites.

Price: \$ 8.00 (ERDA 76/131/1)
\$10.75 (ERDA) 76/131/2 - supplementary forms)

Available From: National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

TOTAL ENERGY MANAGEMENT - 2nd Edition

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION
 NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
 IN COOPERATION WITH FEDERAL ENERGY ADMINISTRATION
 (NOW U.S. DOE)
 1978

A practical handbook on energy conservation and management for use by owners and managers of office buildings and small retail stores. (90 pp)

CONTENTS

- Chapter 1 Introduction presents the integrated approach to total energy management in comparison with the approach of energy management in individual energy-consuming systems.
- Chapter 2 Energy Consumption in Buildings discusses the factors that affect energy consumption and efficiency.
- Chapter 3 Obtaining Initial Commitment and Cooperation stresses the need in obtaining strong commitment and cooperation from all involved personnel in order to have an effective program.
- Chapter 4 Analyzing Building Energy Performance discusses the initial means to begin a total energy management program by analysis of previous energy consumption. Provided is a form for use in the conduction of the data analysis. Other considerations are the optional adjustments to perform the analysis.
- Chapter 5 Conducting a Building Survey provides general guidelines in conducting a building survey.
- Chapter 6 Guidelines for Energy Conservation discusses in a general way, alternative measures which can be implemented following the audit to produce comfortable and cost efficient energy savings in heating and cooling systems. Suggested systems alterations are categorized as either minimally or significantly expensive, in operational and maintenance stages.
- Chapter 7 Financial Evaluation and Completing the Plan explains actions to be taken following the identity of conservation choices. Detailed program rating including economic considerations, priority setting, objectives and goals and responsibilities should comprise the management plan.
- Chapter 8 Implementing the Final Plan explains measures from the detailed requirements listing phase to personnel informational and cooperation options, programmatic observation and accountability and continuing education.

- Chapter 9 Case Histories. Two buildings are analyzed including the nature of energy conservation measures taken and results of efforts taken.
- Appendix A Contains a sample building survey form.
- Appendix B Sources of Information on Energy Management lists organizations for further communication on energy management. A publications list, a glossary and acronyms are also contained.
- Comments: This guide is a valuable introduction to the concept of total energy management for the building owner and manager. It contains important useful samples and alternate sources of information.
- Price: For information on price and availability, contact:
National Electrical Manufacturers' Association
Public Affairs Department
2101 L Street, N.W.
Washington, D.C. 20037

AIR FORCE ENERGY CONSERVATION HANDBOOKVOLUME II: TECHNICAL GUIDELINES FOR ENERGY CONSERVATION

DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
1977

Guidelines for use by U.S. Air Force Staff engineers in evaluating and implementing energy conservation measures. (396 pp.)

CONTENTS

- Chapter 1 Introduction describes the purpose and scope of the manual in terms of the energy problem and the need for motivating personnel.
- Chapter 2 Energy Conservation Measures for Exterior Building Envelopes describes a methodology based upon heating degree days for determining whether a facility at any specific location has a heating or cooling problem. It then describes energy conservation measures for fenestration, reducing air infiltration, and retrofitting building surfaces. The last section of the chapter provides an example for determining the economically optimum allocation of energy conservation resources for building envelopes.
- Chapter 3 Modifying Mechanical Systems and Operating Practices for Energy Conservation provides techniques for modifying mechanical and utility systems to reduce energy consumption in buildings. The mechanical systems covered are HVAC (in large buildings and family housing), domestic hot water, and lighting. The chapter also describes energy conservation practices in the following: steam and high temperature water (HTW) generating plants, and chilled water plants; electrical load management; energy monitoring control systems; power factor adjustments; waste oil utilization; and waste heat reclamation systems.
- Chapter 4 Conducting the Building Survey explains how to conduct a physical reconnaissance of a building to identify potential target areas for energy conservation. Sample data sheets for the building survey are included. Illustrations are used to assist in the identification of problems that may be encountered.
- Chapter 5 Measurements for Identifying Energy Conservation Potentials presents several simple measurement techniques for assessing the thermal transmission characteristics of exterior building envelopes; the thermal performance of HVAC and water heating equipment; and the operating efficiency of central hot water, steam, and chilled water generating plants. These techniques assist in identifying and evaluating their respective energy conservation potentials. Some of these techniques include infrared thermography, energy use indices, and humidity measurements.

- Chapter 6 Economic Analysis provides a framework for making economic decisions on a systematic basis. It explains life-cycle benefit-cost analysis, and conventional approaches to cost-benefit studies in which either greater cost or greater benefit are emphasized but are not equally considered.
- Appendix A Calculation of Energy Requirements for Space Heating and Space Cooling of Buildings presents the calculation methodology in four principal sections: design heating load, design cooling load, energy requirement for space heating and energy requirement for space cooling. Sample problems are solved.
- Appendix B Solar Energy Systems for Air Force Applications provides guidelines for use when considering the use of solar energy systems in buildings.
- Appendix C Heat and Chilled Water Distribution Systems briefly describes various types of systems used on Air Force bases, methods of determining the heat loss characteristics of existing systems, and methods of determining economically optimal pipe insulation thicknesses for the retrofit design.
- Appendix D A Survey of Computer Programs for Evaluating Building and System Performance presents a representative survey of existing computer programs and provides the following descriptive parameters for each: short description of program use, input requirements, outputs, source code language, systems on which the software is implemented, maintenance of software, its availability, and other relevant comments.
- Appendix E Bibliography of Energy Conservation Documents lists 296 publications used to produce the handbook and recommended as supplemental references at the Base level.

Comments: The Air Force Energy Conservation Handbook was developed for use by Air Force staff engineers to assist in evaluation and implementation of energy conservation measures. The scope, however, is broad enough to warrant its use by non-technical persons interested in energy conservation. The accompanying Volume I: Management Guidelines was distributed to Air Force personnel involved in management of its energy conservation program. As of December 1977, Volume I was not available through NTIS.

Price: \$10.75

Available From: National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, Virginia 22161

ENERGY CONSERVATION GUIDELINES FOR BUILDING OPERATIONS

GENERAL SERVICES ADMINISTRATION
1977

Simple recommendations for building maintenance and operation staffs that will encourage energy-consciousness in everyday tasks. (78 pp.)

CONTENTS

- Section 1 Energy Uses and Costs provides background material on costs of energy broken down by usage category (i.e., lighting, heating, air conditioning) and by fuel type.
- Section 2 Electricity identifies the electrical energy requirements of a building and the factors involved in controlling electrical energy use. Topics discussed include controllable billing factors, electric rate schedules, lighting energy, equipment maintenance, outside air for cooling, electrical demand, load factor, and power factor.
- Section 3 Heat discusses sources of heat, boiler operation and efficiency, heat transfer, and insulation.
- Section 4 Water deals with the conservation of water and the reduction of sewage to reduce energy consumption.
- Comments: This publication provides simple explanations for certain factors related to energy conservation. Its most important functions are to introduce and promote energy conservation to building staff members who are ordinarily concerned only with building maintenance.
- Price: Free.
- Available From: GSA Business Centers located in Boston, New York, Washington, Atlanta, Chicago, Ft. Worth, Kansas City, Denver, San Francisco, and Seattle.

ENERGY COST REDUCTION IN RETAILING

AMERICAN RETAIL FEDERATION
1977

A handbook designed to assist retail store owners in cutting the cost of energy in their business establishments. (74 pp.)

CONTENTS

- Introduction discusses energy waste in retailing and areas of significant potential savings. It also presents an overview of the publication's contents.
- Section I Interior Lighting discusses ways to use lighting energy more efficiently in displays, security, and overall lighting applications.
- Section II Outdoor Lighting discusses energy savings by modifying parking, display, merchandising, and security lighting.
- Section III Heating discusses potential energy savings through temperature setback, temperature reduction, and heat loss reduction in display windows.
- Section IV Air Conditioning discusses energy savings by temperature set forward, cooling system shut-off and moderation of outdoor air intake.
- Section V Maintenance discusses the impact of proper maintenance on energy costs. Recommended methods for savings include improving boiler efficiency, reducing infiltration losses, insulating pipes and tanks, and repairing water leaks.
- Section VI Warehousing discusses the possibilities for energy savings in loading docks and garage areas. Areas of potential savings are reduction of heat loss from open garage doors, control of heating with temperature setback, and use of efficient lighting.
- Section VII Delivery discusses the savings potential in truck maintenance, payload management, and improved routing and scheduling.
- Section VIII Refrigeration discusses factors in reducing the energy costs of refrigeration. These include maintaining cooler parts in good operating condition, raising night temperatures, turning off lights, and maintaining seals.
- Section IX Other Savings Recommendations discusses other areas of potential savings in retailing.

- Section X Energy Management outlines the requirements for an effective energy management program.
- Section XI Assessing Your Energy Needs and Energy Wastes explains how to carry out a simplified energy audit.
- Section XII Economic Projections explains the terms used in making economic projections.
- Comments: Each section begins with an explanation of the energy use in that area of discussion, an estimate of possible energy savings, and a list of recommended steps for saving energy. Several case histories and explanations of recommendations are also included.
- Price: \$2.50
- Available American Retail Federation
From: 1616 H Street, N.W.
 Washington, D. C. 20036

THE ENERGY MANAGERS HANDBOOK

GORDON H. PAYNE

1977

An energy management handbook for persons and organizations intent on increasing energy efficiency. It offers methods for reducing costs and improving both profitability and competitiveness. (141 pp.)

CONTENTS

- Chapter 1 Energy Conservation provides a critical look at the need to conserve energy. It describes the principles of energy conservation, including preliminary considerations and the main areas for examination, measurement, and improved efficiency. It emphasizes that a great deal can be accomplished without brand new technology if well-established principles and techniques are applied.
- Chapter 2 Management of Energy describes the responsibilities of senior management and the qualifications and duties of the energy manager. The need for an energy audit is discussed and a sample format presented. The author discusses energy costs and lists opportunities to lower costs in the planning and control stages.
- Chapter 3 Delivery, Storage, and Handling of fuels illustrates how a great deal of energy waste can be avoided if national codes and sound control and use practices are followed. Oil, coal and gas usage is discussed from this point of view.
- Chapter 4 Boilers considers broad principles of boiler design and operation. The objective of limited production for energy conservation is discussed as well as combustion performance and water treatment. A checklist of boiler control and maintenance procedures is included.
- Chapter 5 Furnaces includes in its definitions kilns, stoves and dryers. Efficient repair, control, and construction of these types of furnaces are outlined. Suggestions on processes and materials are discussed and evaluation criteria are described. Efficient operating procedures are detailed.
- Chapter 6 Heat Distribution and Utilization illustrates the potential for heat loss and heat recovery. It describes practices for steam, hot water, gas, and waste gas systems.

- Chapter 7 Industrial Space Heating describes types and special uses of heat, time control and temperature, air changes, heat distribution, thermal insulation, heat recovery, and non-fuel sources of heat. Advice and warnings are given regarding economical operation.
- Chapter 8 Electricity provides an analysis of costs and tariffs, and ways to improve both load factor and power factor.
- Chapter 9 Services discusses measures which increase energy efficiency, including on-site electricity generation, the use of compressed air systems, water, and lubricant recycling.
- Chapter 10 Road Transport considers methods of minimizing vehicle mileage, conserving gasoline, maintaining and servicing vehicles, and educating drivers.
- Appendix A Units and Conversion Factors lists the International System of Units (SI Units), base units, common units, and calorific values.
- Appendix B Test Equipment lists examples of permanent instrumentation and controls which are simple to operate and, with reasonable care, robust enough for industrial use.
- Appendix C Further Reading and Reference includes sources on British standards (listed separately) and sources grouped by chapter.

Comments: A book with a British orientation but with international applicability. It is not concerned with demand forecasts or other broad economic matters nor new technologies. It is not a text book on fuel technology; it only establishes basic principles. Bold face type sets apart the tips, hints, advice, and warnings offered in each chapter. Appendix B includes photographs and short descriptions of various meters, probes, and analyzers. An index is provided.

Price: \$15.00

Available IPC Science and Technology Press Limited
From: 32 High Street
 Guildford, Surrey, England GU1 3EW

GUIDE TO ENERGY CONSERVATION FOR FOOD SERVICE

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

Rev. 1978

This report offers "how to" procedures for saving energy that a food service operator can perform himself. (74 pp.)

CONTENTS

- Section 1 Introduction and How to Begin presents the need for an energy management program in food service institutions and outlines a plan for program implementation.
- Section 2 Food Preparation and Storage focuses on efficient operation and maintenance of cooking equipment. The major pieces of energy-consuming equipment considered are rangetops, griddles, broilers, ovens, fryers, steamers, refrigerators, and freezers. Efficient operation of equipment is attainable through the energy conservation principles listed.
- Section 3 Lighting contains directions on how to conduct a lighting survey that will accurately determine where energy savings can be made. Then offers suggestions on how to maintain the most efficient lighting systems.
- Section 4 HVAC first describes the operation of heating, ventilating, and air conditioning (HVAC) systems. It then provides tips on operation and maintenance that will reduce energy use.
- Section 5 Sanitation explains how to save energy in dishwashing and water heating processes. Operational procedures and simple maintenance tasks are included.
- Appendix: Tracking Your Energy Use provides worksheets which can be used to determine energy savings.
- Comments: The format of each section emphasizes operation, maintenance and planning. The guide is non-technical and present only guidelines to follow in managing energy use. More technical publications are listed in the bibliography.
- Price: \$2.25 (Stock No. 041-018-00127-1)
- Available Superintendent of Documents
From: U. S. Government Printing Office
 Washington, D. C. 20402

GUIDE TO ENERGY CONSERVATION FOR GROCERY STORES

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1977

A collection of practical recommendations for managers of retail food stores.
(42 pp.)

CONTENTS

Chapter 1	<u>Introduction</u> briefly reviews the energy consumption patterns in grocery stores and discusses the steps store owners are taking to initiate energy conservation programs. It also outlines the organization of the guide.
Chapter 2	<u>Putting an Energy Management Program into Place</u> outlines the steps in establishing an energy management program in a retail food store.
Chapter 3	<u>Environmental Control</u> describes how environmental systems in grocery stores operate, what to do to make them operate more efficiently, and how control systems operate. It also discusses the effect of one system on the operation of another, and the optimization of these effects.
Chapter 4	<u>Building Structure</u> discusses the structural nature of a grocery store and its effect on the energy requirements and costs for interior lighting and environmental control. It suggests conservation measures pertaining not only to the reduction of air infiltration and heat transfer but also to the building envelope and its relation to environmental control and lighting.
Chapter 5	<u>Lighting</u> offers suggestions on how to save energy by selecting, operating, and maintaining lighting more efficiently. Different types of indoor and outdoor lighting are described, and their energy-efficiency, costs, and esthetic features are compared.
Chapter 6	<u>Bakeries and Delicatessens</u> outlines specific energy-efficient procedures for operating and maintaining ovens, proof boxes, deep fat fryers, steamers, and exhaust systems. It concludes with planning suggestions for all energy-using equipment.
Chapter 7	<u>Tracking Your Energy Use</u> presents a step-by-step procedure for monitoring monthly energy use.
Glossary	Provides definitions of terms used in energy management in grocery stores.
References	Provides a list of 38 references used to develop this publication.

Comments: Each chapter is formatted similarly, beginning with a general discussion of the sources of energy losses and the potential for energy savings. Three parallel sections, OPERATION, MAINTENANCE, and PLANNING follow and present different kinds of conservation measures. The guide is concise, but useful for the retail food store management team that has recognized the need for energy conservation.

Price: \$1.90 (Stock No. 041-018-00133-6)

Available Superintendent of Documents
From: U.S. Government Printing Office
Washington, D.C. 20420

A PRACTICAL GUIDE TO ENERGY MANAGEMENT:
ELECTRIC FOOD SERVICE FACILITIES

THE ELECTRIFICATION COUNCIL
1977

A guide for use by food service operators, electric equipment manufacturers, electric utilities, and others concerned with energy management in electric food service facilities. The objective is to achieve efficient management of energy and costs in the operation of electrically equipped food service facilities. (21 pp.)

CONTENTS

- Section 1 Introduction discusses the elements of kitchen design and equipment selection to be considered in planning an energy management program.
- Section 2 Principles of Energy Management: Cooking Equipment presents a discussion of energy management practices that will reduce energy consumption without reducing kitchen efficiency or sacrificing food quality.
- Section 3 Principles of Energy Management: Hot Food Holding and Transporting Equipment offers suggestions for more efficient operation and maintenance of hot food holding and transporting equipment.
- Section 4 Principles of Energy Management: Refrigeration Equipment discusses energy management practices which are often neglected in the selection, operation, and maintenance of refrigeration equipment.
- Section 5 Principles of Energy Management: Warewashing Equipment discusses the selection, installation and adjustment, operation, cleaning, and repair of this equipment.
- Section 6 Principles of Energy Management: Water Heating offers tips for efficient and economical operation of electric water heating equipment.
- Section 7 Principles of Energy Management: Kitchen Ventilating System discusses the design and operation components of the ventilating system which can be utilized to maintain energy requirements at a minimum.
- Section 8 Energy Management Analysis Form provides a checklist for analyzing energy management practices and for recording recommended procedures.
- Comments: This manual suggests operational practices which are useful in planning and establishing an effective energy management program. The "Energy Management Analysis Form" reinforces the material covered and ensures that the user will become familiar with energy use practices in his/her establishment.

Price: \$1.00

Available From: The Electrification Council
1111 Nineteenth Street, N.W.
Washington, D. C. 20036

ENERGY AUDIT FOR GROWERS --
A SELF-INSPECTION GUIDE TO REDUCE ENERGY COSTS

U.S. DEPARTMENT OF ENERGY
SOCIETY OF AMERICAN FLORISTS
1978

The handbook, designed for wholesale growers, shows what process modifications can be made, why they are necessary, and calculates estimated savings and payback time. (126 pp.)

CONTENTS

Introduction contains a summary, in chart form, of energy-saving modifications, the cost of implementing the changes, the payback period, first-year savings and ten-year savings.

Section 1 The Greenhouse includes twenty-six specific recommendations for greenhouse modification. The changes range from installing plastic air curtains to repairing steam traps.

Section 2 Storage and Office Facilities includes four ways to reduce energy consumption, from caulking and weather stripping to using efficient lighting.

Section 3 Refrigeration Units and Buildings describes methods of saving energy, including proper maintenance and replacement of worn refrigerator seals.

Section 4 Delivery Operations describes six ways of reducing truck delivery and maintenance energy-related costs.

Comments: Within each section of the handbook, recommendations for saving energy are listed and described. Implementation suggestions and case study examples are included for each recommended procedure.

Price: \$5.00

Available Society of American Florists
From: 901 N. Washington Street
 Alexandria, Virginia 22314

ENERGY AUDIT FOR RETAILERS --
A SELF-INSPECTION GUIDE TO REDUCE ENERGY COSTS

U.S. DEPARTMENT OF ENERGY
SOCIETY OF AMERICAN FLORISTS
1978

The handbook, designed for retail florists, shows what process modifications can be made, why they are necessary, and calculates estimated savings and payback time. (126 pp.)

CONTENTS

Introduction contains a summary, in chart form, of energy-saving modifications, the cost of implementing the changes, the payback period, first-year savings, and ten-year savings.

Section 1 The Shop lists and describes ways to conserve energy in lighting, heating, refrigeration and delivery services.

Section 2 The Greenhouse/Conservatorium identifies six methods of saving energy in the greenhouse, from pipe insulation to using plastic air curtains.

Comments: Within each section, detailed recommendations for saving energy are listed and described. Implementation suggestions and case study examples are included for each recommended procedure.

Price: \$10.00

Available Society of American Florists
From: 901 N. Washington Street
 Alexandria, Virginia 22314

ENERGY AUDIT WORKBOOKU.S. DEPARTMENT OF ENERGY
ASSISTANT SECRETARY FOR CONSERVATION
AND SOLAR APPLICATIONS

1979

This series of workbooks will be used by State Energy Offices to assist industrial and commercial users in performing energy audits to identify energy conservation measures. (approximately 70 pp. each)

CONTENTS

- Chapter 1 Maintenance and Operational Changes explains modifications which can be incorporated at essentially no cost.
- Chapter 2 Step by Step Examples illustrates methods which can save energy and money. Each method is followed by a problem which will help the engineer or manager to determine what the cost and savings of modifications will be.
- Chapter 3 Energy Measures includes a comprehensive list of energy conservation measures which would require an initial investment of capital. This detailed checklist of steps to take is divided into various sections according to the subject matter at hand.
- Chapter 4 The Action Plan includes a summary of a plan to carry out energy conservation measures and a worksheet showing modifications which have been implemented.
- Comments: Each of these 11 workbooks follows the same format. They are designed as aids to help the commercial and industrial energy consumer save energy and money by taking the company through an energy audit to determine what needs to be changed, and what the cost savings will be.

The workbooks are available to help users in 11 different areas:

- apartments
- bakeries
- die-cast plants
- educational institutions
- hospitals
- hotels and motels
- offices
- restaurants
- retail stores
- transportation terminals
- warehouses and storage facilities

The series also contains an instructor's manual which provides energy auditors with background materials on the subject matter.

Price: Student's Manual: \$2.50 (copy)
 \$6.00 each (printed copy)
 \$3.00 each (microfiche)

Instructor's Manual: Vol. I - \$4.25
 Vol. II- \$5.25

Available

From: National Technical Information Service
 U.S. Department of Commerce
 5285 Port Royal Road
 Springfield, Virginia 22161

ENERGY COST REDUCTION FOR APARTMENT OWNERS
AND MANAGERS

INSTITUTE OF REAL ESTATE MANAGEMENT
1977

A handbook which describes the major opportunities for energy cost reduction in apartment buildings. It shows how energy is commonly wasted and how action on the recommendations set forth can save money immediately and in the future. (61 pp.)

CONTENTS

Energy Investment Returns Thousands of Dollars summarizes the financial paybacks from implementing the measures described in the handbook.

Saving on Hot Water details the implementation procedures for replacing showerheads and faucet aerators to reduce the flow of hot water, reducing the hot water temperature, and installing timeclocks on hot water circulating pumps. Examples of each, including calculated dollar savings, are cited.

Savings on Lighting discusses relamping apartments and common areas to reduce electricity use. Plausible implementation procedures and examples, including calculated cost savings, are included.

Savings on Heating and Cooling explains several energy cost reduction recommendations which should be implemented with the assistance of specialized contractors; others can be executed by maintenance personnel. These include the following: correcting overheating, limiting heating and cooling temperatures, setting back thermostats during heating season, improving and maintaining boiler efficiency, installing storm windows, insulating pipes and tanks, and adding roof insulation. Calculated cost savings for each are listed.

Other Potential Savings contains brief descriptions of simple ideas which are often overlooked or underestimated. These include repairing water leaks, caulking and weatherstripping windows and doors, and shutting off pilots in unused gas furnaces.

Closing outlines some of the factors involved in successfully implementing the recommendations in the handbook, including economic, legal, and incentive obstacles.

Appendix provides supplementary materials that will help the apartment owner or manager to understand energy consumption. Included are instructions for reading utility meters, an appliance rating chart which compares the energy consumption of major appliances, a list of economic projection terms with definitions, and sample tables for recording monthly energy expenditures.

Comments:

The recommendations in the handbook have been tested in detailed energy-usage analyses of apartment buildings throughout the nation. Many can be implemented by the apartment maintenance personnel; for others, experts should be consulted. Some of the recommendations are economically feasible only if the tenants' rent includes utility costs.

Price: \$3.00

Available From: Institute of Real Estate Management
430 North Michigan Avenue
Chicago, Illinois 60611

HOW TO COMPLY WITH THE
EMERGENCY BUILDING TEMPERATURE
RESTRICTIONS

U.S. DEPARTMENT OF ENERGY
July, 1979

Instructions for nonresidential building owners, managers and operators in response to the Emergency Building Temperature Restrictions Regulations effective July 16, 1979. (6 pp.)

CONTENTS

Regulations

- Part A How to Determine if the Regulations Apply to Your Building explains the types of structures covered, excluded and exempted in the regulations.
- Part B How to Comply with the Regulations--Certificates and Forms gives instructions and forms to display or submit to the Department of Energy.
- Part C How to Comply with the Regulations--Adjusting Air Temperatures in Simple and Compound HVAC Systems is presented. Techniques for setting and measuring temperature are set forth.
- Part D How to Comply with the Regulations--Adjusting Water Temperatures applies to water used for general housekeeping and personal care.
- Part E Tenant Responsibilities
- Part F Special Exemptions and how to apply for them are explained.
- Comments: The manual is a simply written explanation of the regulations for temperature control. Provided are the forms needed by the building owner or operator and a list of regional offices and telephone numbers for obtaining additional information.
- Price: For information on price and availability, contact:

U.S. Department of Energy
Washington, D.C. 20585

or one of the ten regional offices.

GENERAL MATERIALS

ENERGY CONSERVATION PROGRAM GUIDE FOR
INDUSTRY AND COMMERCE (EPIC)

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

AND

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1975

This book was first issued in 1974. Widespread distribution and use resulted in the receipt of useful comments and suggestions that were incorporated into Supplement 1 in December 1975.

Well written, and with a large number of fully worked examples, the book is intended to assist industry officials to develop their own energy conservation programs. However, the information is also applicable to other classes of users, including hospitals, schools and government agencies. The book also serves as an excellent introductory text to energy conservation practices and principles and can be used as either a reference or as seminar material.

A special feature of this publication is the heavy involvement of industrial energy specialists and executives in its development. It is eminently practical in its approach, and contains much material that was developed and proven through actual industrial experience. (250 pp.)

CONTENTS

- Chapter 1 Introduction provides a clear description of the need for energy conservation, explains the orientation of the publication, and suggests plans of action for the plant manager that will result in a successful energy conservation program.
- Chapter 2 Energy Conservation Program Implementation is a section that describes in some detail the actions necessary to implement a successful energy conservation program in a typical plant. The process commences with the establishment of top management committees and the assignments for program responsibility. Examples are provided of forms for summarizing past and present energy usage. Appropriate letters, forms, posters, and "kits"

are shown in detail, and the process is continued through initial energy conservation committee meetings, energy surveys, findings, supervisor training, contingency plan development, and ends on a note of continuing concern for continued conservation efforts.

- Chapter 3 Energy Conservation contains a detailed but clear discussion of energy conservation opportunities with descriptions of specific applications. These reports include charts, graphs, tables and sample calculations, as well as a brief description of the initial circumstances and subsequent actions. The calculations illustrate the key steps in estimating energy savings potential and the associated costs, but are not intended to substitute for detailed engineering analyses. Complete references are given for each suggested energy conservation example.
- Chapter 4 Engineering Data and Factors contains selection of tables, graphs and conversion factors useful in calculations needed to determine energy losses, savings and conservation opportunities. Metric equivalents are provided by reference only.
- Chapter 5 Financial Evaluation Procedures states that conservation opportunities require initial capital outlays that must be amortized by the energy savings generated over their lifetime. This section illustrates methods for calculating payback periods and performing benefit/cost analysis, and also discusses return on investment and marginal analysis for those investments whose rates of return decrease as the level of investment increases.
- Chapter 6 Sources of Assistance is a section providing a list, complete with telephone numbers, of the major trade associations, technical societies, and Department of Commerce and Federal Energy Administration Field Offices.
- Chapter 7 Safety, Health and Pollution Considerations shows how conservation actions can result in improvement or degradation of pollution measures at a plant. This section discusses those energy conservation actions that can result in improvements, those that can potentially produce unfavorable effects, and those where precaution is necessary. Reduction of ventilation levels below those considered satisfactory for worker safety and health and lighting levels are also discussed.
- Chapter 8 Employee Participation discusses the importance of employee participation in any plant energy conservation program and shows how to develop this feature through competitions, awards, posters and newsletters. Also discusses the extension of energy conservation into the areas of transportation and the home environment. Communication and education must be a firm management commitment.

Chapter 9 Energy Flow Measurements provides a brief and non-technical discussion of the instrumentation and methods that should be utilized in the measurement of temperatures, fluid flows, pressures, liquid levels, electrical power and flue gas analysis. Subjects covered include the range of operations, principle of operation, costs, accuracies and precautions. No diagrams are provided.

Chapter 10 Bibliography is a detailed listing of handbooks, journal articles and technical papers on all aspects of energy conservation that are covered in this publication.

Comments: An ambitious and well written handbook that should find a wide audience in industry and elsewhere. The handbook should be exceptionally useful to its intended audience — the plant manager. It would not be suitable for operating engineers, nor for an engineering survey, and it is not intended to be.

The handbook lacks a comprehensive index. Tables of contents are fairly complete, but are scattered throughout the handbook, making reference to any particular item unnecessarily difficult.

Supplement No. 1 was issued in December 1975 and contains additional energy conservation ideas and suggestions, some additional case studies, and minor revisions to other sections of the handbook. Supplements are provided at extra cost.

Price: \$2.50 (Catalog No. C13.11:115)
 \$2.25; Supplement No. 1 (Key N-414)

Available Superintendent of Documents
From: U. S. Government Printing Office
 Washington, D.C. 20402

EFFICIENT ELECTRICITY USE: A REFERENCE BOOK ON
ENERGY MANAGEMENT FOR ENGINEERS, ARCHITECTS, PLANNERS,
AND MANAGERS

ELECTRIC POWER RESEARCH INSTITUTE
CRAIG B. SMITH, EDITOR
Rev. 1978

This is a technical manual suitable for use by engineers, architects, planners, managers, and the public which summarizes current technology for improving electrical energy use efficiency. Numerous energy conservation case studies are included along with extensive bibliographies.

CONTENTS

Part I - Benefits and Limitations of Energy Management

- Chapter 1 Practical Savings Achievable with Efficient Energy Use assesses possible fuel savings due to increased use efficiency, and discusses implementation and institutional barriers, such as the cost benefits ratio of making industrial processes more energy efficient, and evaluates the practicality of reducing growth in electrical generating capacity.

Part II - Electric Energy Management from the Prospective of the end User

- Chapter 2 Industry presents current energy patterns, outlines possible immediate reductions in energy use through improved housekeeping methods and through minor mechanical modifications, and discusses overall potential energy savings.
- Chapter 3 Commerce outlines representative electricity use in buildings, summarizes energy management options for commercial buildings, and lists slips for starting an energy management program.
- Chapter 4 Residences contains a digest of householders which can reduce demand, practical modifications which the owner may undertake, and equipment design changes which the manufacturer or builder can undertake.
- Chapter 5 Transportation, Communication and Computers describes electric vehicle design, motors, power sources and future requirements; methods of saving energy through the use of digital computers and through telecommunications.
- Chapter 6 Agriculture depicts the growth of energy technology in agriculture and livestock and reviews conservation options in production, processing and distribution.

- Chapter 7 Building Envelopes and Sites examines factors effective energy use in buildings including the users, the climate, insolation, shape and site and configuration, provides a checklist of energy efficient designs when retrofitting a building for energy savings, and explains the heat transfer mechanisms which will guide the design.
- Chapter 8 Efficient Heating, Ventilating and Air Conditioning presents a variety of HVAC energy management ideas which can be applied to new or existing buildings. Ideas for control modifications, retrofit modifications, and new methods of equipment and system designs are presented. Pumps, chillers, heat pumps, and dampers are discussed in detail in respect to the types of strategies tested above.
- Chapter 9 Light Energy presents operating strategies the user can apply, facility modification strategies, and design modifications; provides cost-benefit data for decision making; and reviews lighting standards.
- Chapter 10 Process Heat and Heat Recovery identifies more efficient ways of using electric heat including equipment modification, insulation and integrated utility systems exchanges, and heat recovery technologies.
- Chapter 11 Electromechanical Energy presents techniques for improving energy efficiency in converting from electrical to mechanical energy, including operational procedure, user, and motor equipment manufacturer improvements.
- Chapter 12 Electrolytic and Electronic Processes points out ways electrical energy can be saved in electronic and electrochemical processes, including housekeeping measures and structural modifications.
- Part IV - Energy Management and the Future
- Chapter 13 Energy Management in Cities depicts the historical trends in efficient energy use by cities. New technological developments are discussed, including solid waste energy recovery, urban transportation and underground urban systems.
- Chapter 14 An Energy Constrained World introduces the energy cycle of the earth, describes sources of the United States energy supply, per capita energy use, and annual energy output.
- Chapter 15 Case Studies provides over 50 case studies which demonstrate the implementation, economic savings and environmental benefits of the suggested energy efficient techniques described in the preceding chapters.
- Appendices Conversion Factors gives energy and power equivalents and conversion factors for energy and power.

Engineering Data presents contents of energy in fuels and manufactured and stockpiled materials. Also points out power plant energy investments.

Energy Efficiency - The Concept of Available Work is a technical discussion of the laws of efficiency and energy utilization and available work efficiencies.

Energy Management Regulations reviews the U.S. energy legislation, the Federal agencies and Congressional committees involved in energy legislation and policy and presents a profile of energy management programs and policies.

Comments: A bibliography included at the end of each chapter provides additional sources of information for the reader on the topics discussed in that chapter.

Some parts of the book are technical and geared toward those with an engineering background but others can be easily understood by the layman. Many of the suggested projects could be implemented immediately with little capital expense. Diagrams, tables and case studies are included for ease in understanding.

Price: For information on price and availability, contact:

Pergamon Press, Inc.
Fairview Park
Elmsford, N.Y. 10523

ENERGY CONSERVATION SELF-EVALUATION MANUAL
FOR FEDERAL MANAGERS

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

A manual to assist Federal managers in initiating their own energy management programs. (108 pp.)

CONTENTS

- Section I** Foreword/Introduction reviews the need for energy conservation as a high national priority and sets forth specific objectives for the manual. This introductory portion of the manual familiarizes the user with the energy conservation initiatives of the Executive Branch of the Federal government and the Federal Energy Management Program. It provides instructions for using the self-evaluation checklists in the second part of the manual and guides the user in interpreting the completed checklists.
- Section II** Evaluation Sections provides checklists for each of twenty facilities design areas to assist facilities managers in improving the energy efficiency of Federal buildings. Each section includes recommendations for improving the energy efficiency of the design area or system in the section, rating instructions for each system component, and a self-evaluation checklist. Specific sections include the following: window, door, ceiling, wall, roof, storage area, shipping and receiving areas, illumination, food area, heat generation, heat distribution, cooling generation, cooling distribution, power distribution (electrical), hot water service, laundry, compressed air, water, process heating, and transportation.
- Completion of the checklists produces an energy efficiency rating score which indicates the degree of improvement needed.
- Bibliography** Provides a list of energy conservation guides, programs, and checklists.
- Comments: The self-evaluation manual assists the facility manager in identifying energy waste. The checklists make no attempt to analyze the cost-effectiveness of recommended energy conservation options but leave this responsibility with the individual manager.
- Price:** Free. Limited copies are available.
- Available From:** Chicago Federal Executive Board
Suite 2302-C
Everett McKinley Dirksen Building
219 South Dearborn Street
Chicago, Illinois 60604

ENERGY MANAGEMENT AT SHORE ACTIVITIES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
1976

This publication is the basis of a week long course in energy management that is given at the Naval School at Hueneme in California. The course is intended primarily for Naval Officers, but students are accepted from both government and industry. Further information on the course can be obtained from the Energy Program Office at Hueneme, Autovon 360-5562; commercial (805) 982-5562.

The materials are discussed in this precis in the order in which they are presented to course students, lecture by lecture. Each individual set of lecture notes is preceded by a summary sheet that details: 1) the objectives of the lecture, 2) reference materials required, 3) texts required, 4) supplementary material required (provided with course materials), and 5) previous assignments that should be completed.

Course materials are supplemented throughout with worked examples, clear diagrams, brochures, magazine articles, movies, copies of applicable regulations and class notes. The majority of the lecture periods are followed by workshops and student participation exercises.

CONTENTS

- Chapter 1 Introduction is an introductory lecture which discusses the objectives for the entire course and recommends that the student prepare a "Personal Action Plan" for energy management at his home facility. The U. S. energy situation is discussed in detail and supplemented by a motion picture, "Energy: The Critical Choices Ahead." A panel of instructors is convened to discuss energy problems with students. Each student is required to present information on an energy conservation technique that has been successfully employed at his home facility, this is later critiqued.
- Chapter 2 FEA/DOD Programs discusses the energy policies of the U. S. Government, how they are promulgated by the FEA, and how they affect both users and managers. The lecture also covers the DoD policies on energy conservation and on coal/oil boiler fuels, the organization and responsibilities of the DoD Defense Energy Directorate, and the purpose and use of the Defense Energy Information System.

- Chapter 3 DoD Energy Conservation Criteria covers the DoD policy on electrical heating and heat pumps, on the conversion from natural gas and fuel oil to coal burning facilities, and on solar and total energy system applications.
- Chapter 4 Navy Energy Programs discusses the overall economic and operational impact of energy conservation programs on the Navy fleet and shore installations and interprets current DoD and Navy Energy Programs as they impact Navy activities. Cost trends, fuel policies, conservation targets and operational standards are covered. The student is recommended to apply these programs at his facility.
- Chapter 5 Navy Family Housing Conservation discusses the problem of energy conservation when the housing occupant is entitled to free utility services and suggests methods of improving utility conservation. Materials provided to the student include sections from the NAVFAC Family Housing Energy Conservation Handbook. Solar energy applications and the future administrative trends regarding energy conservation in family housing are also discussed. Family housing consumed 10 percent of the total Navy energy budget.
- Chapter 6 ERDA Programs describes the national energy policies and discusses the role of ERDA in implementing this policy.
- Chapter 7 Utilities Procurement discusses in detail the Navy policies and procedures that apply to the procurement of utility services from the General Services Administration, from public utilities and from other Navy sources. Subjects discussed include contractual arrangements, invoicing, utility rate structuring, and the procedures used by various regulatory agencies. The student prepares a rate comparison and checks typical utility invoices.
- Chapter 8 Energy Audits contains a detailed discussion of the methods used to prepare energy audits. The information is presented from the point of view of a large industry with many plants in different parts of the country, and it is then shown how these methods can be applied to Naval facilities. Examples are provided to show how the program could be organized, the importance of good "public relations," and how to summarize and present the results.
- Chapter 9 Energy Conservation Investment Program deals with energy conservation from an economic viewpoint and covers priority ranking by payback period, amortization rates, escalated energy rates, and the effects of inflation. Several fully worked examples are included. The Navy Energy Conservation Investment Program (ECIP) criteria are presented, together with the normal process for funding energy projects from identification through Congressional funding action.

- Chapter 10 Electrical Energy Conservation is a detailed discussion of electrical power system components, functions, maintenance, and energy conservation opportunities in Naval installations. Special attention is given to lighting energy conservation, power factor correction and the advantages of a 34.5 KV distribution system.
- Chapter 11 Mechanical Energy Conservation is a thorough review of the basic principles of various types of boilers and heating systems. Covers potential for energy losses in the boiler plant and in the distribution system, including condensate return, and stresses equipment inspection and maintenance.
- Chapter 12 Heating, Ventilating and Air Conditioning Systems uses a large number of clear diagrams, graphs and tables to discuss the features of the more common type of HVAC systems, the equipment used in those systems, and the energy conservation opportunities and techniques that can be applied. Basic information is provided on the properties of air as related to heating and air conditioning, human comfort considerations, and methods for calculating heating and cooling loads. Special attention is given to the proper use and maintenance of controls.
- Chapter 13 Supervisory and Other Control Systems is essentially an introduction to automated energy management systems and covers the function of simple on-off controls, time clocks, thermostats, demand and ripple control systems. The influence of utility billing procedures that include demand interval billing, fuel adjustments and power factor adjustments is discussed. Demand curves, with and without ratchet clauses, are included. Problems that are frequently introduced by existing control systems on HVAC systems are discussed, and the function of demand controlling systems in saving energy and maintenance and providing security, alarms, and maintenance monitoring are covered.
- Chapter 14 Building Improvements and Rehabilitation covers a number of subjects including building architecture, HVAC systems, and domestic hot water systems. Basic equations are provided for understanding some aspects of heat transfer, infiltration and ventilation, energy consumption for heating and cooling, and for calculating the associated energy consumed. Several suggestions are provided for saving energy in existing buildings together with sample calculations for determining both energy and cost savings.
- Chapter 15 Lighting Applications discusses present day considerations for the design of lighting systems and introduces the various types of energy saving lamps that are now available. An example is given of an economic analysis of a lighting system. The use of natural daylight is also covered.

- Chapter 16 Facilities Research and Development contains a detailed discussion of the energy research and development program conducted by the Civil Engineering Laboratory of NAVFAC Engineering Command at Point Hueneme. The CEL acts as a clearinghouse for Naval energy problems and also performs research and development on a wide range of energy problems.
- Chapter 17 Total Energy Applications discusses the principles, advantages and constraints of total energy systems, presents typical equipment configurations, and presents the calculations required for total system evaluation. Also discusses economic analysis and the design and installation considerations.
- Chapter 18 Solid Waste Fuel Developments is a discussion of the methods and variables involved in converting solid wastes into energy, presents details of ongoing research, and related Navy policy implications. Tables are provided giving the heating values of various solid wastes and, solid waste production figures from various military facilities. Pollution considerations are discussed, together with details of boiler test programs. Clear diagrams of various installations are given.

Additional This section of the student manual contains selected Naval
Materials: directives dealing with aspects of energy conservation.

Comments: This course appears to cover every aspect of facilities energy conservation as practiced within the U. S. Navy. The course materials are complete, detailed and accurate. The materials contained within the manual itself represent a thorough and workable approach to energy conservation. Upon completing this course, the student should be well equipped to initiate energy conservation programs at his own facility.

The sole omission is a thorough discussion of advanced mini-computer-controlled energy management systems.

Available
From:

Energy Program Office
Port Hueneme, California

Autovon 360-5562; Commercial (805) 982-5562

ENERGY MANAGEMENT GUIDE FOR LIGHT INDUSTRY AND COMMERCE

W.J. Kelnhofer and L.A. Wood

U. S. DEPARTMENT OF COMMERCE, NATIONAL BUREAU OF STANDARDS

1976

A training tool to assist small industrial and commercial organizations in making the most efficient use of energy. (28 pp.)

CONTENTS

Introduction presents the problems of uncontrolled energy use in industry that have evolved with the energy crisis and the necessity of an effective energy management program.

Energy Management Program discusses the four main points of consideration in an energy management program: 1) organization of the program, 2) conducting an energy audit, 3) taking action on energy saving, and 4) promoting the program.

Checklist for Reducing Energy Usage lists simple procedures for employees to follow to reduce energy use in buildings and grounds, in electricity and in vehicles.

Cost Analysis Procedures discusses two procedures for making a financial analysis of the industry's cost savings opportunities. One approach is to determine the benefit/cost relationship, another is to determine the time to recoup the investment.

Assistance suggests where to find outside help in solving energy usage problems. Suggestions include private consultants, utility companies, trade associations, and government organizations.

Interaction with OSHA and EPA Requirements discusses the coordination of energy saving practices with health requirements established by OSHA and EPA.

- Appendix I Cost Savings Opportunities lists case studies where substantial energy savings were realized.
- Appendix II U. S. Department of Commerce District Office Directory
- Appendix III References includes documents on energy management and conservation.
- Appendix IV Conversion Table to International System of Units.

Comments: This document is an edited and rewritten version of portions of NBS-HB-115, the EPIC manual. It is intended to be used by small organizations with a limited supply of technical manpower.

Price: \$.70 (Catalog No. C13.11:.20)

Available From: Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

UCAN TECHNICAL IMPLEMENTATION MANUAL

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1976

This UCAN (Utilities Conservation Action Now) Manual supplements The UCAN Manual of Conservation Measures by focusing on the methods adopted by utilities, public service commissions, and public interest groups which have proven to be successful implementation strategies in energy conservation. The primary audience includes the management and planning teams of these groups. (170 pp)

CONTENTS

- Section 1 Rate Reform to Reflect Time-Varying Cost of Service examines the FEA recommendation that utilities adopt structural rate reforms that embody peak responsibility pricing and time-varying rates, based on marginal cost principles. It then illustrates the initiatives that may be taken by electric utilities, gas utilities, public service commissions, and public interest groups in applying this recommendation to their interests.
- Section 2 Load Management and Load Controls discusses the concepts and techniques of utility load management and how it may be encouraged by the utilities, public interest groups, and consumers.
- Section 3 Insulation Consultation and Financing describes a program for encouraging the retrofiting of insulation in three major phases: promotion, consultation, and financing. The active roles of utilities, public interest groups, and public service groups in this program is detailed here.
- Section 4 Consumer Usage Information describes the communication efforts to be taken by utilities and other groups to encourage reduction of energy use. Special emphasis is given to the residential customers who are normally given less information and attention in this important area. Included in this section, are sample utility bills which demonstrate attempts to explain to the residential energy consumer exactly what the bill says and means.
- Section 5 Energy Efficiency Awards explains the implementation of such a program as a vehicle through which the public, especially industrial and commercial customers, is encouraged to use energy more efficiently. Sample promotional materials, score sheets and checklists are provided to further illustrate the scope of an energy efficiency award program to be used effectively by utilities, public interest groups, and public service groups.

- Section 6 Energy Efficiency Promotion addresses itself to measures that can be taken in residential and commercial sectors to improve the efficiency of systems already in use, i.e., lighting systems and appliances. Consumer education programs are incorporated into this plan. The role of public interest groups in residences is particularly emphasized here.
- Section 7 Interior Environment Consultation Programs focuses on achieving energy savings through improved interior environmental control in commercial buildings, especially in space conditioning and lighting systems. The utility companies offer technical expertise, the public service commissions focus on consumer education, and the public interest groups raise consumer awareness to initiate a well integrated program.
- (Inserted at this point is a supplement to the document, Energy Conservation Through Control of the Interior Environment of Commercial Buildings, which informs the commercial customer of the need for energy conservation, the cost benefits that are possible, and to suggest certain conservation measures that are readily implemented. These are specifically in lighting, heating, and cooling factors).
- Section 8 Building Code Revisions encourages revisions of building codes to promote energy conservation and to encourage innovative design. Participation of gas and electric utilities, public service commissions, and public interest groups at hearings and/or in lobbying are considered to be highly valuable functions.
- Section 9 Energy Audit Consultation recommends two energy audits within the context of the UCAN program — an overall audit by the utility which analyzes variation in energy use by the customer, and a more detailed audit by the customer to determine why these variations have occurred. The public service and public interest groups act to encourage industrial and commercial firms to use the audit services offered by utilities.
- Section 10 Individual Rather Than Master Metering of Electrical Service in Apartment Buildings discusses the advantages to energy management programs in the use of individual metering of electricity rather than master metering. This is based primarily on tenant response to individual electricity billings.

Comments: The manual is illustrated with many sample programs useful in the planning stages of other energy management programs. It covers all relevant topics well enough to encourage and promote energy conservation in industry, commerce, and residences.

Price: \$7.00 (PB 261-094)

Available National Technical Information Service
From: 5285 Port Royal Road
 Springfield, Virginia 22161

HEAT RECOVERY ENGINEERING SEMINAR

THE TRANE COMPANY

1977

An engineering manual which analyzes the vital considerations associated with the application of heat recovery systems and equipment. (58 pp.)

CONTENTS

- Part 1. Practicality of Heat Recovery studies the interdependent nature of the factors to be considered, including weather, fuels, building characteristics, systems/equipment, and building utilization. The two overriding factors which determine the suitability of heat recovery systems, available heat and a use for recovered heat, are also examined in this part.
- Part 2. Systems/Equipment presents various heat recovery systems and equipment combinations and provides the logic for determining the best arrangement to serve the need. Systems covered are coil loop, terminal reheat, double duct, single zone (fan coil), and variable volume. Equipment covered includes domestic water preheating, separate water circuits, air cooled reciprocating chillers, computer room air conditioners, de-superheaters, storage, and control.
- Part 3. Evaluation provides the techniques that permit the evaluator to analyze the various systems in terms that relate to his goals. A sample building is used to illustrate each example system/equipment combination.
- Comments: These seminars are conducted for engineers, negotiating contractors and consultants. Further schedule information may be obtained from the regional company offices who sponsor the seminars.
- Price: \$1.75
- Available From: Main Office
The Trane Company
3600 Pammel Creek Road
La Crosse, Wisconsin 54601
Attention: Neil Patterson

LIFE CYCLE COSTING EMPHASIZING ENERGY CONSERVATION

GUIDELINES FOR INVESTMENT ANALYSIS

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1977

This handbook was prepared specifically for use by ERDA and its contractors as a guide to using life-cycle costing as a tool to justify and analyze investment decisions relating to ERDA energy conservation projects. The methodologies presented are generally applicable to a wide range of industrial-type projects whether retrofits or new construction/installation. It provides a detailed review of the use of life-cycle costing as an evaluation technique and as an investment decision tool. (107 pp.)

CONTENTS

Chapter I Introduction emphasizes the importance of thorough analyses of all energy-related capital investments and introduces the concept of life-cycle costing as a method of expenditure evaluation that recognizes the sum total of all costs associated with the expenditure during the time it is in use.

As stated, the purpose of this publication is to provide the applicable study parameters for capital expenditures for energy conservation, including such features as discount rates, energy cost escalation, salvage value, BTU measurement and analytical techniques.

Chapter II Economic Concepts and Guidelines discusses, in the form of narrative and illustrative examples, the following economic concepts that are used in life-cycle costing analyses:

- Time Value of Money and the Present Value
- Economic Life
- Residual Value
- Incremental Costing
- Differential Cost Escalation.

Economic measurement concepts are also discussed and include:

- Savings/Investment Ratio (SIR)
- Discounted Payback Period
- BTU Savings/Investment Dollar.

Chapter III Life-Cycle Investment and Energy Analysis summarizes the procedures for gathering life-cycle costing data and provides a flow chart to illustrate their interrelationships. Discusses the various types of baselines that are used in evaluating the effectiveness of energy conservation measures.

Text, diagrams, tables, and formulas are used to illustrate the application of the life-cycle costing method in a typical situation involving energy production/generation, distribution, and the facility customer. Examples are provided to show the method of analyzing energy use and cost including consideration of fuel adjustments; demand; load factor; and non-energy costs such as maintenance, repairs, and replacements.

Chapter IV Economic Analysis Methodology this final chapter in the handbook presents complete details of two economic analysis techniques—the Nomogram Analysis Technique and the Primary Project Analysis Technique. Each technique is followed through in logical sequence with detailed examples of both blank and completed forms.

Appendices Five appendices are provided to supplement the text. The information presented covers the following:

- Definition of Economic Terms
- Average Useful Life of Energy Machinery and Equipment
- Annual and Accumulative Present Value Tables
- Differential Escalation Rate Tables
- Payback to SIR Conversion Table

Comments: The Desk Guide goes beyond a general introduction to economic analysis of energy conservation projects, although a short refresher course of fundamental concepts is provided in the second chapter. As a working document, it addresses practical solutions to problems of order bias in selecting conservation alternatives, electrical demand charges, unequal cash flows, etc. A computer program written in Fortran IV and Basic is available to facilitate the computational process. No bibliography is provided.

Price: \$6.50 (printed copy); (ERDA 76/130 Rev.)
\$3.00 (microfiche)

Available From: National Technical Information Service (NTIS)
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

LIGHTING DESIGN HANDBOOK

NAVAL FACILITIES ENGINEERING COMMAND

1977

Design and application techniques to achieve both energy savings and better visibility. This guide is intended for use by lighting engineers. (198 pp.)

CONTENTS

Section I	<u>Artificial Lighting Design</u> presents information, data and concepts essential to the understanding of artificial lighting design. The interrelationships between the luminous, thermal, and acoustical environments are discussed as they relate to lighting design and energy conservation. Energy considerations, design techniques, cost, and factors essential to the application of the fundamental principles conclude the chapter.
Section II	<u>Daylighting Design</u> takes an objective look at the impact of daylighting on the human occupants, luminous environment, and energy conservation. Daylighting is dealt with by first analyzing daylighting and then establishing design techniques. The analysis is performed in terms of the three primary aspects of daylighting: 1) exterior environment, 2) interior environment, and 3) interface medium - the window.
Section III	<u>Controls</u> discusses several methods to control lighting energy consumption falling into two basic categories: 1) ON-OFF control which provides for either an ON or OFF state, and 2) level controls which provide ON-OFF control in addition to providing the ability to select a level of energy consumption between ON and OFF.
Section IV	<u>Combined Artificial/Daylighting Control Systems</u> briefly describes several systems investigated by NAVFAC and makes suggestions for modifications to the control systems.
List of
References	Provides a list of 48 references on which the publication is based.
Appendix A	<u>Photometrics</u> provides methods and data for calculating zonal lumens and luminaire average luminance.
Appendix B	<u>ESI Calculation</u> demonstrates the procedure for calculating ESI footcandles by providing a sample solved problem.
Appendix C	<u>Point-by-Point</u> demonstrates a procedure for calculating illumination from two sources by providing two sample problems.
Appendix D	<u>Typical Lighting Design Procedure</u> provides a methodology for designing a lighting system by the Lumen Method With Zonal Cavity Coefficients. A sample solved problem is provided.

- Appendix E ASHRAE 90-75/EMS-1 Power Budget Calculation provides a sample solved calculation.
- Appendix F Roadway Lighting Calculations.
- Appendix G Lumen II Daylighting Study lists assumptions, variables, and purpose of a daylighting study.
- Appendix H Longhand Daylighting Calculations
- Appendix I Lumen II Daylighting Computational Procedure

Comments:

The authors suggest that the IES Lighting Handbook* be used in conjunction with this publication to provide more detailed information and explanations. The introduction to the text explains how the publication is organized and how to use it. The publication is technical enough to provide the lighting engineer with a thorough understanding of lighting fundamentals and design.

For information on availability of CR 79.015, write:

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

*See Supplementary Resources for review.

WINDOW DESIGN STRATEGIES TO CONSERVE ENERGY

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
1977

Design strategies to improve performance and achieve energy-efficient windows. Intended readers include professional designers, lessees and owners of commercial space, home buyers and owners, window component manufacturers, and researchers. (209 pp.)

CONTENTS

- Chapter 1 Site discusses the key considerations in siting a building to provide favorable window orientation. These include windbreaks, shading ground surfaces, orientation to the sun, and orientation to the wind.
- Chapter 2 Exterior Appendages covers improved window performance with exterior appendages which are part of the window system, or part of the wall or roof system. These include sun screens, exterior roll blinds, architectural projections, exterior shutters, and awnings.
- Chapter 3 Frame discusses frame composition and construction with respect to energy-efficient design. Included in this discussion are frame ventilators, weatherstripping, thermal breaks, type of operation, window tilt, and size/aspect ratio.
- Chapter 4 Glazing discusses types of glass used in windows including multiple glazed glass, heat-absorbing glass, reflective glass, applied films, reduced glazing, glass block, and the thru-glass ventilator.
- Chapter 5 Interior Accessories addresses the use of venetian blinds, draperies, film shades, opaque roll shades, and insulating shutters for improved window performance.
- Chapter 6 Building Interior discusses the design of the illumination and mechanical systems, the design and color selection of room surfaces and the placement of massive building components to determine how the energy gained by the windows can serve to reduce illumination, air conditioning, and heating energy costs.
- Comments: Each chapter is divided to provide an individual section for each window design strategy. Each design strategy is described in a consistent format under the following headings: strategy, phenomena, advantages, disadvantages, aesthetics, costs, examples, and references. Each chapter is full of illustrations and photographs to complement the text. A glossary of terms used in window design and energy conservation introduces the document.

Price: \$3.75 (Catalog Number C13.29/2:104)

Available From: Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

ENERGY CONSERVATION COMPENDIUM:
A GUIDE TO MATERIALS TO SUPPORT IMPLEMENTATION OF
EXECUTIVE ORDER 12003

DEPARTMENT OF ENERGY
1978

A collection of detailed publication summaries. The intended audience is Federal energy coordinators whose agencies must comply with Executive Order 12003. This directive mandates a reduction in energy consumption in the operation of motor vehicles and buildings. (175 pp.)

CONTENTS

- Section I Introduction explains the occurrences which led to the development of the Energy Conservation Compendium. It describes the scope of the materials included and the method for using the compendium as efficiently as possible.
- Section II Entry Indexes includes two indexes—one alphabetically by entry title, the other by key words.
- Section III Abstracts of Publications contains abstracted information on twenty-eight publications selected for their relevance to the planning, implementation, and management phases of an energy conservation program.
- Section IV Appendices provides some supplementary documents that are judged to be of value to Federal managers. Included are examples of contractual documents, energy survey forms, and utility rate analysis forms.
- Comments: This publication can assist the Federal Manager in locating materials which will help in the implementation of Executive Order 12003. All the materials (except the appendices) included in the Energy Conservation Compendium are summarized similarly in this resource file.

For current information on price and availability, please contact:

U.S. Department of Energy
Office of Conservation and
Solar Applications
Federal Programs Office
Washington, D.C. 20461

ENERGY MANAGEMENT ACTIONTHE ELECTRIFICATION COUNCIL
1979

An updated training course for building owners, managers, superintendents, engineers and administrators for all commercial, institutional and small industrial buildings. Upon completion all trainees will have developed practical energy management plans which can be put into effect in their firms' buildings.

CONTENTS

- Session 1 Introduction to Energy Management reviews the national energy situation, including amounts, sources, and uses of energy. Other topics include energy consumption and waste in buildings, steps in planning an energy management program, and evaluation of energy purchases, such as electricity, gas, oil and steam.
- Session 2 Conducting an Energy Audit defines the purposes and types of audits, provides instructions on how to conduct an energy audit, lists the type of information obtained through audits, and discusses sources of outside assistance that can consult with the manager during an audit.
- Session 3 - Identifying Low Cost Options for Energy Efficiency provides information on general operating and maintenance concerns such as ventilation, infiltration and exfiltration, heating and cooling, lighting, service hot water, power distribution, and other systems.
- Session 4 Identifying Moderate and Capital Intensive Options provides criteria to evaluate options that may require outside services, enables the trainee to secure estimates, and to determine payback considerations. Moderate cost options examined are: ventilation, lighting, service hot water, heating and cooling, power factor improvement computer facilities, and process heating. Capital intensive options include envelope insulation, heat recovery, energy storage and solar, and energy substitutions.
- Session 5 Calculating Potential Costs and Savings presents economic factors of implementing options, in addition to general evaluation criteria for selection. Topics covered are cost of implementation, preparation of specifications, obtaining bids and cost estimates, evaluating proposals, establishing priorities in options, preparing a proposal for management review and action, and implementing an energy management plan.

Comments: The course is comprised of five 2-1/2 hour units, each divided into home study and classroom review, and designed to train participants to develop and implement an energy management plan. Homework assignments based on actual energy operations of the participant's building are included. One hundred and eight transparencies are included in the package, which also includes student texts, a leader's guide, pretraining packages, name badges and completion certificates.

Price: For information on price and availability, contact:

The Electrification Council
1111 Nineteenth Street, N.W.
Washington, D. C. 20036

ENERGY SAVING BY INCREASING
BOILER EFFICIENCY

L. H. YAUVERBAUM, EDITOR
1979

A text which provides boiler plant managers and operators of single boilers the assistance needed to implement efficiency improvement techniques.

CONTENTS

- Chapter 1 Overview of Boiler Efficiency and Controlling Factors describes major factors affecting boiler efficiency, including heat loss minimization and combustion efficiency. Also included is an overview of boiler maintenance and operator practices, and a description of boiler auxiliary equipment for efficiency improvement.
- Chapter 2 Combustion in Boiler Systems explains the fundamentals of combustion (furnace excess air, nitrogen oxides, heat losses), and the effect of the following on efficiency: combustion air, temperature of inlet water, flue gas temperature, and fuel composition. Air pollutants generated by combustion are also discussed.
- Chapter 3 Combustion in Natural Gas and Fuel Oil Burners describes types of burner systems and controls (atmospheric, premix, nozzle-mix, and radiant tube burners). Optimization of fuel consumption is explained in terms of available heat effects and effects of combustion on fuel use.
- Chapter 4 Boiler Testing identifies boiler inspection procedures, in terms of items inspected: burners, combustion controls, furnace, stack instruments, flame appearance, and stack sampling. Data recording is also discussed.
- Chapter 5 Reduction of NOx and Other Impurities explains NOx reduction techniques and explains treatment of boiler feedwater.
- Chapter 6 Operational Procedures and Modifications identifies modifications such as reduced steam pressures, water quality control, load management and fuel conversions. Waste heat recovery techniques and methods of adjusting the air/fuel ratio are explained.
- Chapter 7 Efficiency Improvement Equipment describes operation, performance, costs, and design factors of air preheaters, economizers, firetube turbulators, combustion control systems, oil and gas burners and supply systems, wall and soot blowers, and insulation.

- Chapter 8 Boiler Maintenance Practices includes a description of general maintenance procedures, such as tune-up and cleaning of systems and equipment, and a summary of routine requirements and record-keeping methods.
- Chapter 9 Determination of Combustion Efficiency provides an overview of the testing procedure for the direct and indirect method of boiler performance, and describes measurement methods, devices and techniques.
- Chapter 10 Calculation of Boiler Efficiency fully explains the direct and indirect methods of testing, including information on measurements, types of instruments and error analysis.
- Chapter 11 Economics Evaluation identifies types of economic performance measures.
- Comments: The information in this text is taken from multiple sources. The book contains different points of view on monetary values and opinions of future potential. The book is a comprehensive text designed to help the boiler plant manager realize fuel savings.
- Price: For information on price and availability, contact:
Noyes Data Corporation
Noyes Building
Park Ridge, New Jersey 07656

A GUIDE TO REDUCING ENERGY USE
AND BUDGET COSTS

NATIONAL ASSOCIATION OF COUNTIES
NATIONAL LEAGUE OF CITIES
U.S. CONFERENCE OF MAYORS
REPRINTED APRIL 1978

A report for use by local officials with responsibilities in energy conservation program planning and implementation in communities. The manual is divided into sections for the executive, and for staff who are to implement program strategies.

CONTENTS

- Chapter 1 Introduction discusses the increase in fuel costs and the urgent need for energy conservation measures by local officials. Basic points are ways that savings can be made immediately by adjusting working schedules, lowering thermostats, fixing leaky faucets, and so on. A guide for using the manual is also included.
- Chapter 2 The Commitment to Energy Management provides an overview of management practices necessary to initiate and maintain an energy management program. Work assignments, publicity and coordination of activities are discussed. The appendices give examples which can be used to initiate administrative policies and begin program activities.
- Chapter 3 Employee Programs discusses the responsibility of energy coordinators to re-educate employees, and change habits. Establishment of the energy management office, Advisory Committees, and communications tools as well as program activities such as transportation initiatives are discussed.
- Chapter 4 Vehicle Fleets discusses activities to be undertaken by government departments that operate official vehicles. A driver checklist is provided. Suggestions such as inventories, record-keeping methods, and maintenance programs are included. Cost savings guidelines are provided for various vehicles.
- Chapter 5 New Buildings gives special consideration to design and construction. Guidelines are available as essential considerations when constructing energy-efficient buildings. Attention is given to insulation, glass walls and windows, lighting, HVAC and building management systems.

Chapter 6 Existing Buildings discusses the development of data bases in order to conduct energy audits. The chapter shows how engineers can implement maintenance procedures to conserve energy.

Comments: This is a good, basic, comprehensive manual for elected officials who must commit their administration to a sound, dedicated mission of conserving energy. The appendices are valuable sources of proven examples wherein the staff can begin implementation of programs to achieve objectives and goals of policy decisions. A bibliography at the manual's end is a good source of materials that can be referred to.

Price: For information on price and availability, contact:

U.S. Department of Energy
OAS Distribution (AD 473)
Washington, D. C. 20545

HOW TO COMPLY WITH THE EMERGENCY
BUILDING TEMPERATURE RESTRICTIONS

U.S. DEPARTMENT OF ENERGY
July, 1979

Instructions for nonresidential building owners, managers and operators in response to the emergency building temperature restrictions regulations effective July 16, 1979. (6 pp)

CONTENTS

Regulations

- Part A How to Determine if the Regulations Apply to Your Building explains the types of structures covered, excluded and exempted in the regulations.
- Part B How to Comply with the Regulations--Certificates and Forms gives instructions and forms to display or submit to the Department of Energy.
- Part C How to Comply with the Regulations--Adjusting Air Temperatures in Simple and Compound HVAC Systems is presented. Setting and measuring temperature techniques are set forth.
- Part D How to Comply with the Regulations--Adjusting Water Temperatures applies to water used for general housekeeping and personal care.
- Part E Tenant Responsibilities and
- Part F Special Exemptions and How to Apply are explained.
- Comments The manual is a simply written explanation of the regulations for temperature control. Forms needed by the building owner or operator, and a list of regional offices and telephone numbers for obtaining additional information are provided.

Price: For information on price and availability, contact:

U.S. Department of Energy
Washington, D. C. 20585

(or one of the ten Regional Offices)

**INDUSTRIAL PLANTS AND PROCESSES;
POWER GENERATION.**

A PRACTICAL APPROACH TO ENERGY CONSERVATION

THE CENTER FOR PROFESSIONAL ADVANCEMENT

EAST BRUNSWICK, NEW JERSEY

Managers of institutional, manufacturing and processing facilities are in positions where they must find ways of conserving energy in order to meet economic goals. In the near future, the limited availability of some conventional types of energy will force managers to institute sophisticated conservation programs. This course demonstrates various practical means of implementing an energy conservation program in an existing facility, while providing additional help to those who have already started programs.

Plant managers and engineers who have operating responsibility in manufacturing and processing plants should plan to attend this course, as well as staff members charged with upgrading the efficiency of energy-using equipment. Management staff will find the course of value as an aid to highlighting the relative importance and merits of energy economics presented for budgeting by plant and engineering personnel. Plant design and maintenance engineers are also potential students of this course.

CONTENTS

First Day Course objectives include a practical approach to energy conservation, reasons to conserve energy and development of an effective conservation program. The course discusses the energy picture today, including the laws which govern the reporting of energy use.

The course then looks at the cost trends of fuels and the relative cost of fuel sources. An in-depth presentation is made on how to perform energy inventories for heavy and light industries.

The first day also involves a detailed discussion on energy-saving opportunities involving steam trapping.

Second Day Discussion on this day includes utility rates and energy cost trends, minimizing system loads, reducing off-hour energy use, energy conservation in refrigeration, HVAC, and energy conservation in steam generation, including the utility of coal and oil as boiler fuels.

Third Day The topics on this day include fuel substitution for energy conservation and emergency energy supplies, monitoring energy use, energy management systems, measuring the effectiveness of an energy conservation program, selling an energy conservation program and governmental reporting requirements.

Fourth Day The fourth day is devoted to energy recovery and process
(optional) energy conservation opportunities in chemical processing industries. Many case studies are discussed along with the actual saving achieved for each conservation project implemented.

Fifth Day The fifth day addresses the long-term future of energy
(optional) supplies and usage patterns in North America.

Price:	First three days,	\$370
	First four days,	465
	Five days	535

Available The Center for Professional Advancement
From: P. O. Box 997
 Somerville, New Jersey 08876

A GUIDE TO ENERGY CONSERVATION
FOR THE SOFT DRINK MANUFACTURER

NATIONAL SOFT DRINK ASSOCIATION
 1979

A brief list of suggestions for saving energy in the typical soft drink bottling plant. It covers all aspects of operation. (8 pp.)

CONTENTS

Getting Started emphasizes the role of management in initiating energy conservation actions and communicating problems and goals to employees. Specific suggestions for communication are given. Also suggested are conducting an energy audit and a survey of facilities and equipment to determine energy needs and possibilities for reduction.

Saving Energy in Buildings and Grounds lists considerations for conservation through lighting systems and heating and cooling systems and practices.

Saving Energy in Production suggests means of conservation in the filling process, through adjustments to air and refrigeration compressors, in the bottle washing process, in treatment of fork lift trucks, in use of electric motors, in use of water; and suggests other means of savings related to equipment and to scheduling.

Saving Energy in Product Distribution outlines methods to improve routing of delivery vehicles as well as adjustments to vehicles and the vehicle fleet for increased energy saving. It also suggests ways to instruct drivers in energy-saving practices and describes equipment which can help increase operating efficiency of vehicles. This section lists considerations for maintenance of vehicles and supervision of their fueling.

Saving Energy Through Sales lists sales techniques and suggestions for treatment of vending machines which will result in energy savings.

A suggested monthly energy audit form and cumulative monthly energy audit form are provided.

Comments: Provides useful, industry-specific recommendations for saving energy. While the pamphlet does include two sample energy audit forms, it does not contain all the information management will need to design and implement an energy conservation

program. More detailed instructions on how to conduct an energy audit, and how to identify the most cost-effective conservation improvements are needed.

Price: For information on price and availability, contact:

National Soft Drink Association
1101 Sixteenth Street, N. W.
Washington, D. C. 20036
(202) 833-2450

ENERGY MANAGEMENT: HOW TO USE LESS NATURAL GAS
FOR INDUSTRIAL SPACE HEATING

EAST OHIO GAS COMPANY
1975

An information packet intended for managers of industrial buildings (factories, warehouses, etc.). This booklet provides guidelines and tips in three areas: building improvements, in-plant warm air conservation, and maintenance and troubleshooting on four common types of space heaters. (20 pp.)

CONTENTS

- Section 1 Building Improvements That Can Reduce Heat Losses outlines heat loss reductions which can be achieved by installing additional insulation.
- Section 2 Calculate the Average Heat Loss Through Your Building's Walls and Roof provides suggestions to involve employees in conservation programs. It offers ideas on redirecting air flow, or heating by zone.
- Section 3 Safety Tips alerts the reader to unsafe operating practices.
- Section 4 Maintenance Guide to Four Types of Gas-Fired Space Heating Equipment describes maintenance and troubleshooting practices for overhead unit heaters, large warm air heaters, unvented infrared heaters, and make-up air heaters. The practices discussed deal primarily with combustion problems. It outlines procedures for inspection, troubleshooting, normal start-up, and maintenance.
- Comments: This packet assumes that the owner/operator of a plant is familiar with its heating systems, construction, and needs. It is easily read and understood, and illustrated with diagrams and sketches.
- Price: Free.
- Available From: Industrial Utilization Department
East Ohio Gas Company
P. O. Box 5759
1717 E. Ninth Street
Cleveland, Ohio 44101

ENERGY AUDITS:
FUEL EFFICIENCY BOOKLET 1

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet explaining why and how an industrial/commercial energy audit should be carried out. It is intended for use by the managing director, accountant, and engineer who should work together to produce the audit. (12 pp.)

CONTENTS

- Section 1 Why Have an Energy Audit? reviews the importance of measuring a company's energy expenditures, and the relation of energy outlays to a company's overall costs.
- Section 2 How Do You Start an Energy Audit? includes energy analysis forms which when completed provide an overview of how and where energy is used.
- Section 3 Where Do You Start? introduces more detailed energy consumption analysis forms that allow closer scrutiny of energy consumption patterns.
- Section 4 What Is the Next Stage? uses a step-by-step approach to explain how an energy audit can be used to reduce energy consumption. It explains what existing figures mean and how they can be related to external and internal factors. It also shows how audit figures can be refined to show meaningful relationships, how consumption data differ from year to year, and how to report energy usage.
- Comments: The booklet provides introductory materials on energy audits and should be supplemented with the publications listed for further reading. It is the first in a series of fifteen booklets on fuel efficiency.
- Price: Free.
- Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

THE SENSIBLE USE OF LATENT HEAT:
FUEL EFFICIENCY BOOKLET 2

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet describing how to save energy in all kinds of steam-using plants through simple modifications to operating procedures. (11 pp.)

CONTENTS

- Section 1 Latent Heat and Sensible Heat defines latent and sensible heat and provides tables which show the relationship between pressure, temperature, enthalpy, and heat.
- Section 2 Reducing the Demand for Heat describes modifications to plant operating procedures that can increase efficiency and save energy.
- Section 3 Heat Insulation explains the role of insulation in reducing energy consumption.
- Section 4 Making Use of Residual Heat reviews the role of steam recovery in reducing energy consumption.

Comments: This booklet will assist plant managers in using steam heat efficiently. Supplementary materials must be used to provide the technical information needed to implement suggestions. It is one in a series of fifteen booklets on fuel efficiency.

Price: Free.

Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

UTILISATION OF STEAM FOR PROCESS AND HEATING:
FUEL EFFICIENCY BOOKLET 3

DEPARTMENT OF ENERGY (UNITED KINGDOM)

1976

A booklet explaining the physical principles of steam generation, steam usage, and heat transfer as they relate to energy efficiency. (29 pp.)

CONTENTS

- Section 1 Simple Physical Principles explains the basic principles of steam, with particular emphasis on what makes steam usable for heating and process work.
- Section 2 Heat Losses discusses what happens to steam after it leaves the boiler: where and how heat losses occur.
- Section 3 Reducing the Amount of Work Done by Steam reviews the importance of constant temperature differentials in space heating equipment, and constant temperature in process work to reduce the amount of work done by steam.
- Section 4 Making Use of Latent Heat discusses the principles of latent heat which must be considered in designing efficient heating systems.
- Section 5 Heat Transfer from Steam explains the role of insulating water and films on the condensate surface in reducing the heat transfer efficiency of a steam-heated process unit.
- Section 6 The Condensate Film considers different ways of reducing the condensate film on the steaming side of a steam-heated vessel.
- Section 7 The Wrong Use of the Right Steam Traps discusses the avoidance of indiscriminate group trapping, steam locking, air binding, and dirt to ensure that waterlogging does not occur and that the resistant water film is as thin as possible.
- Section 8 Making Use of Sensible Heat explains the direct use of sensible heat in the heating process, the use of sensible heat in flash steam recovery, and the use of condensate as boiler feed.
- Section 9 Conclusion reviews all the points made in the booklet and gives a general discussion of the efficient use of steam in a boiler plant.

Comments: The booklet is full of simple, easily understandable diagrams which complement the text; it covers the main areas of consideration in efficient steam production. Supplementary engineering manuals should be used to implement any changes in equipment or operations. It is one in a series of fifteen booklets on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

COMPRESSED AIR AND ENERGY USE:
FUEL EFFICIENCY BOOKLET 4

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A guide for managers of industrial buildings and garages to avoid waste of compressed air. (11 pp.)

CONTENTS

- Section 1 Optimum Conditions for Efficient Compression identifies areas where energy can be saved in the compressor plant, air intake inlets, and air receivers. It also covers adjustments in control and instrumentation systems which monitor air intake for efficient operation.
- Section 2 Avoiding Leaks and Other Wastage discusses air flow leaks in the air distribution system, air dryers and reheaters, and hose fittings and couplings.
- Section 3 Efficient Running of Air-Driven Equipment describes maintenance of clean, intact filters, correct operation of equipment, and adequate lubrication.
- Section 4 Using Lower Pressure reviews operation of equipment at lower pressures to effect energy savings.
- Section 5 Recovering the Heat of Compression discusses this option for achieving significant energy savings.

Comments: Several publications are suggested for further reading on compressed air and energy use. This booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

STEAM COSTS AND FUEL SAVINGS:
FUEL EFFICIENCY BOOKLET 5

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet assisting service and works engineers, cost accountants, energy managers, and industrialists in reducing steam costs and increasing fuel savings. (13 pp.)

CONTENTS

- Section 1 Cost of Steam discusses how to determine overall steam production costs. It reviews fuel costs in the context of increased steam use efficiency.
- Section 2 Metering describes the role of metering in increasing the efficiency of steam production.
- Section 3 Evaluating Savings explains how to calculate the amount of fuel saved by condensate recovery and by reduction in steam demand.
- Section 4 A Quick Summary of Things to Check provides a checklist for storekeeping steam, steam distribution, process methods, condensate and air removal, flash steam, condensate, and waste heat recovery.
- Comments: In order to implement the suggested measures, supplementary materials must be used. This booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

FLASH STEAM AND VAPOUR RECOVERY:
FUEL EFFICIENCY BOOKLET 6

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet offering practical examples of savings realized by the use of flash steam and vapor recovery. (13 pp.)

CONTENTS

- Section 1 Flash Steam explains how flash steam becomes available for use under various operating conditions.
- Section 2 What to Do With the Flash Steam discusses the correct way to use flash steam, and how to recover it most efficiently.
- Section 3 Some Typical Examples of Flash Steam Recovery suggests ways to incorporate flash steam recovery into existing operations. Specific examples include heating systems, laundry ironers, and sweetmaking.
- Section 4 How to Control the Flash Steam Pressure briefly discusses the use of a reducing valve to control low-pressure steam supply admitting make-up when there is insufficient flash steam available to meet demand.
- Section 5 Size of Flash Vessel discusses steam flow rate and turbulence in calculating the optimal size of the flash vessel.
- Section 6 Pumping Hot Condensate reviews alternative ways of handling hot condensate.
- Section 7 Simple Vapor Recovery suggests a simple method for collecting vapor.

Comments: Supplementary materials should be used to implement the various flash steam recovery techniques. This booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available
From: Library
 Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

DEGREE DAYS:
FUEL EFFICIENCY BOOKLET 7

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1928

A booklet describing how degree days can help to determine the efficiency of heating plants and to predict fuel consumption over long periods. (18 pp.)

CONTENTS

- Section 1 What is a Degree Day? provides a working definition, explains the relationship to fuel consumed and discusses ways that degree days should and should not be used.
- Section 2 How Are Degree Days Calculated? provides calculation formulas and tables for calculating from maximum and minimum temperatures.
- Section 3 How Accurate Are Fuel Calculations Based on Degree Days? provides graphs which illustrate the divergence of degree days from a 90-year average and lists factors which must be considered when using degree days.
- Section 4 What Areas Are Covered by Degree Day Reports? shows monthly totals for geographical areas within the United Kingdom.
- Comments: The booklet lists monetary values in pounds, not dollars, and all calculations make use of the centigrade scale. The book is one in a series of fifteen on fuel efficiency.

Price: Free

Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

THE ECONOMIC THICKNESS OF INSULATION FOR HOT PIPES:
FUEL EFFICIENCY BOOKLET 8

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet describing how to save energy by insulating hot pipes. (40 pp.)

CONTENTS

- Section 1 Preventable Heat Losses discusses those heat losses that can be reduced by the practical and economic insulation of hot pipes.
- Section 2 Insulation Thicknesses shows the normal recommended minimum thickness of insulation for heating installations served by oil-fired, gas-fired, and coal-fired boiler plants.
- Section 3 Economic Thickness of Insulation describes the principles to consider in calculating the economic thickness of insulation.
- Section 4 How to Calculate the Economic Thickness summarizes the information necessary to calculate economic thickness. Factors to consider include: cost of fuel, boiler efficiency, hours of operation, number of years of anticipated use, installed cost of insulation, and heat loss. •
- Section 5 Step-by-Step Calculation of Economic Thickness provides a fully worked problem as an example for calculating economic thickness.
- Section 6 Materials and Applications discusses the three most commonly used insulation product types—preformed rigid fibrous sections (rock and glass fibers), preformed rigid calcium silicate sections, and preformed rigid polyurethane or polyisocyanurate sections.
- Section 7 Glossary defines the technical terms used in the booklet.
- Section 8 Heat Loss Graphs provides 23 graphs illustrating heat loss from pipes at different temperatures insulated with the three different types of insulating materials.
- Section 9 Appendix explains the basis of the graphs showing heat loss, calorific values used, and conversion factors for units used in the booklet.
- Comments: A list of material suppliers and contractors to provide the services described is given at the end of the booklet. This booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

HOW TO MAKE THE BEST USE OF CONDENSATE:
FUEL EFFICIENCY BOOKLET 9

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A booklet applying the physical principles of condensate to its recovery in industrial operations. (16 pp.)

CONTENTS

- Section 1 The Heat in Condensate explains the heat content of condensate and the principles of condensate recovery.
- Section 2 Exceptions discusses site size and its relation to advantageous condensate recovery.
- Section 3 Contaminated Condensate suggests different ways to take advantage of the heat in contaminated condensate (e.g., use of heat exchanger).
- Section 4 Condensate Recovery explains the different stages of condensate recovery and the use of adequately sized piping.
- Section 5 Condensate Lifting and Back Pressure reviews different ways to lift condensate from the trap to the higher level of the return line.
- Section 6 Pumping Condensate discusses pumping as a way to avoid back pressure and condensate build-up.
- Section 7 Too Hot to Handle discusses different ways of arranging boiler and water handling equipment to overcome problems caused by hot condensate.
- Section 8 Keeping the Heat In discusses heat emission from condensate pipes and the advantages of insulating these lines.

Comments: The booklet is intended for use by plant engineers. Other sources should be consulted in implementing condensate recovery. This booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

CONTROLS AND ENERGY SAVINGS:
FUEL EFFICIENCY BOOKLET 10

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1978

A booklet geared to building maintenance and operating engineers to help ensure that controls on energy consumption are working. (12 pp.)

CONTENTS

- Section 1 Types, Application, and Design of Controls describes automatic control systems, suggests ways to improve performance, and lists design criteria.
- Section 2 Use of Controls discusses tuning and adjustment of the system, optimum start control, and provides suggestions for maintenance. A checklist is provided to use as a tool to see that all systems are operating at peak efficiency.
- Section 3 Comfort and Environment lists common complaints and their causes. This diagnostic tool can help maintenance engineers better serve building occupants.
- Comments: The booklet is one in a series of fifteen on fuel efficiency.
- Price: Free.
- Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

ENERGY AUDITS 2:
FUEL EFFICIENCY BOOKLET 11

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1978

This booklet is designed as an aid to internal auditors and energy managers. (17 pp.)

CONTENTS

- Section 1 Energy Conservation Audit Questionnaire can be used by internal auditors and engineers. It is divided into three sections: controls, sources, and uses of energy.
- Section 2 General Audit Programme is a checklist which can be used by any organization. The list covers records of consumption, housekeeping, personnel, and capital investment, as do each of the following checklists.
- Section 3 Manufacturing Audit Programme
- Section 4 Transportation Audit Programme
- Section 5 Other Sectors Audit Programme
- Comments: The questionnaire and audit checklists should prove to be useful tools. Appendices are also provided which detail cash flow on capital expenditure and energy conversion factors. However, monetary figures are in pounds, not dollars. The booklet is one in a series of fifteen on fuel efficiency.
- Price: Free.
- Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

ENERGY MANAGEMENT AND
GOOD LIGHTING PRACTICES:
FUEL EFFICIENCY BOOKLET 12

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1978

The booklet is designed to provide energy managers with guidance on good lighting practice and the effective use of energy. (12 pp.)

CONTENTS

Section 1 How Much Light Do We Need? provides standard recommendations, and discusses glare, the use of daylight, choice of light source, and effect of age on workers.

Section 2 The Choice of Light Source discusses various filament and discharge (fluorescent) lights, provides general considerations for the choice of luminaires, and discusses maintenance factors for industrial installations.

Section 3 Assessing the Efficiency of An Installation provides an outline for a comparative lighting cost analysis, and lists steps to take to check the efficacy of existing lighting.

Comments: The booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available Library
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

THE RECOVERY OF WASTE HEAT
FROM INDUSTRIAL PROCESSES:
FUEL EFFICIENCY BOOKLET 13

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1978

The booklet summarizes heat recovery techniques that can be used to achieve maximum efficiency in fuel utilization. (13 pp.)

CONTENTS

Section 1 Analysis of Heat Usage discusses the availability of waste heat, lists sources of waste heat, and lists criteria used to determine if waste heat can be used in its existing form.

Section 2 Recovery Methods explains the principles of each of the following: shell and tube heat exchangers, plate type heat exchangers, run round coil system recuperators, regenerators, heat wheels, heat pipes, and heat pumps.

Comments: The book is one in a series of fifteen on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

ECONOMIC USE OF OIL-FIRED BOILER PLANT:
FUEL EFFICIENCY BOOKLET 14

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1978

This booklet describes ways in which oil can be saved during boiler plant operations. (23 pp.)

CONTENTS

Section 1 Boiler Operation provides formulas which reveal possible savings or losses due to changes in efficiency. Flue gas losses and flue gas listing to determine if controls are operating are discussed. Losses are graphically portrayed. Radiation loss, firing schedules, and blowdown are also described.

Section 2 Feedwater Supply discusses conditions under which chemical water treatment is necessary, and illustrates the fuel saved by condensate recovery.

Section 3 Steam and Hot Water Services discusses energy efficiency in steam supply and pipework.

Section 4 Checklist of Money Saving Procedures summarizes, in checklist form, ways to increase fuel efficiency, and provides examples of boilerhouse log sheets.

Comments: The booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

ECONOMIC USE OF GAS-FIRED BOILER PLANT:
FUEL EFFICIENCY BOOKLET 15

DEPARTMENT OF ENERGY (UNITED KINGDOM)
* 1978

This booklet describes ways in which gas can be saved during boiler plant operations. (23 pp.)

CONTENTS

- Section 1 Gas Supply and Boiler Operation examines various losses and shows how they can be minimized and provides formulas which reveal savings or losses due to changes in efficiency. Charts are provided which show the effects of increasing or reducing the amount of excess air, and the effect of a higher flue gas temperature. Flue gas heat recovery systems, such as economizers, spray recuperators, heat wheels, and fuel dampers are discussed.
- Section 2 Feed Water Supply discusses conditions under which chemical water treatment is necessary, and illustrates the fuel saved by condensate recovery.
- Section 3 Steam and Hot Water Services discusses energy efficiency in steam supply and pipework.
- Section 4 Checklist of Money Saving Procedures summarizes, in checklist form, ways to increase fuel efficiency, and provides examples of boiler house log sheets.

Comments: The booklet is one in a series of fifteen on fuel efficiency.

Price: Free.

Available From: Library
Department of Energy
Thames House South
Millbank, London SW1P 4QJ
England

CONTROL SYSTEMS THAT SAVE ENERGY

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

1976

One in a series of self-study modules focusing on industrial energy conservation. It demonstrates the conservation of energy in industrial processes through the proper application of controls. (111 pp.)

CONTENTS

- Unit 1 Thermodynamics and Energy Conservation describes how the laws of thermodynamics apply to the problems of energy conservation. Included in this discussion are the first and second laws of thermodynamics, order and energy consumption, and entropy.

- Unit 2 Control via Irreversibility examines how control is exercised over a process by increasing its irreversibility. It also considers how to minimize the resulting loss in efficiency. Subsections address throttling and heat transfer.

- Unit 3 Power Plant Control Systems explains how to modify controls for steam-electric power plants and industrial boilers to achieve increased fuel economy. Turbines and steam headers are considered.

- Unit 4 Refrigeration describes how a refrigeration unit converts heat into work. It explains how to modify refrigerator controls to improve conversion efficiency. Subsections examine the heat pump, heat exchangers, compressors, and chilled-water systems.

- Unit 5 Distillation details how new control methods can be applied to save energy in distillation processes. Subsection topics include floating-pressure control, multiple-effect columns, and columns using heat pumps.

- Appendix Final Examination covers: Multipass Heater, Cryogenic Distillation, CO₂ Liquefaction, Distillation Heat Recovery, Steam-Jet Refrigeration. Final examination answers are provided.

- Comments: This guide is intended for engineers trained in both thermodynamics and process control. The authors suggest, as a prerequisite, that students using this publication should be able to solve second-law problems relating heat, work, and entropy, and be able to use steam tables and Mollier diagrams. Each unit in the module concludes with an Exit Test complete with answers.

For current information on price and availability, write:

Project PROCEED
 Massachusetts Institute of Technology
 Room No. 66-569
 Cambridge, Massachusetts 02139

ENERGY CONSERVATION MANUALGLASS CONTAINER MANUFACTURERS INSTITUTE
1976

A manual of conservation recommendations for glass plant managers. Each production area in a plant is covered separately. (26 pp.)

CONTENTS

The following plant areas are addressed: batch plant, furnace, forehearths, forming, annealing ovens (or lehrs), inspection and packing, decoration, plastic coatings or sleeves, corrugation, warehouse, and general conservation (lighting, general power, comfort heating and cooling, compressed air, motors, general maintenance, water usage, steam generation and use, and in-plant mobile equipment). Each production area is discussed in terms of the following:

Direct Energy Savings lists changes in operational procedures that will effect immediate and direct energy savings. These include turning off equipment when it is not in use and maintaining equipment to avoid energy-wasting leaks.

Operational Procedures to Minimize Material (Energy) Losses suggests changes in procedures that will effect energy savings through reduced material losses.

General Procedures reviews energy systems used in specific plant areas. Energy savings in this section are considered in the general conservation section of the manual.

Environmental offers tips on reducing environmental pollution while reducing energy use.

Comments: This manual was prepared by Energy Conservation and Consumption Task Group of the Glass Container Manufacturers Institute. Most of the suggestions listed are simple operational changes; more technical operation changes and retrofits which may achieve more significant savings are not covered.

Price: Free.

Available From: Glass Packaging Institute
1800 K Street, N.W.
Washington, D.C. 20006

UTILITIES POWER PLANT OPERATION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
1976

Correspondence courses designed to instruct operating and maintenance personnel in efficient operation and maintenance of the utilities function. (80 pp. each)

CONTENTS

#112: GENERATING STEAM IN THE POWER PLANT

- Lesson 1 Transforming Energy Into Work explains the basic principles and concepts that govern each step of the energy conversion process. It identifies the forms of energy and the energy transformations that occur in a steam plant. This chapter also describes fuel formation, fuel combustion, the effects of heat on water, and the fundamentals of steam generation.*
- Lesson 2 Boiler Operation describes the types and characteristics of boilers, and the devices that improve their efficiency. The chapter explains boiler water treatment methods, blowdown, and waste water disposal. Guides to conserving energy are also given to suggest methods of reducing the amounts of fuel and water consumed in individual plants.*
- Lesson 3 Boiler Maintenance describes how soot, scale, and corrosion form on boiler surfaces and how to prevent or remove them. Guidelines that will help to keep control systems, compressed air systems and auxiliary equipment operating efficiently are provided. In addition, the chapter describes typical maintenance schedules and tables.*
- Lesson 4 Combustion and How It Works identifies the properties of coal, oil, and natural gas that affect their ability to burn. It also describes the characteristics of an efficient fire, and the factors that affect the combustion process. In addition, the instruments used to measure the stack draft and the flue gas temperature and content, as indicators of efficiency, are also described.*
- Lesson 5 Steam Generation describes the steam generating process, and traces the flow of water and steam through the system. The chapter also explains how to maintain steam plant auxiliaries to keep them operating properly and thereby reduce energy losses.*

*From the manual.

#113: USING STEAM IN THE POWER PLANT

- Lesson 1 Turbines describes the main types of steam turbines, how they operate, and how they compare with gas turbines. It explains how a condenser operates, and the condenser's effect on efficiency. It also describes good maintenance practices that will help to keep the turbine-generator unit in each plant in good operating condition, and thus conserve energy.*
- Lesson 2 Boiler Instrumentation, Controls, and Safety describes and illustrates the major types of boiler instruments and how to use and maintain them. It also explains how the combustion and feedwater control systems operate. In addition, it describes the types of safety devices needed in the power plant.*
- Lesson 3 Electrical Power Fundamentals explains and illustrates the basic principles of electricity. The chapter then describes the types of metering equipment used to measure electrical quantities in the plant. In addition, it explains the systems and equipment used to distribute electricity from the power plant generator to the user.*
- Lesson 4 Electrical Systems Analysis describes and illustrates the line diagram, and explains its function. The chapter then describes electrical billing procedures, and how demand control and power factor correction can decrease power costs. Transformer losses and system voltage variation are also explained. In addition, it introduces maintenance procedures that will help to keep each plant's electrical system equipment in good condition.*
- Lesson 5 Air Conditioning Systems describes the basic air-conditioning cycle and how each component operates. It also describes accessories and controls that contribute to efficient operation. In addition, recommended maintenance practices for improving efficiency and saving energy are suggested.*

Comments: These manuals are designed as texts for a course in energy conservation through utilities operation. Figures, tables, and graphs are used widely to clarify the texts. There are series of programmed exercises at critical points in the texts.

Price: For information on price and availability, contact:

Technical Publishing Company
1301 South Grove Avenue
Barrington, Illinois 60010

Attention: Ms. Carolyn Nylen, Training Counselor

*From the manual.

ENERGY MANAGEMENT FOR INDUSTRIAL OPERATIONS

MINNESOTA ENERGY AGENCY

1976

This energy conservation handbook is designed for use by managers and operators of industrial processing plants. Each area of energy use is divided into a series of checklists — Systems, Operating Procedures, and Controls. The user is asked to check each of the booklet's recommendations for its potential applicability, and to consult with relevant staff to determine whether recommendations would be economical. A telephone number is provided for requests for follow-up technical assistance. (42 pp).

AREAS COVERED

- Air Conditioning Systems
- Boiler Operations
- Compressed Air Systems
- Domestic Hot Water
- Electrical and Lighting
- Gas Turbines
- Material Handling Operations
- Paint Line Operations
- Process and Manufacturing Operations
- Space Heating and Building Operations
- Welding Operations

GRAPHS AND TABLES

- Fuel Direct Heat Values
- Tool Air Requirements
- Uninsulated Pipe Heat Loss
- Steam Leak Losses
- Seasonal Steam Leak Loss
- Annual Steam Leak Loss
- Boiler Scale Transfer Reduction
- Compressor Air Leak Losses

Comments: The manual can be used alone (with technical assistance) or as the beginning of a sequential energy management course. It is a readable and readily applicable survey guide that includes an important dissemination feature: a tear-out postcard for the reader to return with comments and the names of other people who should receive the manual. This manual is being revised in 1980 and will be entitled "Heat Recovery."

Price: Free.

Available

From: Minnesota Energy Agency
 Energy Conservation Division
 740 American Center Building
 150 East Kellogg Boulevard
 St. Paul, Minnesota 55101

ENERGY SAVINGS IN INDUSTRY

DEPARTMENT OF ENERGY (UNITED KINGDOM)
1976

A guidebook to starting an industrial energy management/conservation program.
(13 pp.)

CONTENTS

- Section 1 The Starting Point outlines the energy-saving program set forth by the United Kingdom government. The steps to implementation are: (1) organizing management resources, (2) monitoring energy savings, (3) setting conservation objectives, and (4) implementing energy conservation options.
- Section 2 Your Energy-Saving Checklists provides checklists of energy-saving options to assist managers in developing an overall company program. The managerial areas covered are: Factory/works, office, and transport. A checklist and promotional steps are also provided.
- Comments: This booklet is one in a series from the Department of Energy to promote energy saving throughout the country. It covers each section briefly and serves to introduce the basics of energy management. A list of 18 addresses to which the users may write for more information is included.
- Price: Free.
- Available Information Division
From: Department of Energy
 Thames House South
 Millbank, London SW1P 4QJ
 England

INDUSTRIAL BOILER USERS' MANUAL:METHODS AND EQUIPMENT FOR EFFICIENCY IMPROVEMENT

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

This manual's scope includes boilers in the range of 10,000 - 50,000 lb/hr steam flow, utilizing natural gas, oil or coal. Its intended audience includes purchasers and operators of boilers, who want to achieve the most economically feasible degree of energy efficiency in boiler operations. (104 pp.)

CONTENTS

- Chapter 1 Introduction states the manual's objectives, points out the importance of fuel conservation, and gives an overview of the manual's design.
- Chapter 2 Boiler Efficiency and Controlling Factors reviews the major constraints on boiler efficiency, and suggests operational and equipment modifications.
- Chapter 3 Boiler Maintenance Practices and Operational Modifications recommends, as a first step, simply returning the boiler to its original level of operating efficiency and maintaining that level. Boiler tune-up steps are enumerated, and a method is given for developing a maintenance program. Special attention is given to coal-fired boilers. General recommendations include reduced steam pressure, water quality control through various flow down options, and methods of load management. Fuel conversion is treated briefly.
- Chapter 4 Boiler Efficiency Improvement Equipment gives a detailed analysis of air preheaters, economizers, firetube turbulators, combustion control systems and instrumentation, low excess air burners, wall and soot blowers and insulation. For each of these modifications, the following characteristics are described, as appropriate: 1) principle of operation, 2) performance, 3) costs, 4) physical description and application, 5) instrumentation, and 6) air pollution emissions. Brief consideration is given to the costs and benefits of purchasing a new boiler rather than refurbishing an old one.
- Chapter 5 Financial Evaluation Procedures This section is reprinted directly from *Energy Conservation Program Guide for Industry and Commerce* (NBS Handbook 115).^{*} Its purpose is to acquaint the user with the various methods of measuring the value of an energy conservation investment, including payback period, return on investment and benefit-cost ratio.

^{*}See Index for location of Abstract in this publication.

Appendix

Auxiliary Equipment Manufacturers Survey lists the names, type of equipment offered, efficiency data and costs for the manufacturers, as well as partial information for 22 others. The Appendix strongly urges that the manufacturer of the original boiler be contacted before any equipment is purchased.

Comments:

The manual is a companion volume to *The Potential for Energy Conservation Through Improved Boiler Efficiency*. It is recommended that the two be used together for a comprehensive study of energy conservation in boilers. This volume may be used alone if the users are boiler owners and operators whose objective is to understand boiler efficiency options well enough to begin looking for manufacturers.

Price:

\$6.50 (Document # 262-577/AS)

Available

National Technical Information Service

From:

5285 Port Royal Road
Springfield, Virginia 22161

THERMODYNAMIC AVAILABILITY ANALYSIS

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
1976

One module in a series of self-study educational editions addressing industrial energy conservation. The effectiveness of energy use in the flow process is considered in practical and theoretical perspective. (78 pp.)

CONTENTS

- Unit 1 Availability, Enthalpy and Entropy defines and explains the availability function, showing its relationship to enthalpy and entropy. Sub-sections describe reversibility and maximum work, the steady flow process, available useful work or availability function, availability and Gibbs free energy, entropy and enthalpy, and availability analyses of physical processes.
- Unit 2 Availability in Chemical Reaction Processes considers what happens to availability in simple and complex processes, presenting results in graphic form. Sub-sections describe availability analysis of chemical reaction processes, availability analysis of a methane reforming process, and the dilemma of availability conservation.
- Appendix Table of Standard Chemical Availabilities.
- Comments: This module is designed for use by industrial process engineers. Each unit in the module concludes with an Exit Test complete with answers.

For current information on price and availability, write:

Project PROCEED
Massachusetts Institute of Technology
Room No. 66-569
Cambridge, Massachusetts 02139

ENERGY CONSERVATION OPPORTUNITIES IN THE SMALL INDUSTRIAL PLANT

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

1977

One of a series of self-study modules addressing industrial energy conservation. It explains how to establish a conservation program, or how to improve ongoing conservation efforts. It is intended for plant managers, maintenance foremen, personnel managers, or chief engineers, depending on the type and size of the company. (94 pp.)

CONTENTS

- Unit 1 Introduction lists the reasons for establishing an energy conservation program. Subsections address the energy dilemma, the question of supply and demand, energy sources, energy uses, industry's vital stake, and what business can do to help conserve energy.
- Unit 2 Basic Elements of Successful Energy Conservation Programs describes the main ingredients of effective conservation programs. Discussions include organizing management resources, surveying energy uses and losses, setting conservation goals, launching an energy conservation campaign, and matching an energy conservation program to different industries.
- Unit 3 Record Keeping—Where Is Your Energy Dollar Going? describes how to establish a record of energy consumption for a specific company.
- Unit 4 The Energy Survey—Which Processes and Operations Are the Big Energy Wasters? explains how to survey energy consumption patterns in a plant and identify ways energy might be conserved.
- Unit 5 Electrical Energy Billing describes how to calculate electricity costs, using the billing methods of several different utility companies.
- Unit 6 Lighting reviews possible changes in the distribution and operation of lighting to conserve energy.
- Unit 7 Boilers explains how to examine a plant's boilers and find ways to minimize fuel consumption.
- Unit 8 Steam Traps explains the procedures for correcting steam traps to eliminate energy waste.
- Unit 9 Insulation describes how to calculate the energy losses associated with uninsulated steam lines.
- Unit 10 Heating, Ventilation, and Air Conditioning examines common sources of energy loss in the plant's system and methods for correcting the losses.

Unit 11

Compressed Air discusses areas of pressure loss in the plant's system. The most important considerations are in sizing the system and system components for the most efficient operation.

Comments:

This is an extremely useful manual. It emphasizes on-the-job experience so that students have a plant or facility from which to get actual data for completing assignments. It is designed for persons with a technical background, but not necessarily a college degree. Information is very well organized, so that the student can find what he/she needs quickly. Sample problems, complete with answers, permit individual progress to be measured.

For current information on price and availability, write:

Project PROCEED
Massachusetts Institute of Technology
Room No. 66-569
Cambridge, Massachusetts 02139

MEASURING AND IMPROVING THE EFFICIENCY OF BOILERS

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
1977

One of a series of self-study modules concerning industrial energy conservation. It provides the fundamental information required to design and implement a boiler efficiency improvement program. (150 pp.)

CONTENTS

- Unit 1 Fuels reviews the thermal and physical characteristics of common fuels. Subsections address fuel characteristics and fuel properties.
- Unit 2 Analysis describes how to analyze the thermodynamics of boiler operation. Subsections address calculation of material flow, calculation of energy flow, efficiency of a boiler, calculation of auxiliary quantities, and combustion efficiency.
- Unit 3 Parameters Affecting Boiler Performance explains the degree to which important parameters affect boiler performance. Subsections address economic considerations, the effect of combustion air, of feedwater temperature, of flue gas temperature, of fuel composition, and of fouled heat transfer surfaces on efficiency.
- Unit 4 Boiler Control Systems describes how and why boilers are controlled. Subsections include a description of boiler control systems and criteria for selecting a control system.
- Unit 5 Boiler Feedwater Treatment explains how and why boiler feedwater is treated. It reviews water quality terminology, feedwater treatments, and water analysis.
- Unit 6 Waste Heat Recovery from Boilers examines the recovery and utilization of waste heat from exhaust gases, excessive steam pressure, and blowdown.
- Unit 7 Determination of Boiler Performance by Testing presents detailed procedures for measuring boiler performance. Subsections address the measurement of boiler efficiency by the direct method, and determination of combustion efficiency by the indirect method.
- Unit 8 Boiler Troubleshooting details procedures for determining sources of boiler inefficiency. Subsections provide a troubleshooting guide and recommendations for analysis.

Unit 9 Operation and Maintenance of Boilers describes how to maintain boiler performance through proper operation and maintenance. Subsections review both general and daily, weekly, monthly, and annual requirements for boiler operation and maintenance.

Unit 10 Recommended Boiler Efficiency Improvement summarizes a program for boiler efficiency improvement.

Comments: This manual is intended for managers of industrial facilities. It provides the basic understanding managers need to design and implement boiler efficiency improvement programs. Exit Tests, complete with answers, accompany each section and enable students to measure their grasp of the material.

For current information on price and availability, write:

Project PROCEED
Massachusetts Institute of Technology
Room No. 66-569
Cambridge, Massachusetts 02139

MEASURING AND IMPROVING THE EFFICIENCY OF BOILERS:

A MANUAL FOR DETERMINING ENERGY CONSERVATION
IN STEAM GENERATING POWER PLANTS

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1977

Fuel-saving techniques for plant managers, owners, engineers, and boiler operators. (170 pp.)

CONTENTS

- Chapter 1 Introduction discusses the text's purpose, scope, contents, and use.
- Chapter 2 The Energy Situation reviews U.S. and world energy use patterns, its end uses, and available and potential energy resources.
- Chapter 3 Description of Boilers provides a liberally illustrated discussion of the three types of boilers—fire-tube, water-tube, and electric. The energy-using characteristics and the advantages and disadvantages of each type of boiler are enumerated.
- Chapter 4 Effect of Important Parameters on Boiler Performance includes consideration of the economic consequences of poor boiler performance. The effect of combustion air, inlet water, fuel gas temperature, and fuel composition on efficiency are dealt with in detail.
- Chapter 5 Performance of Boilers describes two methods of measuring boiler performance—the direct, which measures steam generator efficiency, and the indirect, which measures combustion efficiency. Also discussed are the accuracy of instrumentation and the impact of errors in measuring mass flow rates, and change in enthalpy. Instruments are recommended for both methods, along with the relative advantages of each technique.
- Chapter 6 Economics Associated with Energy Conservation gives an introduction to basic methods of figuring the costs of conservation measures. Methods include the calculation of payback period and benefit/cost ratio analysis. The reader is then led through both types of calculation to determine the appropriateness of buying a heat exchanger.
- Chapter 7 Combustion Control Systems begins with an input-output analysis of the boiler system, followed by a description of the basic variations of the model, e.g., two-position systems and modulating systems. Combustion management systems are then described.

- Chapter 8 Boiler Feedwater Treatment demonstrates the impact of scale, corrosion, and foaming caused by improperly treated feedwater. Water quality terminology is defined, as are a wide variety of treatment methods. A water quality troubleshooting chart is provided.
- Chapter 9 Waste Heat Recovery From Boilers covers the potential sources of recoverable heat, including exhaust gases, process steam pressure drops, and steam condensate and blowdown. Potential uses of the recovered heat are indicated along with the mechanisms for implementing waste heat recovery, including finned tube heat exchangers, flash tank systems, and hybrid flash tank heat exchangers. Throttling turbines are also discussed as a source of electricity where a sufficient pressure gradient is available.
- Chapter 10 Operation and Maintenance of Boilers is divided into sections on general, daily, weekly, monthly, and annual requirements. Using a problem-solution approach, the correct maintenance responses to various situations are delineated. In addition, the chapter contains a number of charts that identify specific energy-conserving operation and maintenance steps and the schedules that must be followed.

Appendices - Are devoted to the more highly technical aspects of energy use analysis, including the properties of fuels, boiler analysis, use of the Orsat analyzer, and the throttling calorimeter. Necessary tables and equations are provided.

Comments: The manual is thoroughly documented with references and illustrations. Chapters are so arranged that they can be used individually or in combination, depending on the objectives of the trainer and the needs of the student. Question and answer sections are provided to enable the user to test himself.

Price: \$9.00 (PB265-713)

Available The National Technical Information Service
From: 5285 Port Royal Road
 Springfield, Virginia 22161

MEAT PLANT ENERGY CONSERVATION GUIDELINES

AMERICAN MEAT INSTITUTE, ENERGY TASK FORCE

1977

Practical suggestions are presented for reducing energy use in slaughtering and meat processing plants. It is designed for use by plant managers, plant operation managers, plant superintendents, departmental supervisors, and plant engineers. (14 pp.)

CONTENTS

The guidelines cover each area of plant operation and offer tips for conserving energy in each location. The plant areas covered include: management; mechanical department; welfare areas; shipping docks; office; pen areas; hog kill and beef kill; hot hog, lamb, and beef coolers; holding coolers; fresh meat cutting, packing, conversion, breaking, and fab area; hide tanks, hide curing, and storage rooms; lard department; inedible rendering; edible rendering; curing rooms; process ovens and areas; smoked meat coolers and process areas; freezers; sausage coolers and process areas; outside storage tanks for lard, tallow, and fuel oil; boiler and engine rooms.

Comments: The guidelines were prepared by the engineering group of the American Meat Institute's Energy Task Force and supply the meat plant-specific information needed in such a guidebook.

Price: Free.

Available American Meat Institute
From: P.O. Box 3556
Washington, D.C. 20007

SYNTHESIS OF NETWORKS OF HEAT EXCHANGERS

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
1977

One module in a series of problem-centered, self-study publications focusing on industrial energy conservation. It considers how to save energy in networks of heat exchangers used in chemical engineering processes. (172 pp.)

CONTENTS

- Unit 1 Heat Energy Management in a Chemical Process reviews the energy conservation and plant cost factors involved in the synthesis of networks of heat exchangers for chemical engineering processes and explains the factors which affect efficient energy use.
- Unit 2 Creation of Alternative Heat Exchanger Networks describes the fundamentals of heat exchanger network analysis, including a demonstration of how to apply four methods for developing alternative heat exchanger networks. These are: using heating and cooling duties of streams, using the Pho and Lapidus matrix method, using evolutionary strategy, and using the forward branching scheme of Rathore and Powers.
- Unit 3 Methods for Synthesizing Optimum Heat Exchanger Networks describes various methods of synthesizing the optimum heat exchanger network for given processing streams, i.e., heuristic synthesis, the Ponton and Donaldson method, the tree-branching method of Pho and Lapidus, evolutionary synthesis, and Rathore and Powers' forward branching and bounding method.
- Unit 4 Synthesis of a Heat Exchanger Network for a Crude Oil Distillation Unit demonstrates how to apply the fast heuristic methods for locating optimum heat exchange networks while solving the problem of synthesizing the optimum network for a crude oil distillation process.
- Unit 5 Economic and Design Aspects Affecting the Selection of the Appropriate Synthesis Method and the Quality of the Optimum Network describes the economic and process engineering factors affecting the selection of the appropriate synthesis method and the viability of optimum heat exchanger networks.
- Unit 6 Design and Cost Estimation of Heat Exchangers describes methods used for the design and cost estimation of simple heat exchangers (e.g., design of a shell-and-tube heat exchanger, estimating the overall heat transfer coefficient, and estimating the cost of heat exchangers and heat exchanger networks).

Comments:

This technical publication is recommended for process design and chemical engineers. The text is extremely well organized and allows the student to spend only as much time studying it as necessary. Each chapter specifies instructional objectives, and closes with an Exit Test, complete with answers, to allow the student to assess his or her grasp of the material.

For current information on price and availability, write:

Project PROCEED
Massachusetts Institute of Technology
Room No. 66-569
Cambridge, Massachusetts 02139

UPGRADING EXISTING EVAPORATORS TO REDUCE ENERGY CONSUMPTION

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1977

A technology applications manual suggesting ways to improve the energy efficiency of existing evaporators, including a discussion of the economic and other design constraints which must be considered. The intended user is the evaporator engineer who will be performing technical and economic analyses to determine the most suitable upgrading techniques for a particular plant. (91 pp.)

CONTENTS

Chapter 1	<u>Potentials of Upgrading Evaporators</u> explains how radical increases in energy costs relative to capital equipment costs have invalidated much of the pre-1973 design and cost reasoning. Cost-effective improvements are frequently possible. Improvement options fall into three categories: fine-tuning existing equipment, modifying auxiliary hardware, or implementing major hardware modifications.
Chapter 2	<u>Correctable Operating Factors of Existing Evaporators</u> describes how to conduct a thorough analysis of the existing plant to determine optimum operating procedures and conditions, and to identify areas where improvement is needed. Discusses major sources of energy losses due to operating factors.
Chapter 3	<u>Improving Energy Use Through Minor Capital Investments: Heat Recovery</u> reviews the technology and the economics of installing heat recovery equipment to further recover the energy from such sources as steam condensate, product, and feed.
Chapter 4	<u>Upgrading Existing Evaporators Through Major Capital Investments</u> considers the potential for significant further reductions in steam consumption through system modifications which alter existing evaporator layout and process conditions. Included are techniques for thermal recompression, mechanical recompression, and the combinations of effects.
Chapter 5	<u>Guidelines for Formulating an Upgrading Program</u> describes how to plan and coordinate retrofit construction and plant modifications with existing production schedules to reduce the risks of production losses.
Chapter 6	<u>New Technology</u> reviews new technologies which may be used in designing second or third generation evaporator systems. Discussion includes computer-assisted evaporator design and evaporator control systems, the use of lower grade heat, solar-assisted systems, heat-transfer enhancement methods, and other methods for concentrating solutions, such as membrane techniques.

Glossary provides a list of abbreviations used in the discussion of evaporators.

Bibliography provides a list of reference materials.

Comments:

This manual provides the basic tools that are required to evaluate the preliminary economics and to select the best methods for upgrading the evaporators for a particular plant and application. It is written for the engineer who is completely knowledgeable in evaporator hardware and operation.

Price: \$4.75 (Report No. C00/2870-2)

Available

From: National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

WASTE HEAT MANAGEMENT GUIDEBOOK

U. S. DEPARTMENT OF COMMERCE

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1977

Sources of waste heat in industrial processes are reviewed, and an overview of off-the-shelf technology available for its use is given. Discussions of waste heat measurement technology and economics are included, as are 14 case studies of successful industrial waste heat recovery installations. (264 pp.)

CONTENTS

- Chapter 1 Sources and Uses of Waste Heat waste heat is defined as heat that is rejected from a process at a temperature high enough to permit the extraction of additional value from it. The sources of waste heat are discussed, and grouped into three sections — high temperature (1000-2800°F), medium temperature (450-1200°F), and low temperature (80-450°F). A brief discussion is provided of the uses to which waste heat of various thermal content may be put. The organization and implementation of a waste heat management system are briefly discussed.
- Chapter 2 Determination of Waste Heat Requirements discusses the need for economic recovery of waste heat. A clear discussion of the first and second laws of thermodynamics shows how the quantity and availability (quality) of waste heat is determined theoretically. Heat balance is covered in some detail with sections on energy input, energy losses, and energy discharges, and shows how these considerations must be combined when determining the economics of waste heat recovery. Fully worked examples are given for determining the heat balance of a boiler and the chemical energy in fuel, with reference to stack gas condensation problems. The economics of waste heat recovery are illustrated by an example of heat recovery from a steel tube furnace. A final section discusses methods of transferring the waste heat from the steam in which it is produced to the stream where it can be made to do useful work. All the basic thermodynamics equations and relationships are given, together with references for further reading.
- Chapter 3 Economics of Waste Heat Recovery deals with concepts and analytical techniques that can guide the industrial plant manager in evaluating the economic efficiency of investments in waste heat utilization. It explains in text book fashion, and demonstrates in simplified but realistic examples the use of alternative methods of evaluating and comparing energy saving investments. The methods discussed range from simple techniques, such as determination of the payback period, to more sophisticated methods, such as benefit-cost analyses, life-cycle cost analysis, and the internal rate of return method. The discussion covers the treatment of taxes, inflation, and uncertainty in data estimates and assumptions. The kinds of financial data needed

- Chapter 3 (Cont.) to perform the analyses are identified, and the appropriateness of the different evaluation methods for analyzing various kinds of investments is explained. The chapter concludes with tables of compound interest factors for both single payment and uniform payments from 6-25 percent discount rates for 50-100 interest periods.
- Chapter 4 Case Studies of Successful Systems for Industrial Waste Heat Recovery provides summaries of several successful industrial installations of waste heat recovery systems. These case studies are selected to represent: (a) major commercial options in waste heat recovery equipment (examples are radiation recuperator, economizer, heat wheel); (b) various industrial applications of heat recovery equipment (examples are glass making, forge furnace, paint and varnish processing; and (c) various geographical locations throughout the United States.
- Fourteen individual case studies are presented. Details include all thermal calculations, cost analyses, process diagrams, design details, flow diagrams, and before-and-after-operating parameters and cost savings.
- Chapter 5 Commercial Options in Waste Heat Recovery Equipment reviews available industrial heat exchangers. Five categories are considered: gas-to-gas heat exchangers, gas or liquid-to-liquid regenerators, waste heat boilers, gas and vapor expanders, and heat pumps. Within those categories, clear diagrams are provided to indicate the method of operation, flow paths, and design details. The diagrams are supported by the text, which discusses typical applications.
- Chapter 6 Instrumentation provides a technical discussion of the various technologies that are available for measuring the essential parameters of a system prior to installation of waste heat recovery devices. Four areas are covered: thermometry, flow and pressure measurement, infrared thermography, and flue gas analysis. The theoretical basis of the measurement is discussed in detail together with the pertinent equations and relationships. Diagrams are provided for the various instruments and actual use examples are shown. Several references are given for further reading.
- Chapter 7 Engineering Data for Waste Heat Recovery compiles various charts, graphs, and tabulated data that are essential to the analysis of waste heat problems. The data have been gathered from various sources and provides a comprehensive reference section.
- Chapter 8 Sources of Assistance for Designing and Installing Waste Heat Systems provides a very brief listing of some of the major engineering and electrical societies/institutions. For further assistance, the reader is directed to consulting engineers and manufacturers, although no specifics are provided.

Appendix Provides a complete listing of all symbols and notation used in this publication.

Comments: This publication provides an excellent treatment of waste heat management suitable for both technical and non-technical personnel. The mathematics and diagrams are extremely well presented and fully supported by tabulated data. The publication is well written, logical in its approach, and covers all aspects of the subject. It should be an invaluable reference for industrial and mechanical engineers.

Price: \$2.75 (Catalog Number C13.11.121)

Available from: The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

AVAILABLE ENERGY ANALYSIS TECHNIQUES

THE CENTER FOR PROFESSIONAL ADVANCEMENT

This course is designed for engineers concerned with energy conservation in design and operation. It teaches thermodynamic available energy analysis, which provides a basis for energy costing and conservation in industrial processes.

CONTENTS

- First Day** An optional thermo refresher - includes basic thermodynamic principles and properties such as enthalpy and entropy.
- Second Day** Topics include energy quality, reversibility and maximum work; calculation of availability changes during physical processes; energy degradation, including mixing and heat exchange; and availability changes in chemical processes.
- Third Day** The third day includes the following topic areas: using tables of standard chemical availabilities, chemical processes at nonstandard conditions, availability analysis of steam power plant and petrochemical plant, and analysis of an HVAC installation.

Price: For information on price and availability, contact:

The Center for Professional Advancement
Box H
East Brunswick, New Jersey 08816

THE COATING INDUSTRY
ENERGY SAVINGS WITH VOLATILE
ORGANIC COMPOUND EMISSION CONTROL

1979

A technology applications manual providing technical and economic data to enable engineers and managers in the coating industry to evaluate the energy conservation opportunities for installation of solvent emission control systems. (104 pp.)

CONTENTS

- Chapter 1 Overview presents an introduction to the coating industry, provides general approaches for volatile organic compound (VOC) emission control, and energy cost considerations for implementing these approaches.
- Chapter 2 VOC Emission Control Technologies: Add-On Devices discusses properties of VOCs and the advantages and disadvantages of thermal incineration, catalytic incineration and carbon adsorption, the three most widely used add-on technologies.
- Chapter 3 Energy Cost Savings Through Heat Recovery lists methods and effects of integrating heat recovery with emission control, heat recovery equipment, provides calculation procedures for heat recovery through examples given as guides to site-specific applications.
- Chapter 4 Economics explains methods for economic evaluations, including manufacturing cost factors, investment costs for incineration systems, energy costs and savings for incineration systems, annual costs for incinerator operation, heat recovery optimization, and carbon adsorption cost and savings. Examples of cost calculations are also given.
- Chapter 5 Emerging Technologies describes the Department of Energy demonstration project on conserving energy while achieving air quality standards for VOC emission control, in addition to presenting new curing technologies.
- Chapter 6 Selecting Energy Efficient and Economic Control Technologies provides information on how to meet environmental regulations and contains an implementation program checklist to aid the manager or engineer in conserving energy while controlling VOC emissions.

Appendices contain a definition of symbols, enthalpies of gases, and combustion data for fuel oil.

Comments: The manual presents ways in which energy savings can be achieved while controlling VOC emissions. The information will aid the engineer to estimate energy savings, energy rates, performance of control systems and heat recovery options. Graphics and illustrations show energy use, savings and economics.

Price: \$6.50; TID-28706

Available From: National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

THE DAIRY ENERGY CONNECTION

U.S. DEPARTMENT OF ENERGY

1979

The handbook, designed for managers and dairy owners, shows what process modifications can be made, why they are necessary, and calculates estimated savings and payback time. (126 pp.)

CONTENTS

- Introduction** The Introduction contains a summary, in chart form, of energy-saving modifications, the cost of implementing the changes, the payback period, first-year savings, and ten-year savings.
- Section 1** Process includes fifteen specific recommendations for changes in the process of preparing, storing, and distributing dairy items. The changes range from reducing defrost cycles to shutting off the ventilation system in unoccupied areas.
- Section 2** Transportation describes six ways of reducing truck delivery and maintenance energy-related costs. Improvements cited are divided into two areas: improvements to the truck fleet, such as replacing bias ply with radial tires, and driver and dispatcher improvements, such as careful route planning. Tables are included which show gasoline versus diesel fuel costs, energy savings with various tune-up strategies, and so on.
- Section 3** Lighting lists and describes three methods of reducing energy costs, from replacing incandescent with fluorescent to using more efficient security lighting. Charts are included which show the recommended maximum light levels and various low-energy replacement savings.
- Section 4** Heating and Related Issues identifies ways of saving energy on heating and cooling the dairy. Charts are included which show savings associated with boiler tune-ups, the annual cost of steam trap leakage, and pipe insulation payback.
- Comments:** Within each section of this handbook, recommendations for saving energy are listed and described. Implementation suggestions and case-study examples are included for each recommended procedure. The book devotes approximately 40% of each section to tables and graphs. The book is written in terms which the layman can understand.

Price: \$10.00

Available From: National Independent Dairies
1730 K Street, N.W., Suite 1302
Washington, D. C. 20006

ENERGY AUDIT WORKBOOK

U.S. DEPARTMENT OF ENERGY
ASSISTANT SECRETARY FOR CONSERVATION
AND SOLAR APPLICATIONS
1979

This series of workbooks will be used by state energy offices to assist industrial and commercial users in performing energy audits to identify energy conservation measures. (approximately 70 pp. each)

CONTENTS

- Chapter 1 Maintenance and Operational Changes explains modifications which can be incorporated at essentially no cost.
- Chapter 2 Step by Step Examples illustrates methods which can save energy and money. Each method is followed by a problem which will help the engineer or manager to determine what the cost and savings of modifications will be.
- Chapter 3 Energy Measures includes a comprehensive list of energy conservation measures which would require an initial investment of capital. This detailed checklist of steps to take is divided into various sections, according to the subject matter at hand.
- Chapter 4 The Action Plan includes a summary of a plan to carry out energy conservation measures and a worksheet showing modifications which have been implemented.
- Comments: Each of these workbooks follows the same format. They are designed as aids to help the commercial and industrial energy consumer save energy and money by taking the company through an energy audit to determine what needs to be changed and what the cost savings will be.

The workbooks are available to help users in 11 different areas:

- apartments
- bakeries
- die-cast plants
- educational institutions
- hospitals
- hotels and motels
- offices
- restaurants
- retail stores
- transportation terminals
- warehouses and storage facilities

The series also contains an instructor's manual which provides energy auditors with background materials on the subject matter.

Price: Student's Manual:
 \$2.50 (copy)
 \$6.00 (printed copy)
 \$3.00 (microfiche)

Instructor's Manual:
Volume I - \$4.25
Volume II- \$5.25

Available

From: National Technical Information Service
 U.S. Department of Commerce
 5285 Port Royal Road
 Springfield, Virginia 22151

ENERGY COST REDUCTION IN THE
BAKING INDUSTRY

U.S. DEPARTMENT OF ENERGY
AMERICAN BAKERS ASSOCIATION
RETAIL BAKERS OF AMERICA
1979

The handbook, designed for managers and bakers in industry, shows what process modifications can be made, why they are necessary, and calculates estimated savings and payback time. (126 pp.)

CONTENTS

- Introduction** The Introduction contains a summary, in chart form, of energy-saving modifications, the cost of implementing the changes, the payback period, first-year savings, and ten-year savings.
- Section 1** Process includes twelve specific recommendations for changes in the process of preparing, storing, and distributing baked foods. The changes range from reducing defrost cycles to channeling excess heat over ovens to offices or counter area.
- Section 2** Transportation describes six ways of reducing truck delivery and maintenance energy-related costs. Improvements cited are divided into two areas: improvements in the truck fleet, such as replacing bias ply with radial tires, and driver and dispatcher improvements, such as careful route planning. Tables are included which show gasoline versus diesel fuel costs, energy savings with various tune-up strategies, and so on.
- Section 3** Lighting lists and describes four methods of reducing energy costs, from replacing incandescent with fluorescents to using more efficient security lighting. Charts are included which show the recommended maximum light levels for baking and various low-energy replacement savings.
- Section 4** Heating and Related Issues identifies six ways of saving energy on heating and cooling the bakery. Charts are included which show savings associated with boiler tune-ups, the annual cost of steam trap leakage, and pipe insulation payback.
- Comments:** Within each section of this handbook, recommendations for saving energy are listed and described. Implementation suggestions and case-study examples are included for each recommended procedure. The book devotes approximately 40% of each section to tables and graphs. It is written in terms which the layman can understand.

Price: \$5.00

Available

From: American Bakers Association
2020 K Street, N.W.
Suite 850
Washington, D. C. 20006

ENERGY SAVING BY INCREASING
BOILER EFFICIENCY

L.H. YAUVERBAUM, EDITOR
1979

A text which provides boiler-plant managers and operators of single boilers the assistance needed to implement efficiency-improvement techniques.

CONTENTS

- Chapter 1 Overview of Boiler Efficiency and Controlling Factors describes major factors affecting boiler efficiency, including heat-loss minimization and combustion efficiency. Also included is an overview of boiler maintenance and operating practices, and a description of boiler auxiliary equipment for efficiency improvement.
- Chapter 2 Combustion in Boiler Systems explains the fundamentals of combustion (furnace excess air, nitrogen oxides, heat losses), and the effect of the following on efficiency: combustion air, temperature of inlet water, flue gas temperature, and fuel composition. Air pollutants generated by combustion are also discussed.
- Chapter 3 Combustion in Natural Gas and Fuel Oil Burners describes types of burner systems and controls (atmospheric, premix, nozzle-mix, and radiant tube burners). Optimization of fuel consumption is explained in terms of available heat effects and effects of combustion on fuel use.
- Chapter 4 Boiler Testing identifies boiler inspection procedures in terms of items inspected: burners, combustion controls, furnace, stack instruments, flame appearance, and stack sampling. Data recording is also discussed.
- Chapter 5 Reduction of NO_x and Other Impurities explains NO_x reduction and alternate reduction techniques and explains treatment of boiler feedwater.
- Chapter 6 • Operational Procedures and Modifications identifies modifications such as reduced steam pressures, water quality control, load management and fuel conversions. Waste heat recovery techniques and methods of adjusting the air/fuel ratio are explained.
- Chapter 7 Efficiency Improvement Equipment describes operation, performance, costs, and design factors of our preheaters, economizers, firetube turbulators, combustion control systems, oil and gas burners and supply systems, wall and soot blowers, and insulation.

- Chapter 8 Boiler Maintenance Practices includes a description of general maintenance procedures, such as tune-up and cleaning of systems and equipment, and a summary of routine requirements and record-keeping methods.
- Chapter 9 Determination of Combustion Efficiency provides an overview of the testing procedure for the direct and indirect methods of boiler performance, and describes measurement methods, devices and techniques.
- Chapter 10 Calculation of Boiler Efficiency fully explains the direct and indirect methods of testing, including information on measurements, types of instrument, and error analysis.
- Chapter 11 Economics Evaluation identifies types of economic performance measure.
- Comments: The information in this text is taken from multiple sources. The book contains different points of view on monetary values and opinions of future potential. The book is a comprehensive text designed to help the boiler-plant manager realize fuel savings.
- Price: For information on price and availability, contact:
- Noyes Data Corporation
 Noyes Building
 Park Ridge, NJ 07656

HOW YOU CAN PROFIT FROM
THE ENERGY CRISIS

U.S. DEPARTMENT OF ENERGY
NATIONAL ASSOCIATION OF
FURNITURE MANUFACTURERS
AND
SOUTHERN FURNITURE MANUFACTURING ASSOCIATION
1979

Handbook for reducing energy costs in the furniture manufacturing industry.
(105 pp.)

CONTENTS

- Introduction** The prologue explains the reasons for energy conservation in a furniture manufacturing operation, projects further increases in costs for the future, discusses potential savings through recommendations in this handbook, and describes the development of these recommendations.
- Savings Summary Index provides a tabulation of recommendations for lighting, heating, building shell, and process, listing for each recommendation the cost for implementation, payback period, first-year savings, and ten-year savings.
- Section 1** Lighting suggests reviewing light use in the plant to see where savings can be effected; recommends maximum light levels for various tasks in furniture manufacturing; suggests ways to relamp with more efficient, fluorescent lamps (and provides a table for incandescent-to-fluorescent conversion showing wattage and dollar savings); recommends use of timers and switches and more efficient security lighting.
- Section 2** Heating and Related Issues discusses savings for typical upholstery and casegoods plants through reduced temperatures, improved boiler efficiency, repairing steam traps, shutting off unused zones and repairing leaks, insulating pipes, installing wood boilers, improving wood burning efficiency, adding wood waste storage, and reducing energy consumption related to computer use.
- Section 3** Building Shell covers opportunities for savings by preventing heat loss (through doors, cracks, and windows), using plastic storm windows, and reducing heat loss through shipping dock doors.
- Section 4** Process suggests strategy and equipment improvements such as reducing air leaks and relocating air intake, changing compressor operation, reducing operating pressures, reusing collector air, controlling kiln temperatures, adding kiln insulation, reducing heated air lost through spray booths, and minimizing use of drying ovens.

Comments: This is a useful, how-to guide to energy savings for upholstery and casegoods plant managers. Its recommendations are given in clear, specific language, and the projected savings resulting from their implementation are set forth in efficiency percentages and dollars and cents.

Price: \$10.00

Available

From: Southern Furniture Manufacturers Association
Post Office Box 2436
High Point, North Carolina 27261

INDUSTRIAL ENERGY CONSERVATION

D. A. REAY
2d Edition - 1979

A handbook for engineers and managers. (371 pp.)

CONTENTS

- Chapter 1 Current Primary Energy Resources discusses existing reserves of fossil (e.g., coal, gas, oil) and nuclear fuels and reviews some of the new processes which can lead to wider applications for coal. Data are given on the possible effects exploiting alternative sources of oil, such as oil shale, could have on future supplies.
- Chapter 2 Optimum Use of Prime Movers for Power Generation and Other Applications examines electricity generation by national authorities and by industry, and describes steam turbines, rankine vapor cycle turbines using freons, gas turbines, combined cycles (gas turbine plus steam turbine), and diesel and gas engines (reciprocating).
- The chapter compares heat recovery rates of various engine types and discusses maintenance and reliability and installation and control systems of the prime movers used for electricity generation.
- Chapter 3 The Energy Intensive Industries - 1 discusses the metal industries (particularly iron and steel), the chemical industries, and oil refining in the context of their large proportion of energy consumption and the resulting attraction of attention and financial support.
- Chapter 4 The Energy Intensive Industries - 2 concentrates on a number of industries where energy costs have a significant effect on efficient operation and financial cost of the product. Included are descriptions of energy consumption in the pulp and paper, glass manufacturing, food processing, and textile industries.
- Chapter 5 Common Items of Plant - Good Housekeeping discusses factors such as preventive maintenance, the use of temperature control systems, insulation, and similar low-cost activities which can save energy. This and Chapter 6 deal in detail with processes common to a wide range of industries; therefore, the scope of the treatment is broad enough to apply the discussions to almost every industry. Examined in this chapter are air conditioning, air conditioning control systems,

boilers, chimneys, combustion systems, cooling towers, dryers, in-plant electricity generation, electric equipment, furnaces, general process heating, incinerators, lighting in factories and offices, plant buildings, plant domestic hot water systems, useful aids to energy conservation implementation, steam traps, and vats and hot storage tanks. A section at the end of the chapter gives information on fuel additives.

- Chapter 6 Common Items of Plant - Energy Recovery deals in detail with components of processes which are common to a wide variety of industries from the point of view of energy (in particular, heat) recovery.
- Chapter 7 Waste Heat Recovery Techniques describes the main methods of heat recovery from air, gases and liquids, including systems such as heat pumps, heat pipe heat exchangers, and a range of recuperators and regenerators capable of operating at very high exhaust temperatures.
- Chapter 8 Energy Storage is discussed in terms of thermal storage boilers and accumulators, thermal insulation, and heat storage media.
- Chapter 9 New or Specialised Processes and Plant Having Energy-Saving Potential briefly describes some of the techniques either available or under development which offer savings, such as electron beam welding, which minimizes the use of weld preparations, thus reducing machining time. This process is sufficiently repeatable to allow higher quality and consistent welding, thereby reducing wastage.
- Chapter 10 Alternative Sources of Energy lists and describes such sources as wind power, geothermal energy, wave power, the hydrogen economy concept, and solar energy.
- Appendix 1 Energy Management and Energy Audit discusses the organization of an energy management program and monitoring the program to enable the manager to identify inefficiencies and wastage.
- Appendix 2 Financial Analyses for Evaluating Benefits of Energy Conservation Equipment identifies areas of analysis and data required which help to indicate the effectiveness of energy conservation techniques.
- Appendix 3 Organisations Offering Services to Industry in the Field of Energy Conservation lists research associations, government departments, members of the fuel industries and various private organizations in the U.K. and the U.S. which can assist in a variety of ways.

Appendix 4 Manufacturers of Equipment for Energy Conservation lists a selection of companies that manufacture goods of interest to commercial organizations wishing to conserve energy.

Appendix 5 Bibliography - on energy conservation publications.

Appendix 6 Useful Conversion Factors and Fuel Properties

Comments: This book is a comprehensive and useful reference source for energy managers and plant engineers, as it deals in detail with the questions of equipment reliability, heat recovery systems, and energy conservation techniques as well as provides cost data.

Price: For information on price and availability, contact

Pergamon Press Inc.
Maxwell House, Fairview Park
Elmsford, New York 10523

PLANT ENGINEERS AND MANAGERS GUIDE
TO ENERGY CONSERVATION

ALBERT THUMANN, P.E.

1977

A technical instruction manual for directors and operations managers geared toward implementation of proven energy conservation techniques in existing and new industrial facilities. It contains checklists and aids to the engineer, architect and others involved in design or maintenance of industrial plants. (365 pp.)

CONTENTS

- Chapter 1 Implementing a Cost-Saving Energy Conservation Program
shows how to set up programs and save fuel by 30% or more, and reduce the cost of its use. Program planning, including executive decision-making, objective and goal definition and coordination of strategy, are discussed. The program planner is directed first to determine the usage of fuel. A checklist is provided as an aid to implement and continuously monitor projects which involve the entire plant system. Methods of identifying electrical, steam and utility costs are included. Conversion factors and heating values are explained with examples of reports. There is also a guide which shows how to calculate the plant's energy content. The testing techniques allow the engineer to solve problems of "simulated experience" (SIM). Comparative analysis of power costs and reserves throughout the country are included.
- Chapter 2 How Life Cycle Costing Cuts Yearly Operating Expenses
discusses the principles of total system costing over the useful life of the system. Decisions to make conservation investments can be based on six factors explained in the chapter. These factors allow for conversion of dollars over time. Sample calculations illustrate problem-solving approaches. Also explained are methods of determining the best and lowest cost alternatives. Depreciation accounting and after-tax savings formulas are also given attention.
- Chapter 3 How to Reduce the Monthly Electrical Bill by Power Factor Correction. The plant engineer is shown that understanding the electric rate structure can save dollars. Plant power factor improvements based on rates schedules and hours of usage are illustrated. Capacitor locations are illustrated which decrease losses and increase cost benefits.

- Chapter 4 Load Management and Efficient Use of Lighting. The first major area discussed is to balance power use demands over periods of time. Techniques are illustrated as well as applications of load shedding. The basics of reducing lighting waste are methodically illustrated with given formulas. The types of lamps and quality of maintenance and installation are cited.
- Chapter 5 Reducing Energy Losses in Utility and Process Operations discusses steam properties and the uses of steam tables, specific heat concepts, latent heat concepts, and the specific volume concept for more efficient power usage. The first and second laws in thermodynamics are discussed and illustrated in a system which conserves energy materials and applications of heat processing. These effects are analyzed, as well as the effects of steam heat waste recovery systems.
- Chapter 6 Applying the Principles of Heat Transfer for Reducing Energy Losses of Equipment and Piping. Minimizing heat loss requires an understanding of the three ways it is transferred (conduction, radiation and convection). Illustrations show how to estimate heat loss in vessels, tanks, piping and flat surfaces, and how to insulate and save heat.
- Chapter 7 What to Know About Reducing Building Energy Losses discusses building design and construction. Several tables are provided which allow calculation of heat loss and heat gain, and show how materials substitution can solve energy waste problems. A section is devoted to solar energy, explaining the most efficient uses of solar heating.
- Chapter 8 Cooling and Heating While Saving Energy. The efficiency of heating, ventilation and air conditioning systems (HVAC) is discussed. The chapter shows the engineer how to measure and compare systems efficiency. It also illustrates how to apply various heat pumps and cooling equipment in different areas of the building. In addition, it proposes how to make use of schedules to control computerized programming of an evaluated system.
- Chapter 9 Reducing Peak Loads by Utilizing the Solar Collector. This section alerts the engineer to the technical data available on collection and use of solar energy for water and space heating. There are detailed methods to compute collected solar energy, taking various factors into account. The solar device, its construction and efficiency and effects are examined.

Chapter 10 Establishing a Maintenance Program for Plant Efficiency and Energy Savings discusses the need to survey existing maintenance practices which cause energy waste. Proper management planning and preventive maintenance activities are elements discussed when establishing a program. A survey checklist helps identify specific areas of maintenance operations to be monitored for savings.

Chapter 11 Managing an Effective Energy Conservation Program discusses the many engineering functions taken into account and the manager's responsibility and role in organizing the activities which require commitment, identification of objectives, priority setting, as well as communication and coordination for all levels of activity.

Chapter 12 A Consortium of Handy Working Aids contains a comprehensive directory of tools such as forms and tables to aid the manager and engineer in identifying, evaluating, and implementing energy and money conservation in plants.

Comments: This guide is a comprehensive source of technical information and instruction for the plant manager and engineer involved in organizing and maintaining energy and money savings programs. It contains a wide range of practical guides.

Price: \$19.95.

Available Van Nostrand Reinhold Company
From: 135 West 50th Street
New York, N.Y. 10020

THE SYSTEMATIC ENERGY CONSERVATION
MANAGEMENT GUIDE

AMERICAN MANAGEMENT ASSOCIATIONS
1979

A practical, specific energy conservation reference applicable to companies in all industries and to other large facilities. (11 volumes)

CONTENTS

- Volume 1 Introduction to Energy Conservation Management explains the basic facts about the U.S. energy program. It analyzes energy supply and demand and the impact of Government policies on various industries and individual companies.

- Volume 2 Organization and Management of the Energy Conservation Function discusses management tasks that are important, integral parts of a sound energy program. It presents step-by-step checklists for corporate- and plant-level planning, organizing, staffing, directing, and controlling; identifies key policies and procedures which have been demonstrated to be worthwhile; details qualifications of key members of an energy conservation team; outlines organizational structures; and provides a complete system of management for maximizing energy conservation activities.

- Volume 3 Conducting an Energy Audit gives detailed procedures for conducting an energy audit; shows how to spot likely energy savings areas, how to set up a conservation program. It details techniques for energy efficiency and balance analysis; demonstrates how to divide a facility into energy cost centers; presents a checklist of energy conservation ideas; spotlights implementation and follow-up procedures; and gives actual forms for various activities.

- Volume 4 Conserving Energy in HVAC and Lighting Systems

- Volume 5 Conserving Energy in Boilers and Steam Distribution Systems

- Volume 6 Conserving Energy in Electric Motors, Pumps, and Compressors

- Volume 7 Conserving Energy in Kilns, Furnaces and Dryers

- Volume 8 Conserving Energy Through Recycling, Recuperation, and Cogeneration

Volumes 4 through 8 are devoted specifically to engineering considerations in 14 technological areas. They discuss how to calculate precisely energy input, output, and efficiency.

Included are checklists for improving maintenance and operating procedures. In addition, they provide technical descriptions of various equipment, instruments, control devices, and major and minor cost devices. They examine the advantages and disadvantages of major modifications and improvements and show how to determine efficiency and standards; demonstrate how to calculate energy savings from each improvement; outline major cost improvements and low-cost improvements; and present checklists of available options.

- Volume 9 Analyzing Capital Projects in Energy Conservation presents a complete system for financial analysis. This volume details methods developed especially for analyzing capital energy conservation projects and explains investment analysis techniques from simple payback to cost/benefit ratio and net present value methods. In addition, it shows how to use cash flow analysis to handle various depreciation methods, investment tax credits, the escalating cost of fuel, etc. Such factors as capital rationing are discussed, and ready-to-use forms for all types of analysis are included.
- Volume 10 Monitoring and Surveillance in Energy Conservation details the function of following up on established programs and other energy conservation plans, presents an exhaustive discussion of instrumentation; details monitoring techniques such as tracking charts, ratio charts, and control charts; and explains how to set energy standards using simple approximates as well as sophisticated techniques. This volume shows how to estimate the effects of changes in temperature and production volume on energy use. It explains how statistical techniques such as index numbers, regression, and correlation can be applied to energy conservation, and it compares various performance evaluation systems and shows how to design such a system.
- Volume 11 Accounting and Reporting in Energy Conservation Management shows what an Energy Information System is and how it works. This volume examines the link between energy information and management action; tells what kind of data should be maintained and features input and output forms; shows the impact of making energy a major line item on a budget; and demonstrates how to allocate energy costs to various products and departments.
- Appendix Contains an extensive checklist of available options for the recovery and use of waste energy, together with a list of its potential applications.
- Comments: This set of 11 volumes provides managerial and financial advice on energy conservation management as well as comprehensive technical material of particular interest to engineers.

Price: \$325. (AMA members are entitled to a 10% discount. Second and additional copies are available for \$99 each when ordered at time of original purchase.)

Available From: American Management Associations
Energy Management Division, 16th Floor
135 West 50th Street
New York, New York 10020
(212) 586-8100

MINNESOTA GUIDE TO WASTE HEAT RECOVERY

MINNESOTA ENERGY AGENCY

1979

A manual designed to assist industrial, commercial, and institutional organizations in the effective utilization of energy resources. (44 pp.)

CONTENTS

- Part I Introduction discusses waste heat and its uses when recovered and briefly deals with development of a waste heat recovery plan.
- Part II Waste Heat Sources lists common heat sources and their respective waste heat stream temperatures. This section also provides a sample worksheet for a waste heat audit and outlines a procedure for conducting such an audit.
- Part III Potential Heat Recovery Projects describes methods for analyzing each heat source with respect to potential applications, equipment, and economic considerations. Currently available types of heat exchanger are listed so as to reflect the state of the source and reuse streams, temperature of the source stream, and ability of the equipment to handle contaminated streams; and a rough cost comparison of types of equipment is provided. This section gives guidelines to selecting waste heat recovery projects and lists sources of additional information on waste heat sources and recovery projects.
- Part IV Economic Analysis details potential costs and benefits to consider in determining which project will be most feasible. Such short-term benefits are listed as fuel savings, reduced size and capital cost of heating/cooling equipment, reduced labor cost, and others. Some of the factors potentially affecting the costs of waste heat recovery are also listed: Equipment, planning, maintenance, space, and insurance costs are among those discussed. A simple payback formula is provided to help in selecting equipment, and a case study is given to demonstrate payback calculation. Sources of additional information are listed.
- Part V Equipment Options lists five equipment categories (i.e., air/air recovery, air/liquid recovery, liquid/air recovery, liquid/liquid recovery, and direct reuse to waste streams) which correspond to the different types of source and application combinations to consider. Each category is discussed in detail, with reference to specific equipment within the category. Diagrams illustrate the different types of equipment, and names and addresses are given of manufacturers of equipment for each category.

Appendix A Glossary of Terms

Appendix B Fuel Direct Heat Values gives values for coals and related products; woods and related products; liquid fuels, oils and related products; and industrial waste heating values and densities.

Appendix C Conversion Factors lists conversion factors for pressure, volume, temperature, heat, measure, weight, volumetric rate, power, viscosity, and velocity.

Appendix D Waste Heat Audit Worksheet

Appendix E Energy Conservation Bibliography gives sources for the publications listed as well as consultant referrals.

Comments: This manual is an introduction to the technology of waste heat recovery and is a useful guide to making initial evaluations of potential waste heat recovery projects. It provides the basic information necessary to identify potential sources of waste heat, select equipment that is the most efficient for the particular application, and evaluate the economics of the investment. The manufacturers of heat recovery equipment listed are located in the Midwest.

Price: For information on price and availability, contact:

Minnesota Energy Information Center
980 American Center Building
150 East Kellogg Boulevard
St. Paul, Minnesota 55101

RESIDENTIAL;
HEALTH CARE INSTITUTIONS;
OTHER HOUSING

THE BUILDERS GUIDE TO ENERGY CONSERVATION

NATIONAL ASSOCIATION OF HOME BUILDERS

1974

A manual designed to assist builders in selecting the most effective energy conservation methods in the design and construction of energy-efficient homes. (63 pp.)

CONTENTS

- Chapter 1 General reviews the energy situation of the United States and its impact on the marketing of new homes. It presents an energy consumption profile of typical single family residences in the Washington/Baltimore area which demonstrates the potential for improved energy efficiency.
- Chapter 2 Design Considerations discusses the various design features which apply to single family residences and the related energy savings of each. Design features such as siting, orientation, and glazing, which do not add to the first cost of the house, are considered as well as insulation, shading devices, and heating and air conditioning systems.
- Chapter 3 Material Selection reviews the process of selecting construction materials which complement the energy conservation design features of doors, windows, walls, floors, and ceilings. It also covers selection of energy-efficient appliances and heating/cooling systems.
- Chapter 4 Construction Techniques presents techniques which will ensure the builder that the energy-saving design techniques that are incorporated will actually effect significant energy savings in home heating/cooling. These construction techniques cover insulation installation, infiltration reduction, and weatherstripping installation.
- Chapter 5 Long Range Considerations discusses the roles of alternative energy sources (i.e., solar, geothermal, nuclear) and better land use planning as long-term solutions to the fossil fuel shortage.
- Appendix A Methods for Energy Conservation for the Homeowner lists energy conservation practices for the homeowner to incorporate in the operation of the home.
- Appendix B Heat Loss and Heating Cost Calculations provides methodologies for calculating the heat loss and for estimating the annual heating costs for a dwelling in a moderate climate area. Sample filled-in worksheets are provided.
- Appendix C Heat Loss and Gain Calculations provides examples of heat loss and heat gain calculations in cold and warm climate areas.

Appendix D Selected References is a list of technical publications from professional societies and government agencies all dated before 1975.

Comments: The techniques for design and construction which are presented in the guide steer the builder towards the easily adaptable practices in building energy-efficient homes. Technical material and detailed drawings help the builder decide which methods are best for each home that is designed and built.

Price: \$3.50

Available National Association of Home Builders
From: 1625 L Street, N.W.
 Washington, D.C. 20036

EASI-GUIDE TO CONSERVING ENERGY AND MATERIALS

FOREST H. BELT, MARTI McPHERSON, PAT CONSTABLE
1974

A practical guide to conserving energy in personal "shortage" situations. (128 pp.)

CONTENTS

- Chapter 1 Ways to Have Enough Gasoline discusses ways to reduce gasoline consumption and considers the importance of a properly adjusted and maintained carburetor in reducing automobile energy consumption. Other topics covered are the ignition system, city and highway driving, and handling large vehicles and trailers. There is a special section on saving gasoline dollars in the use of recreational vehicles (i.e., boats, snowmobiles, minibikes) and work vehicles (i.e., lawnmowers).
- Chapter 2 Coping With Electric Power Brownouts suggests ways to use less electric energy to avoid the inconvenience of brownouts and to lower electric bills. Topics discussed include incandescent and fluorescent lighting, using appliances properly and saving power in meal preparation.
- Chapter 3 Getting Comfort Out of Heating/Cooling Fuels explains how to make the most of heating and cooling equipment. Topics addressed include adjusting heat distributors (i.e., vents or radiators) to provide even heating to desired areas, adding humidifiers to the forced air heating systems to increase comfort level and reduce heating levels, keeping air filters clean to obtain the greatest efficiency from any kind of heating/cooling system, and maintaining heating/cooling systems in good working order.
- Chapter 4 Some Old-Fashioned Ways to Conserve Heat suggests ways to keep the warm air inside and the cold air outside. It recommends closing off drafts in houses, insulating walls, and using decorations that help insulate. It also discusses the part furniture plays in keeping warm, the uses of reflective glass and solar films, and fireplace "do's" and "don't's."
- Chapter 5 Your Own Energy Can Save You Money explains how to establish resilience to temperature changes through a routine of daily exercise, what to wear to keep warm, and how to schedule days to conserve energy.
- Chapter 6 Combating Food Shortages and Prices suggests ways to cut food costs by using meat substitutes and more vegetables in menu planning.
- Chapter 7 Your Share of Scarce Materials identifies materials that are in short supply and considers how to reclaim and/or recycle materials that are reclaimable and/or recyclable.

Chapter 8 Taking Vacations Despite the Cutbacks proposes various ways to enjoy vacations while using less energy. The reader is reminded that rest and recreation enable one to cope with all the shortages.

Comments: The primary author, Forest H. Belt, has won awards for his Easy-ReadTM style of writing and editing. This style is used in Easi-Guide to Conserving Energy and Materials. The guidebook is a useful tool and is liberally illustrated with interesting and helpful photographs.

Price: \$3.50

Available

From: Howard W. Sams & Company
4300 West Sixty-second Street
Indianapolis, Indiana 46268

THE ENERGY-SAVING GUIDEBOOK

GEORGE S. SPRINGER AND GENE E. SMITH
1974

Intended for home owners and mobile home owners who need to know how they can save energy at home, on the road, at work, and at play. It includes useful suggestions applicable in different regions (north, south, urban, rural).
(102 pp.)

CONTENTS

- Chapter 1 A Few Facts About Energy provides information on sources, uses, and ways to measure energy.
- Chapter 2 Heating Your Home describes many ways to reduce heat loss in a home and improve operating efficiency in heating systems.
- Chapter 3 Cooling the House in the Summer contains a thorough discussion of air conditioners, dehumidifiers, and fans.
- Chapter 4 How to Save on the Electric and Gas Bills encourages the efficient use of appliances and provides factual discussion on cloths washers, dryers, and dish washing machines. Lighting, cooking, and other common areas of energy waste are explored.
- Chapter 5 Tips for the Mobile Home Owner demonstrates that mobile home owners have similar opportunities to reduce operating costs. Ideas are outlined with regard to insulation and sun protection to avoid excess heat absorption in hot weather.
- Chapter 6 A Note to Apartment Dwellers shows how some of the same ideas for home owners can be used by apartment dwellers.
- Chapter 7 Saving Energy at Work provides a brief discussion and checklist of ways to cut back on energy use.
- Chapter 8 How to Go More for Less: Saving Gasoline describes the efficient operation of different modes of transportation. A look into buying cars, pollution control devices, tires, gasoline, and maintenance helps steer a person away from wasting money and fuel. Other tips are given on starting cold or stalled engines, idling, air conditioning and heating on short trips, weather/road conditions, pulling trailers, carrying luggage racks, car pooling, using public transportation, and motorcycling.
- Chapter 9 Boats, Snowmobiles, and Small Airplanes is designed to make owners aware of how much fuel they consume, and it encourages their efficient use.

Appendix I Abbreviations.

Appendix II How to Convert Various Energy Units.

Appendix III Approximate Heating Values of Various Fuels.

Comments: An interesting collection of ideas and procedures which can save the consumer energy in his home and vehicles. The Energy-Saving Guidebook assumes the reader has some familiarity with energy concepts.

Price: \$8.50

Available From: Technomic Publishing Company, Inc.
265 West State Street
Westport, Connecticut 06880

SAVE ENERGY: SAVE MONEY!

COMMUNITY SERVICES ADMINISTRATION
1974

A guide to winterization for low-income homeowners. (40 pp.)

CONTENTS

- Section I Keeping Warm explains how to seal holes in foundations and floors against heat loss and how to install storm windows inexpensively. In addition, it offers common-sense tips on keeping warm in a cooler home.
- Section II Getting Heat Where You Need It suggests several do-it-yourself methods of heating living areas efficiently by distributing heat to areas where it is most needed.
- Section III Using the Sun tells how to make the best use of the winter sun in keeping a home warm.
- Section IV Furnaces, Stoves and Fireplaces stresses the necessity of keeping these heat-projectors clean and tells how to do it.
- Section V Insulation and Other Energy Needs specifies other important areas in the home where energy savings may be substantial, e.g., appliances, insulation.
- Section VI Do-It-Yourself Projects includes instructions on installing a fireplace air vent, a porch and a solar-design window heater.
- Section VII Emergencies is a brief checklist of what to do if the heat supply is cut off.

Comments: This guide, being geared towards lower-income families, suggests ways to lower the energy bill by employing do-it-yourself methods and devices. There is a list of references in the back of the guide that tells where to get more information.

Price: Free.

Available From: Community Services Administration
1200 19th Street, N.W.
Washington, D.C. 20506

WEATHERIZATION MATERIALS HANDBOOK

COMMUNITY SERVICES ADMINISTRATION
1979

A handbook to aid Community Action agencies and other nonprofit organizations. The handbook provides information on how to purchase materials, what materials are needed for different weatherization purposes, and lists of current (1979) factory prices for some items. (127 pp.)

CONTENTS

- Part I Insulation includes sections on properties, such as thermal resistivity and moisture resistance; a product description of the types of insulation materials; a buyer's guide to insulation products which provides charts for the following: standard prices for different materials, chemical additives in cellulose insulation and the possible effects, and recommended materials for different structural building parts; a description of the various blowing machines; and a check-list for buying and operating the machines.
- Part II Storm Windows and Storm Doors describes the proper construction, hardware and finish of these energy-saving home additions, enabling the buyer to select the type of window or door which best suits his purpose. Different types of window glazings are also described.
- Part III Caulking includes a complete description of different types of compounds, which are divided into three categories: basic, intermediate, and high performance. Also included are Federal specification numbers for each type of caulk or sealant, and a buyer's guide to caulking, which is a one-page list of tips on how much and where to buy.
- Part IV Weather Stripping identifies the various types of materials, and lists the advantages and disadvantages of each. A buyer's guide is included, which provides a price index for different weather stripping materials.
- Appendix I Manufacturers of Insulation, Storm Windows and Storm Doors contains a state-by-state listing of manufacturers, including address, telephone number and type of material used in manufacturing.
- Appendix II Distributors and Manufacturers of Insulation Blowing Machines lists company name and address, model number, blower and hopper capacity, blower rating and shipping weight.

Appendix III Manufacturers of Caulking Compounds includes company name and address, telephone number, type of caulking and minimum size order (quantity).

Appendix IV Manufacturers of Weather Stripping lists company name, address, telephone number, type of product and minimum size order (quantity).

Comments: This handbook has been designed to enable the consumer to get the highest quality weatherization materials at the best price. Price discounts available through bulk purchasing and questions regarding storage are discussed. The book is not an installation manual, but a buyer's guide to purchasing these materials.

Price: For information on price and availability, contact:

Community Services Administration
1200 Nineteenth Street, N.W.
Washington, D. C. 20506

A DO-IT-YOURSELF INSULATION HANDBOOK

MICHIGAN CONSOLIDATED GAS COMPANY

1975

A homeowner's guide to insulating, including short discussions on the insulation process. (31 pp.)

CONTENTS

- Chapter 1 Insulation--The Quick and Easy Home Improvement serves as an introduction to the whole idea of home insulation and energy savings.
- Chapter 2 Cost Comparisons compares the annual savings of two insulated houses. It also illustrates other benefits from insulating.
- Chapter 3 Now That You're Ready to Insulate, Let's Start From the Top describes the importance of adequate attic insulation.
- Chapter 4 Insulation Comes In Various Forms describes blanket insulation, insulating batts, loose-fill insulation, and "R" values.
- Chapter 5 The Higher the "R" Value, the Better the Insulation discusses how ceilings should be insulated to be most cost-effective.
- Chapter 6 Next, Get To Know Your Attic outlines the steps in making the attic a safe place to work.
- Chapter 7 How Much Insulation Do You Need? shows how to measure the attic correctly and calculate the number of square feet of insulation needs.
- Chapter 8 When You're Buying Insulation, Buy a Vapor Barrier Too describes what a vapor barrier is and how to purchase and install one.
- Chapter 9 How To Install Blanket Insulation tells how to install or add insulation and gives other helpful tips.
- Chapter 10 How To Install Loose-Fill Insulation reminds the user about the vapor barrier and provides the inexperienced homeowner with clear instructions and helpful hints.
- Chapter 11 How To Install Insulating Batts shows how to do this, making sure that the vapor barrier side is down and that pieces fit snugly.
- Chapter 12 Don't Forget Those Air Vents reminds the homeowner of the importance of air vents and warns against blockage.
- Chapter 13 The Insulating Value of Storm Windows and How To Buy Them by the Roll discusses the six-mil polyethylene plastic which comes by the roll. It also describes other materials needed to complete the job.

- Chapter 14 Caulk the Frames on All Windows and Doors offers tips on caulking the home.
- Chapter 15 Install Weather Stripping at Movable Joints illustrates three types of weather strips and sketches their placement on window frames.
- Chapter 16 Weather Stripping Helps Keep Cold Air In Its Place shows how to install various kinds of metal stripping.
- Chapter 17 Additional Do-It-Yourself Conservation Tips outlines furnace maintenance and home heating tips.

Comments: This easy-to-understand booklet includes photographs of people insulating or weatherstripping their houses. It does not address apartments or commercial buildings. This handbook can also be used by salesmen when advising customers of their insulation needs.

Price: Free.

Available Michigan Consolidated Gas Company
From: One Woodward Avenue
 Detroit, Michigan 48226

IN THE BANK...OR UP THE CHIMNEY?
A DOLLARS AND CENTS GUIDE TO ENERGY-SAVING
HOME IMPROVEMENTS - 2nd Edition (GPO #023-000-00411-9)

TECHNOLOGY & ECONOMICS, INC.,
FOR THE
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
1977

The results of HUD-sponsored research on ways to save energy and money while heating and cooling a house.

CONTENTS

- Part 1 A Quick Look at Your Home suggests energy-saving techniques and projects resulting in dollar savings based on given specifications for a house at the middle of the range given. Shaded maps indicate areas of the U.S. that would be affected by the savings packages suggested.
- Part 2 A Closer Look at Your Home recommends more specific actions to achieve savings and gives cost and savings factors for each. It discusses caulking and weather stripping; storm windows; insulation of finished and unfinished attics; insulation of walls, crawl-space walls, basement walls, and floors; thermostats, furnaces and air conditioners; and heating and cooling factors (a table is provided to help determine these factors for the individual home).
- Part 3 How to Do It is divided into 13 sections, each dealing with an energy-saving step from the standpoints of how hard it is, how to get it done, and other information that may be needed. Included are tips for windows and doors; insulation; saving energy with heating, air conditioning, and water heating; choosing a contractor; and getting financing.
- Part 4 More...on How to Save Heating & Cooling Energy gives general and specific advice regarding doors and windows, attics and roofs, basements, shading your home, hot water, heating, air conditioning, buying a room air conditioner, the heat pump, fireplaces, lights, energy from the sun, energy from the wind, and new ways to get back waste heat.

The inside back cover has an energy checklist which provides a way to determine savings from implementation of these suggestions.

Comments: This is a highly practical guide for the homeowner to specific energy-saving methods and how to implement them, with precise information on cost savings.

Price: \$1.70

Available From: U.S. Government Printing Office
Washington, D.C. 20402

PROJECT RETROTECH:
TEACHER'S KIT FOR COURSE ON HOME WINTERIZATION

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
MAINE UNIVERSITY
1975

A guide to teachers for developing lesson plans for a home winterization course to promote the utilization of known retrofit technology, to improve thermal characteristics and conserve energy in residential housing. Intended audiences are senior high school through non-specialist adult. (165 pp.)

CONTENTS

Section 1 General Lesson Plan delineates course objectives, instructional objectives, equipment required, student materials, lesson topics, instructional strategies and format of lesson plans.

Section 2 Lesson Plan 1 - Overview of Course points out the objectives of the course, which include developing skills in estimation and installation, and points out the course content, including an introduction to heat loss, building heat loss by conduction, building heat loss by infiltration, four steps to home winterization, and laboratory and field exercises.

Lesson Plan 2 - Introduction to Heat Loss teaches a number of basic concepts including Btu, the calculation of total fuel use, the district heating factor and the causes of heat loss. An overview of the four-step process of home winterization is then given.

Lesson Plan 3 - Building Heat Loss by Conduction elaborates on the concept of conduction and teaches the various types of insulation as well as the concept of R value and vapor barrier.

Lesson Plan 4 - Building Heat Loss by Infiltration explains the chimney effect and shows points at which cold air typically may enter a building.

Lesson Plan 5 - Home Winterization is reviewed as a four-step process and then detailed in terms of inspection of the building, calculation of heat loss, evaluation of the data and installation of the materials (a student job book is included that allows for entry of all items of data and provides all necessary formulas for performing calculations). Extensive guidance is given to the teacher on methods for setting up classroom demonstration of the concepts involved.

Lesson Plan 6 - Job Book Examples by Students is an actual field exercise in which students complete an evaluation of a building and prepare a job write-up specifying materials for improving the thermal efficiency of the building, including a calculation of costs and payback period. The student's results are then scored against the previously calculated figures for the building.

Comments: Project RETROTECH is a complete course in home winterization. It includes all necessary charts for use as transparencies, and specifies the necessary materials that should be brought to the classroom for demonstration purposes. The kit contains the Teacher's Guide to Home Winterization, the Home Winterization Job Book, the Home Winterization Manual and Home Winterization charts.

Cost: \$6.75 (Document No. PB-250 148)

Available From: National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

SAVING HOME ENERGY

RICHARD V. NUNN
Rev. 1978

A guide to the purchase and installation of winterizing materials that are available to the homeowner. (96 pp.)

CONTENTS

- Section I Introduction explains the purpose and objectives of the publication by presenting examples of the types of problems it attempts to solve, and shows the consumer how to read his gas or electric meter to determine how much energy is being used.
- Section II Bundle Your Home in a Blanket of Insulation describes the types of insulation and the significance of the R and U values of the different types of materials. Several pages of illustrations and photographs detailing insulating procedures are included, along with instructions.
- Section III Caulking and Weather Stripping describes the types of caulking and weather stripping materials that are available. Several pages of photographs accompany the installation procedures for caulking and weather stripping, along with instructions.
- Section IV Energy Efficient Heating and Cooling Systems details methods for energy saving maintenance and repair of heating and cooling systems, discusses the advantages of a heat pump and introduces solar heating technology.
- Section V Saving Water Heater Energy provides instructions for insulating hot water pipes, repairing leaky pipes and faucets and replacing leaky pipes.
- Section VI Stop Feeding the Energy Hogs offers numerous energy-saving tips for appliance operation and general home maintenance.
- Section VII Energy Savings Checklist for Every Home includes checklists which provide practical tips for saving energy. They cover the house structure, appliances, pipes and ducts, lighting and water and mechanical equipment.
- Comments: This guide to saving home energy is highly effective in its use of photographs and illustrations. They are large enough (up to 8-1/2" x 11") to provide necessary detail, and illustrate the step-by-step procedures the user is to follow. Special problems that the user may encounter are also illustrated photographically.

Price: For information on price and availability, contact:

Oxmoor House
Book Division of the Progressive Farmer Company
Post Office Box C-59
Birmingham, Alabama 35283

YOU FIX IT: INSULATION

JOSEPH LOSCHIARO AND FRANK LOCICERO
1975

A guide designed for homeowners and prospective home buyers offering quick and simple methods for locating and remedying heating and cooling losses. (90 pp.)

CONTENTS

- Section 1 Isolating Heat Loss Locations in the House illustrates the many points of heat loss at doors, windows, attics, air conditioner openings, trapdoors, exterior accessories (wires, vents), basements, foundation cracks, exterior house walls, wall seams and shingles, floors, and heating systems. Close-up photographs display particular conditions contributing to heat loss.
- Section 2 Cost of Fuel Heating Loss provides some typical examples of fuel and dollar losses for specific areas of a house. Heat loss graphs are given for doors and windows of different sizes and styles (i.e. double hinge, wood sash, metal sash, steel casement, and convenience openings) for both oil and gas usage.
- Section 3 Heat Loss Costs and Costs of Repair details the cost of each heat loss area in a house, the cost to repair it, and a cost-benefit assessment of each repair.
- Section 4 Summer and Winter Suggested Maintenance Procedures uses close-up pictures to point out areas that need attention and areas that have been well maintained. Caulking, weatherstripping and other procedures are outlined.
- Comments: This book stresses how to find heat loss areas rather than how to fix them. It assumes the reader will know how to use a caulking gun, how to install storm windows and insulation, and how to repair or seal exterior wall cracks. The reader has the advantage of close-up photographs of trouble spots with added arrows to further pinpoint the problems. Approximately 100 photographs are used. Typical repair prices are quoted. An index is provided.
- Price: \$2.95
- Available Arco Publishing, Inc.
From: 219 Park Avenue South
 New York, New York 10003

BUYING SOLAR

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

A book of guidelines for the purchase of solar equipment to help the consumer reduce risks and avoid fraud and deception in this new market. It explains many essential engineering terms used to describe or evaluate solar products. (71 pp.)

CONTENTS

- Section 1 Sun Language lists and defines solar terminology. Examples are bioconversion, Btu, collector tilt, Langley, galvanic corrosion, insolation, photovoltaic, pyrometer, solar lights, and thermosyphon.
- Section 2 Sun Terms discusses heat flow terminology.
- Section 3 Solar Subsystems diagrams the collector and its components. The three main elements—transparent cover, absorber, and collector plate channels—are thoroughly explained. Diagrams are provided showing the honeycomb collector and the position of a flatplate collector in relation to the sun (summer, spring, and winter). Recommendations are made for the collector mounting position. A discussion of collector efficiency is given to help consumers evaluate competing collectors.
- Section 4 The Storage Subsystems discusses three types of heat storage, and the advantages and limitations of water, rock (air) and Glauber's salts as storage media.
- Section 5 The Solar System describes the four main end uses of a residential solar energy system and the two basic types of systems, active and passive. The costs, advantages and disadvantages of swimming pool solar heating systems and air and liquid systems are outlined. There is also a discussion of how heat pumps can be used to reduce auxiliary electricity costs.
- Section 6 Solar Energy and Your Home outlines and discusses basic questions a consumer must ask to determine whether a particular type of unit will be useful in his/her home.
- Section 7 Solar As An Investment discusses cases where solar would and would not be a good investment. Having a solar appraisal done by an engineer is recommended as a good way to avoid wasting thousands of dollars on an unneeded system. Prospective solar users are advised of what they will need to know about their homes to calculate the heating and cooling needs. For the person who wants to do a thorough job, information is given to calculate anticipated Btu return.

The Annual Fuel Savings procedure to determine precise fuel savings for specific collector areas is given as well as sample problems. A table of normal total heating degree days (base 65°) by states and selected cities for 12 months is also provided.

- Section 8 Protecting Your Pocketbook outlines three main obstacles the consumer faces in investing in a cost-effective solar system.
- Section 9 Answers to Questions You Always Wanted to Ask answers questions on equipment appreciation (value), collector storage, use of humidifiers, and use of a reliable contractor.
- Appendix Contains maps, tables, charts, surveys, and calculations on mean daily solar radiation (monthly and annually). Solar user's return on investment is described. A cost/benefit analysis is included of various systems prepared by the Solar Energy Industries Association.
- Comments: This guidebook is useful for people who need information on solar heating systems and for those who are seriously considering solar investments. It does not promote solar energy as the only answer but discusses its advantages and disadvantages realistically.
- Price: \$1.85 (Stock No. 041-018-00120-4)
- Available Superintendent of Documents
From: U.S. Government Printing Office
 Washington, D. C. 20402

HOME ENERGY SAVERS' WORKBOOK

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1976

A workbook designed to help homeowners determine what measures will make their homes more energy efficient and what they can expect to save in heating and cooling costs by implementing these measures. (30 pp.)

CONTENTS

Test Your Energy Quotient provides five ways to cut energy use and asks questions about home heating and cooling practices.

A Few Basic Numbers describes heating and cooling factors for different zones of the country, fuel factors for various fuels, and takes the homeowner through the steps to determine the home's fuel index. House dimensions and annual fuel costs for the home are determined, and used to calculate savings.

Calculations for Annual Savings derives thermostat settings where 15% savings can be realized. Savings in both heating and cooling seasons can be determined by using the worksheet provided. Yearly savings from caulking and weatherstripping, from storm windows and for ceiling, wall, and floor insulation can also be obtained using the zone maps and tables provided.

Materials and Installation Techniques details the types of caulking compounds, filler, and weatherstripping available and comments on their effectiveness. It gives advice on where to apply insulation and weatherstripping. It also explains the types of insulation and storm windows, and assesses their adequacy.

Where to Get Help discusses contractor selection and financing home improvements.

Tips for Saving Energy offers a checklist of other recommendations for efficient energy usage.

Appendix A How to Calculate Your First Floor Area and Heated Living Area illustrates the easiest way to determine the number of square feet of heated living space.

Comments: The format of this workbook includes maps and places to go for instruction and advice. A Savings Calculation Worksheet is provided, and many tips are given to steer the homeowner away from wrong assumptions. This workbook is useful for determining energy savings in hot and cold climates. The worksheet does not tell the homeowner how to install insulation, but where to install. It assumes that the homeowner is familiar with home construction.

Price: \$.35 (\$1.00 minimum for each mail order).
(Stock No. 041-018)

Available From: Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

HOMEOWNER'S GUIDE TO SAVING ENERGY

BILLY L. PRICE & JAMES T. PRICE

1976

A guide to saving energy on home heating, cooling, appliance and electricity costs. (288 pp.)

CONTENTS

- Chapter 1 Fundamentals of Heating and Cooling explains the basic principles involved in home heating and cooling systems. It discusses the major factors influencing efficiency and workloads.
- Chapter 2 It Pays to Know Your Insulation discusses the heat transfer characteristics of various materials including those commonly used for insulation. It also explains the three factors used to rate these properties: the K factor, the U factor, and the R factor. Different kinds of insulating materials are surveyed.
- Chapter 3 Insulating Your Home presents criteria for making decisions on where to insulate (e.g., floor vs. crawl space). The chapter also deals with stopping moisture problems that can decrease the efficiency of insulating materials and explains in depth how to install insulation.
- Chapter 4 Insulating Your Garage presents techniques for installing insulation in heated or unheated garages.
- Chapter 5 Weatherstripping Doors and Windows explains how to use weatherstripping to reduce heat loss and infiltration. Diagrams and photographs illustrate how to install weatherstripping, storm doors and windows, and caulking materials.
- Chapter 6 Heating Systems and Routine Maintenance presents guidelines to increasing efficiency in furnaces, electric resistance heaters, and heat pumps.
- Chapter 7 Turning Up Your Heating System offers practical advice on cleaning electric, gas, and oil furnace parts and adjusting controls for efficient furnace operation.
- Chapter 8 Furnace Humidifiers discusses the use of humidifiers to increase the relative humidity in the home, thereby increasing comfort levels. Different types of humidifiers are described.
- Chapter 9 Air Conditioners and Common Sense deals with the efficient use of room air conditioners. It discusses choosing a good location for the air conditioner and selecting the optimal size.

- Chapter 10 Maintaining Your Air Conditioners describes maintenance and cleaning procedures for room air conditioners, central air conditioning units, and heat pumps.
- Chapter 11 Refrigerators and Freezers discusses regular maintenance, service, and inspection activities that will keep refrigerators and freezers in better operating condition.
- Chapter 12 Water Heaters shows how to clean and repair gas and electric water heaters to save energy. Energy-saving tips for operating water heaters are also provided.
- Chapter 13 Washers, Driers, and Dishwashers explains the procedures for checking these appliances for proper operation, for cleaning water lines and filters, and for making energy-saving repairs.
- Chapter 14 Home Wiring and Lighting provides safe procedures for rewiring home electrical systems and for installing new electrical outlets, light switches, and resistance heaters. It also provides information on efficient lighting and lighting requirements.

Glossary defines close to 200 terms used in the guide.

Comments: This guide is exhaustive in its coverage of operating and maintenance tips for saving energy in existing homes. Each procedure is described in detail and is accompanied by diagrams and photographs which can be valuable to its implementation.

Price: \$5.95

Available Tab Books
From: Blue Ridge Summit
 Pennsylvania 17214

HOME OWNER'S GUIDE TO SOLAR HEATING AND COOLING

WILLIAM M. FOSTER
1976

A guide for homeowners on how to purchase, install, and maintain solar heating, cooling, and hot water systems. (196 pp.)

CONTENTS

- Chapter 1 Is Solar Heating Economical? provides information on solar water heaters, fuel cost comparisons, local weather considerations, characteristics of the home, and government incentives. Calculations and equations are fully explained.
- Chapter 2 How Does It Work? describes how the heat of the sun can be absorbed, collected, stored, and used. It diagrams the construction of air and water systems. Eleven demonstration projects sponsored by the Department of Energy are analyzed.
- Chapter 3 System Components illustrates collector panels, absorbers, selective absorber coatings, coverpanes, collector heat loss, focusing collectors, collector requirements, heat transfer media, heat storage materials, storage tanks, heat exchangers, collector filters, getters, expansion tanks, differential thermostats, variable flow controls, pumps, valves, and solar collector loops. Provides the basic options available and advises that knowledge of how these individual components operate is essential to intelligent system selection.
- Chapter 4 Typical System Arrangements discusses air systems for room heating, the function of liquid systems, heat pumps, absorption cooling, load profiles, and solar water heaters.
- Chapter 5 What Size System? explains how to calculate the required collector area and storage tank space. The application of economic analysis to predict fuel savings is also discussed.
- Chapter 6 Solar Water Heaters describes the types of systems (thermosiphon, pumped, heat exchange, preheater with supplemental storage), load calculations, collector area calculations, economic analysis and storage tank sizing.
- Chapter 7 Heating a Swimming Pool with Solar Energy presents the issues of solar pool heaters. It includes a discussion of pool covers, solar panels, typical system arrangements, panel size and orientation, and economics.

- Chapter 8 Precautions and Advice for Consumers warns against hasty decisions in this new market and advises the reader about performance warranties. The consumer should make sure that the system is consistent with regulations and standards of the International Congress of Building Organizations (ICBO). A list of areas that should be checked during installation is provided as well as a discussion of legal considerations.
- Appendix A Glossary provides a list of commonly used solar terms to put the consumer on an "equal footing" with salesmen.
- Appendix B Solar Manufacturers is only a partial listing. However, an address from which a complete catalog of manufacturers may be ordered is included.
- Appendix C Bibliography.
- Comments: This is a somewhat technical, yet understandable guide for consumers. It assumes the reader knows only a very little about investing in a solar heating system. A summary is included at the end of each Chapter. Maps, charts, tables, and diagrams require study, and are essential to completing calculations. An index is provided.
- Price: \$4.95
- Available TAB Books
From: Blue Ridge Summit
 Pennsylvania 17214

HOW TO CUT YOUR ENERGY BILLS

RON DERVEN AND CAROL NICHOLS

1976

A photographically illustrated guide for persons interested in buying, remodeling, or building an energy-efficient home. (131 pp.)

CONTENTS

- Section 1 Weather Barriers describes the types of insulation available and the specific purpose each type serves. Readers learn of the major dollar savings possible through insulation. They are instructed how to find out whether their homes need additional insulation and, if so, how to insulate and where.
- Section 2 Windows and Doors explains how to prevent heat loss through windows and doors: what to look for, how to use weatherstripping and caulking, how to buy or make storm windows.
- Section 3 Heating and Cooling examines various systems, suggesting how to save money on the operation of each. This section considers how to make existing systems work more efficiently and comfortably. A discussion of the design principles of heat pumps is included.
- Section 4 Ventilation explains how proper attic ventilation can save the homeowner money. Readers learn how to determine whether their attics are properly ventilated and, if not, how to choose and install ventilators.
- Section 5 Lighting considers the types of light which can save money on electric bills. This section describes dimmer switches and how to install them, and suggests room arrangements and alternative lighting schemes which can save energy.
- Section 6 Appliances discusses how to buy, use, and maintain typical home appliances for greatest economy. This section also describes kitchen planning for maximum efficiency and minimum dollar output, meter reading, offpeak electrical use, and checking home wiring.
- Section 7 Hot Water examines how to improve residential water heating systems to save energy, and includes maintenance tips.
- Section 8 Complementary Heating Sources asks whether the homeowner is losing heat every time he or she lights a fire. Among the topics covered are fireplace covers and how to make one, wood-burning stoves, and other inexpensive energy sources.

- Section 9 Creating New Living Space addresses the tradeoffs involved in finishing off an attic or basement vs. building an additional room. This section suggests ways to create new living space for maximum energy-saving dollars, and includes quality control procedures.
- Section 10 Special Energy-Saving Homes describes some of the energy-efficient homes which have already been built. These homes are presented so that the reader can benefit from the energy saving ideas others have used.
- Section 11 Seasonal House Check provides a convenient fall and spring checklist the homeowner can use to maintain peak efficiency while saving energy dollars.
- Section 12 Appendices offers a checklist of energy-related points to consider in buying an older home. Also included are a glossary of terms and a list of manufacturers of air conditioners, dishwashers, fireplaces, heating systems, humidifiers, dehumidifiers, laundry equipment, lighting equipment, ranges/ovens, refrigerators/freezers, solar collectors, ventilators, water heaters, wind power equipment, and windows.

Comments: The homeowner should find How To Cut Your Energy Bills a very readable publication. The quality of writing, the number and clarity of figures, and the quality of the printing contribute to its effectiveness. Not geared to lower-income readers. An index is provided.

Price: \$4.95

Available Structures Publishing Company
From: 24289 Indoplex Circle, Box 423
Farmington, Michigan 48024

HOW TO USE ELECTRICITY AND GAS WISELY AND SAFELY
& SAVE MONEY, TOO

CONSOLIDATED EDISON
1976

A booklet which offers the homeowner tips on conserving energy and saving money on gas and electric bills. (30 pp.)

CONTENTS

- Section 1 Why Conserve Energy? discusses reasons for conserving energy and shows the consumer how to calculate the amount of energy he/she is actually saving. It also briefly discusses the use of electric appliances during off-peak hours.
- Section 2 Wise Use of Electric and Gas Appliances suggests how to increase the efficiency of electric and gas appliances (i.e., range, refrigerator, air conditioner, washer-dryer, water heater, dishwasher, space heater, furnaces, and lights).
- Section 3 Safe Use of Electricity and Gas discusses several rules of safety in the use of electricity and gas.
- Section 4 Avoiding Needless Service Calls provides simple guidelines and checklists to follow before calling for service on major appliances.
- Section 5 Energy Requirements of Household Appliances reviews the estimated annual electricity use (in kwh) of major appliances.

Comments: This booklet is a concise guide to improving energy efficiency in the home. Con Edison also offers the publication in Spanish, entitled *Cómo Usar la Electricidad y el Gas en Forma Inteligente y Segura y Ahorrar Dinero Además*.

Price: Free.

Available Consumer Affairs, Room 1625-S
From: Con Edison
 4 Irving Place
 New York, New York 10003

KEEPING THE HEAT IN:
HOW TO RE-INSULATE YOUR HOME TO
SAVE ENERGY AND MONEY (AND BE MORE COMFORTABLE, TOO)

DEPARTMENT OF ENERGY, MINES, AND RESOURCES (CANADA)
1976

A manual explaining a step-by-step procedure for retrofitting or re-insulating different types of houses in cold climates. This manual is written for owners of single-family residences. (180 pp.)

CONTENTS

Chapter 1	<u>The Basics - How Your Home is Built</u> provides basic information on house construction using labeled illustrations of doors, walls, ceilings, roofs, attics, and foundations.
Chapter 2	<u>The Basics - House Insulation and Moisture Control</u> describes heat loss, R-value, and moisture control. It provides essential background information explaining thermodynamics, retrofitting and ventilation.
Chapter 3	<u>What Should be Done First</u> pinpoints the first steps by helping the owner to determine the present condition of the house, recommended insulation levels, and location of the greatest heat loss. Worksheets and charts are provided to determine what should be insulated first.
Chapter 4	<u>How to Re-Insulate Your Home</u> may be read selectively according to what part of the home is being re-insulated: attics, walls and other spaces. Types of insulation, tools required and other useful tips are included.
Chapter 5	<u>How to Upgrade Your Windows and Doors</u> provides homeowners with reasons why windows and doors are big energy wasters and how the installation of plastic storm windows, removable storm windows, permanent storm windows, double and triple glazing, and storm doors can be noticeably more effective in retaining heat.
Chapter 6	<u>How to Weatherstrip and Caulk</u> explains how to upgrade windows, doors, fireplaces, e.g.: • how to determine if a draft exists • where to seal • where not to seal • how to apply weatherstripping or caulk • what type of seal to use in different places • how many places should be sealed • effectiveness, relative cost of five types of seals • where to apply five types of seals.

Kinds of seals discussed include closed-cell vinyl foam, vinyl-covered polyurethane foam, combination kits, hairfelt, and spring metal.

- Chapter 7 A Few Miscellaneous Ways to Keep the Heat In reviews thermostats, drapes, furnace maintenance techniques, exhaust fans or fireplace plugs, milk and mail chutes, garages, heat ducts, and basement doors.
- Chapter 8 How to Select a Reliable Contractor advises using a careful selection procedure, which is discussed.
- Chapter 9 Dollars and Sense shows how much fuel may be saved after upgrading a house with insulation. Alternatives are discussed if the homeowner cannot afford the most energy-efficient methods of insulating.
- Appendix Why Conserve Energy includes feedback forms for reader comments and order forms for additional publications.
- Comments: This manual contains an index and is written with Canadians in mind. Homeowners trying to save on their fuel bills will find useful information here. There is no need to read the entire book if the reader desires to insulate only certain areas in the home. Essential information is contained in Chapters 2 and 3, and it is the author's recommendation that these be read by everyone.
- Price: Free.
- Available From: Minister of Energy Mines and Resources
Office of Energy Conservation
Department of Energy, Mines and Resources
580 Booth Street
Ottawa, Ontario
Canada

LOW-COST, ENERGY-EFFICIENT SHELTER FOR THE OWNER AND BUILDER

EUGENE ECCLI (ED.)

1976

A book presenting information and design principles needed to build sensibly and economically. Ideas can be gleaned for small- and large-scale projects whether designing, building, or renovating a house. (408 pp.)

CONTENTS

- Section I Finding a Housing Solution considers the kinds of housing available for different family needs, and explains how to undertake the financial and other administrative work that accompanies home building. Creative ideas and options presented include a cooperative venture with others. It also explains how a person can avoid unsuitable or very expensive housing.
- Chapter 1 The Owner-Builder in Retrospect describes two 17th century shelter solutions in North America using natural climate controls and natural materials found at the site.
- Chapter 2 Housing Options Today illustrates four basic approaches to housing solutions: a) the pre-built house, b) the owner-involved but contractor-built home, c) the owner-designed and owner-built home, and d) the renovated house.
- Chapter 3 Financing Your Shelter Needs discusses bank loans, other loan options, credit unions, and the not-for-profit Housing Development Corporation. Another suggested method for reducing housing costs is to cooperate with others who have the same need. Organizations devoted to this goal are listed.
- Chapter 4 Some Problems to Overcome: Codes, Appeals, Public Acceptance, and Contractor Resistance tells the reader what to look out for and how to solve problems if they arise in each of these categories.
- Section II Lowering the First Costs of a Home provides solutions to land and construction costs. Designing and building homes efficiently can reduce these costs enormously. The designer has a choice of space for a given activity and a chance to choose the best of reasonably priced materials. The object is to offer techniques that will achieve a comfortable, flexible home with an option to add on more space if the need arises.
- Chapter 5 Site Planning and Use of On-Site Resources concentrates on choosing land that is less costly to build on. Factors to consider include topography, land, physiognomy, layout, required utilities, other site functions, and free materials on the site.

- Chapter 6 Smaller Houses That Utilize Space and Materials More Efficiently analyzes each area (kitchen, bathroom, etc.) to establish the actual requirements and offers planning suggestions for the most economical use of materials.
- Chapter 7 Renovation and Recycling of Older Buildings and Materials presents these approaches to acquiring housing at a reasonable cost. Attention is given to finding abandoned dwellings and recycling materials. A checklist for buying property is included.
- Chapter 8 Interior and Exterior Skins reviews materials that are suitable for the interior and exterior of a house: roofs, sidings, walls, and ceilings.
- Section III Lowering Your Operating Expenses identifies major areas of concern in achieving the lowest possible operating and maintenance expenses.
- Chapter 9 Better Window Planning: Balancing Energy Aesthetic Needs describes plans that avoid unnecessary windows that waste heat. Some window styles discussed include: clerestory, grouped, skylight, awning, jalousie, hopper, and casement designs.
- Chapter 10 Air Motion and Ventilation quantifies the required amounts of ventilation, analyzes how air enters a typical house and discusses ways of reducing air infiltration. Plans are presented with the New England area as an example.
- Chapter 11 The Specifics of Constructing Better Windows and Vents discusses problems of infiltration around and conduction through doors and windows. Solutions include instructions and evaluations for types of weatherstripping, caulking, sealing, adding or closing off windows, vents and storm windows. Further guidance is given on shutters, curtains, heat transfer, and closing off doors.
- Chapter 12 Insulating Your Home For Winter and Summer Comfort illustrates how and why a home should be insulated. Insulation types, terms, and options are explained and instructions are given for installation. Advice is offered on the best types of insulation and the special problems of older houses.
- Chapter 13 Ways to Save When Using Heating and Cooling Equipment describes the average cost of heating and cooling a home, and the process of selecting more efficient equipment. Guides in selecting a new heating or cooling system and includes names and addresses of outlets for equipment. Tips are given on how to operate equipment more efficiently.
- Chapter 14 Saving Money with Appliances and Lights provides information similar to that in the preceding chapter relating to major and minor appliances.

- Chapter 15 Water Heating and Water Conservation discusses water consumption and cost, breaking it down by use (toilet, kitchen, bathing, laundry, etc.). Addresses and sources for equipment are given as well as ideas for water conservation in toilets and showers.
- Section IV Working with Nature illustrates how to design houses for comfort by making use of the heat of the winter sun. Ideas are also provided for creating a dynamic, healthy, and sensitive relationship with the natural environment around a home. Suggestions include indoor greenhouses.
- Chapter 16 Designing the Solar-Tempered House focuses on passive solar heating as a natural way to increase the heat of a home. Advice on the size of south-facing glass areas and shading devices for non-south-facing windows is given along with diagrams and designs for construction.
- Chapter 17 Solar Water Heaters describes the specifics of widely accepted solar water heaters. Included are the batch system and continuous flow systems. Guidance is given on the size of tank needed for different systems. A "Where to Get Equipment" list supplies names and addresses for build-it-yourself units and suppliers of solar hot water heater kits.
- Section V Putting It All Together illustrates plans for fourteen low-cost, energy-efficient, comfortable homes.
- Chapter 19 Integrations starts with complex designs progressing to the simple design requiring less effort on the builder's part. Ideas presented in the preceding chapters are incorporated into these designs. Specific information is given for all diagrams and tools.
- Comments: A thorough manual, readable and easy to understand. Chapters are written by individuals whose qualifications are described in Contributors. Bibliography provides sources for people needing additional background, instruction, and detail. Supplementary materials include a detailed bibliography, a list of design groups, a glossary, list of contributors, and an index.

Price: \$5.95

Available From: Rodale Press, Inc.
Emmaus, Pennsylvania 18049

YOUR HOME'S SOLAR POTENTIAL

IRWIN SPETGANG AND MALCOLM WELLS
1976

A guide to solar energy which will assist the homeowner in arriving at a scientifically sound rating of his home's solar potential. (60 pp.)

CONTENTS

- Chapter 1 Introduction presents an overview of the world energy crisis, alternative forms of energy, and the case for solar energy.
- Chapter 2 Some Solar Facts answers commonly asked questions about the practical aspects of solar energy including its effectiveness in cloudy weather and different parts of the country, retrofitting for solar heat, and its costs.
- Chapter 3 Solar Fringe Benefits discusses the financial aspects of solar energy. These include home resale value after installation, financing, and tax relief.
- Chapter 4 What This Book Does briefly describes the survey that follows in the next chapter.
- Chapter 5 The Do-It-Yourself Survey presents the procedure for evaluating the home's existing heating system, heat loss, building orientation and available sunlight, collection area, roof slope, site exposure, indoor installation restrictions, and outdoor installation restrictions. After evaluating these areas, the homeowner compares his home's features with those in the provided rating scheme. The final rating of the home indicates its solar potential.
- Chapter 6 Energy Saving Alternatives lists energy conservation options for the homeowner. These cover space heating, water heating and laundry, air conditioning, lighting, and cooking. The different types of solar heating systems are described.
- Chapter 7 Sources of Information lists contacts for information on solar heating technology.
- Comments: This guide is valuable to anyone interested in determining whether or not solar energy is a feasible alternative to his present heating practices. The evaluation procedure is well presented and technically based.

Price: \$9.95

Available

From: Edmund Scientific Company
150 Edscorp Building
Barrington, New Jersey 08007

THE ENERGY MISER'S MANUAL

WILLIAM H. MORRELL
1977

A guide which will assist the homeowner in making decisions for home maintenance and operation procedures that will lower the utility bills. (77 pp.)

CONTENTS

- Chapter 1 Introduction presents a strong case in favor of an energy miser's methods which are introduced in the following chapters.
- Chapter 2 Where Does the Energy Go? presents an overview of the annual household energy budget.
- Chapter 3 Combating Heating and Cooling Bills describes the different types of materials and practices that the homeowner may incorporate to reduce heating and cooling costs. It covers storm windows, storm doors, weatherstripping, interior shading, entry ways, insulation, and moisture problems.
- Chapter 4 Why Turn the Heat Down? discusses the fuel saving and health benefits that may be attributed to lowering home temperatures to 65°-68°. The relationship between adequate moisture in the air and human comfort is also discussed.
- Chapter 5 Beat the Spiraling Household Costs offers suggestions for more efficient operation of energy-consuming systems in the home. These include hot water systems, lighting systems, major appliances, and heating/air conditioning systems.
- Chapter 6 Harmony and Dividends From Our Environment suggests ways to utilize natural environmental factors, such as vegetation and topography, to reduce energy consumption for heating and cooling.
- Chapter 7 Other Sources of Energy—Freedom From the Power Company? discusses the use of solar heating systems, windmills, methane gas, and compost toilets.
- Chapter 8 How Conservative Is Your Heating Plant? discusses efficient furnace operation and suggests ways to improve efficiency.
- Chapter 9 Fireplaces, Wood Stoves, and Warnings discusses the use of wood stoves, fireplaces, and space heaters for additional heating.
- Chapter 10 Reducing the Car's Appetite discusses changes in operation and maintenance that may reduce gasoline consumption.
- Chapter 11 Parting Thoughts summarizes the future energy needs of the United States and the role of the energy miser in meeting these needs.

Appendix I Heating Conservation Example shows the energy savings achievable through the implementation of various techniques.

Appendix II Solar Heating Hardware Sources lists manufacturers of solar heating equipment.

Appendix III Cost of Energy shows the energy miser how to calculate energy costs for electricity, heating (oil, natural gas, and electric), and gasoline.

Comments: The Energy Miser's Manual is directed toward the homeowner who has minimal knowledge about home operation and maintenance. Many helpful diagrams and tables illustrate the concepts and topics presented. Several samples of insulating materials are affixed to the pages of the book.

Price: \$2.25 (includes postage and handling)

Available: The Grist Mill
From: 90 Depot Road
 Eliot, Maine 03903

ENERGY SAVERS CATALOG

PUBLICATIONS INTERNATIONAL, LTD.
1977

This non-technical guide to equipment and methods provides the homeowner with product-specific information for improving and maintaining energy efficiency in existing houses. (160 pp.)

CONTENTS

Insulation describes this option as the "single most important energy-saving assignment for every homeowner," and explains the kinds of insulation available, how much is enough, and where it should go.

Weatherstripping explains that permitting gaps around doors and windows is "just like throwing dollars out the door or windows." This chapter reviews and illustrates the kinds of weatherstripping, and how to install them.

Caulking reviews the kinds of caulk on the market (i.e., latex, rubber-based, oil-based, silicone) and suggests which brands are best suited to specific situations.

Storm Windows, Storm Doors, and Thermal Panes explains how windows and doors can be a source of heat loss during the winter, and a source of heat gain during the summer. The reader is warned, however, to know what you're buying before it's too late!

Reflective Film reviews the kinds of solar reflective window films available, what degree of reflectiveness is best, and how to install film.

Shades, Blinds, Shutters, Drapes and Awnings informs the reader that "shades can reduce summer heat gain by nearly 50 percent..." This chapter describes how to measure and mount each of these items.

Heating notes that "even after you button up your home with insulation, caulking, weatherstripping, etc., you will still be wasting costly energy if your heating system fails to function at peak efficiency." The chapter examines the different kinds of home heating systems, and provides a checklist of maintenance procedures for central heating systems, both gas and oil-fired. Steam heat systems, hot water space heating systems (not to be confused with hot water heaters), electric heating systems, heat pumps, thermostats, and humidifiers are also discussed.

Air Conditioning describes how to choose, install, and maintain air conditioners, both central and room units. A subsection on materials and supplies covers such related areas as covers and weatherstripping, air conditioner accessories, and attic ventilators.

Appliance Efficiency offers step-by-step maintenance procedures which can improve the efficiency of refrigerators and freezers, automatic dishwashers, ovens, stoves, clothes washers, and dryers.

Hot Water Heaters describes how to insulate hot water heaters and hot water pipes to reduce energy consumption. Maintenance procedures are detailed, so readers can keep hot water heating systems operating at peak efficiency. A subsection on materials and supplies reviews the products which are available to help the homeowner maintain an efficient hot water system.

Water Conservation considers ways to reduce the 250 gallons of water consumed each day by the typical American family of four. Subsections address fixing a dripping faucet, hints and tips on better water usage and drilling your own water well. A section on materials and supplies discusses add-on equipment for saving water in faucets, toilets, and on lawn sprinklers. Also, a low-cost, one-person drilling rig is described.

Automobile Energy Savings describes how the reader can drive to save gasoline and includes maintenance procedures which will keep an automobile in peak operating (and fuel-saving) condition. A section on materials and supplies is included.

Alternate Sources of Energy offers a brief description of some of the alternate energy sources which may come into widespread use in the near future. On the subject of solar energy, the reader is advised to "be aware, but be wary." Other energies include wind power, sky therm cooling, methane from organic matter, and hydro-electric power.

Lighting examines ways in which a typical family of four can reduce electric lighting consumption without sacrificing the desired level of lighting, and without incurring any discomfort or danger. This chapter discusses light bulbs, fluorescent fixtures, natural lighting, skylights, and paint and reflective factors.

Energy Emergencies suggests ways of dealing with electrical blackouts, natural gas stoppages, water supply emergencies, and plumbing emergencies.

Directory of Manufacturers presents an alphabetical listing of manufacturers' addresses. Using this directory, the reader can obtain further information about equipment and materials described in the catalogue.

Comments:

Energy Savers Catalog, while filled with descriptions of devices that the reader can buy, supplies a great deal of information on low-cost and no-cost changes that can be made in existing equipment and activities around the house. An average of four illustrations per page demonstrate techniques (such as caulking) and equipment (such as solar collectors, air conditioners and water-saving shower heads), often in cross-section. It might easily be used as a text in energy conservation for Grade 7 through adult. While some of the entries discuss the costs associated with an energy-saving option and the section on appliances efficiency lists hints on energy conservation keyed to particular appliances, the book does not provide a method for planning or budgeting a home energy conservation program, nor does it specify a series of steps for diagnosing energy waste.

Price:

For information on price and availability, contact:

Publications International, Ltd.
3841 West Oakton Street
Skokie, Illinois 60076

YOUR ENERGY EFFICIENT HOME

FLOYD HICKOK
1977

This book provides weatherization techniques for existing homes in terms that the layman can understand. (140 pp.)

CONTENTS

- Chapter 1 Learning About Heat provides a simple introduction to heat movement.
- Chapter 2 Being your Own Engineer defines basic terms and equations for heat loss and gain, and provides information which allows the homeowner to find out just how energy efficient his home is.
- Chapter 3 What To Do About Attics provides criteria for judging insulation materials, shows how to compute the U value of the attic ceiling, and provides tips on attic ventilation.
- Chapter 4 What To Do About Windows shows the homeowner how to calculate heat gain and heat loss by infiltration and conduction. Directions and suggestions for upgrading windows, such as caulking, weatherstripping, and remodeling are also included, but the chapter concentrates on showing the homeowner how to calculate cost benefits.
- Chapter 5 What To Do About Doors provides information on infiltration and transmission heat loss from various types of doors and storm doors.
- Chapter 6 What To Do About Walls lists R values of most common building materials so that the homeowner can determine heat transmission losses. Wall infiltration rates are also given. Options for wall upgrading are described.
- Chapter 7 What To Do About Floors and Basements provides equations to compute the transmission heat loss through the basement floor, basement wall above and below grade, and slab floors. Suggestions for upgrading basements are included.
- Chapter 8 What To Do About Add-On Rooms summarizes considerations which provide energy saving. Suggestions for reducing heat loss and maximizing heat gain are provided in a checklist form. Heat distribution calculations are also included, so that the homeowner can determine how much heat the room requires and how to distribute surplus heat to other rooms.

Chapter 9 Adding Solar Heat explains how to calculate the amount of solar energy available per month in a given geographical area. Ideas for solar passive storage, solar windows, and alternatives to the solar window are described. Active solar systems are explained briefly, as is solar efficiency.

Chapter 10 Can This Old House be Saved? provides a mathematical comparison of a drafty house with a solar-updated older house.

Comments: This book concentrates on showing the homeowner how to calculate current energy costs and losses, and potential savings. Information in the final chapter is not often found in residential handbooks. The book describes, but does not explain how to install, energy-saving options.

Price: For information on price and availability, contact:

The Book Distribution Center
Route 5A at Brook Hill Drive
West Nyack, New York 10994

PRACTICAL ENERGY MANAGEMENT IN HEALTH CARE INSTITUTIONS

BLUE CROSS OF GREATER PHILADELPHIA
FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1977

An action guide for use by health care professionals. (127 pp.)

CONTENTS

- Part I Executive Summary of Practical Energy Management lists the systems which are the greatest energy consumers in a hospital and outlines energy management implementation with respect to operational expenses and organizational responsibility.
- Part II Practical Energy Management in Health Care Institutions details energy management and includes selected energy saving ideas. The goal is to encourage energy management and to indicate how it can be accomplished through practical measures.
- Section 1 Steps of Energy Management guides the professional in committing and organizing the management to energy management, and finally in carrying out the plans.
- Section 2 Strategy for Energy Management outlines a strategy for use by directors and managers of health care facilities which will be useful in obtaining and maintaining financial aid from the administration.
- Section 3 Case Histories in Energy Management gives brief summaries of selected energy management actions in four hospitals. These case histories are included to further demonstrate practical means to save energy. They result from the instruction and on-site technical support provided all participating hospitals during the development of this guide.
- Section 4 Energy Data Collection and Analysis contains practical steps to collect and analyze energy data in a hospital. It outlines energy records, data collection and data forms, energy indicators, and energy analysis.
- Section 5 Building and Equipment Survey details the practical steps of conducting a facility survey to identify energy saving opportunities.

Section 6 Energy Saving Ideas discusses energy saving ideas found especially useful for health care institutions.

Appendix Includes: (1) a checklist to conduct a facility survey; (2) energy data forms to collect, analyze, and calculate energy data; and (3) note on financial evaluation to explain rationale of suggested approach.

Comments: The first part of the manual broadly covers the major concerns of energy management planners in health care facilities for use by all health care professionals. The second part details the process stepwise and answers the questions of the directors and management of health care institutions.

Price: Free. Supply is limited.

Available From: Blue Cross of Greater Philadelphia
1333 Chestnut Street
Philadelphia, Pennsylvania 19107

Attn: Mr. Doug Worrall
(215) 564-2100

SOLCOST:
SOLAR HOT WATER HANDBOOK

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1977

SOLCOST is a Department of Energy-funded service that gives computerized analyses of solar options. The handbook gives the user a simplified method for sizing and costing residential and commercial solar service hot water systems. The intended audience includes heating and plumbing contractors, HVAC engineers, builders, manufacturers, and suppliers of solar hot water systems, mortgage lenders and bankers, researchers, educators, and home/building owners. (15 pp.)

CONTENTS

- Section I Introduction lists the advantages of using solar energy. It then discusses what the handbook does and how it can be used.
- Section II Guide to Forms presents a sample form and explains in detail how to fill out the input forms. The completed form is sent to the SOLCOST Service Center for analysis.
- Section III What the Analysis Means explains how to interpret the results of the analysis after the completed form is processed at the SOLCOST Service Center.
- Section IV Technical Details outlines the operational and technical details of the SOLCOST Hot Water System engineering and design technology.

Comments: The guide is necessarily brief. The user simply fills out the enclosed form using the handbook's instructions, then sends it off for processing. After processing, the user may interpret the results to determine the cost, optimum size and performance characteristics for solar hot water systems.

Price: Free.

Available SOLCOST
From: Solar Group
 1010 Vermont Avenue
 Washington, D.C. 20005

TIPS FOR ENERGY SAVERS

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1978

A guide to energy conservation in and around the home, on the road, and in the marketplace. The intended audience includes homemakers and their families. (44 pp.)

CONTENTS

How to Save Energy and \$\$\$ at Home focuses on measures that conserve electric energy year-round, then specifically goes into other cold-weather and hot-weather energy savers. It also touches upon other areas in the home where energy may be conserved--the kitchen, laundry, bath, workshop, yard and garden.

On the Road suggests ways to eliminate unnecessary trips through carpooling or other modes of transportation and some important factors to consider when buying a new car.

In the Marketplace mentions a few energy-wise buying practices.

Comments:

The energy-saving measures in the booklet are practical and simple to follow. Emphasis is on behavioral changes to which all home dwellers can readily adapt, and on how to determine whether the home needs improvements to conserve energy as well as which improvements to select.

Price: Free.

Available
From:

Consumer Information
Public Documents Center
Pueblo, Colorado 81009

TOTAL ENERGY MANAGEMENT FOR HOSPITALS

U.S. DEPARTMENT OF COMMERCE
U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION (NOW DEPARTMENT OF ENERGY)
U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
1977

A handbook identifying proven techniques for conserving energy and saving dollars. It is intended for use by management and technical personnel. (78 pp.)

CONTENTS

- Chapter 1 Introduction explains the solution to the ordinary problems of energy management in hospitals in terms of total energy management (TEM). This method considers each building or complex of buildings in a hospital as a unique entity.

- Chapter 2 Understanding Energy Consumption discusses the fundamental systems which affect energy use in hospitals, the factors which influence heat loss and heat gain, and several steps which can be taken to reduce the impact of heat loss and heat gain.

- Chapter 3 Initiating a TEM Program discusses the major management activities for key hospital personnel (i.e. Administrator, Director of Engineering, etc.) and their individual involvement in the early phases of a TEM program.

- Chapter 4 Developing Energy Consumption Data describes the development of data on historical and ongoing patterns of energy use in the hospital for the following purposes: direction of initial efforts, estimation of budget impact, operational overview, and comparison with similar facilities. The concept of the Energy Utilization Index is introduced and the related factors are clearly developed.

- Chapter 5 Conducting the Facility Survey explains to the non-surveyor what to expect from a facility survey conducted by consulting engineers. It discusses what data and materials should be provided to the surveyor and what information the final report should supply.

- Chapter 6 Guidelines for Energy Conservation provides comprehensive information on the hospital building systems which must be considered in the survey and survey report. It identifies specific methods which should be utilized to reduce energy consumption. This information is especially helpful when limited or no outside expertise is utilized.

Chapter 7	<u>Developing and Implementing the Basic Plan</u> describes the steps to be taken by the hospital management team following the facility survey. These include: survey analysis, categorizing options, preparing the basic plan, setting the TEM goal, implementing the basic plan, and extending the basic plan.
Chapter 8	<u>Financial Considerations</u> discusses sources of capital funding for hospitals and financial evaluation of TEM options, including analysis of costs/benefits, payback periods, and average rates of return.
Chapter 9	<u>Communication and Motivation</u> suggests public relations and information activities that can be of substantial value in promoting a TEM Program.
Chapter 10	<u>Monitoring Your Program and Keeping it Effective</u> briefly describes monitoring efforts in terms of quality of implementation and in terms of energy consumption.
Appendix A	<u>Sources of Information on Energy Management</u> provides a list of sources from whom further information on energy management may be obtained.
Appendix B	<u>Building Information for Total Energy Management</u> provides sample survey data sheets.
Glossary	Provides a list of terms used in total energy management.
Bibliography	Provides a list of 43 references used to develop this publication.
<u>Comments:</u>	This guide is an introduction to the concept of total energy management in hospitals. The sources of information in the appendices and bibliography are necessary supplements to the text.
Price:	Free.
Available From:	Division of Energy Policy and Programs Center Building Room 1022 3700 East West Highway Hyattsville, Maryland 20782

TOTAL ENERGY MANAGEMENT FOR NURSING HOMES
AND OTHER LONG-TERM CARE FACILITIES

U.S. DEPARTMENT OF COMMERCE
U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION (now DEPARTMENT OF ENERGY)
U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
1977

A handbook identifying proven techniques for conserving energy and saving dollars, for use by management and technical personnel in long-term care facilities. (62 pp.)

CONTENTS

- Chapter 1 Introduction explains the major thrusts of the concept of total energy management, (TEM) in which each building in a long-term care facility is considered to be a unique entity.
- Chapter 2 Understanding Energy Consumption discusses the fundamental systems which affect energy use in long-term care facilities, the factors which influence heat loss and heat gain, and several steps to be taken to reduce the impact of heat loss and heat gain.
- Chapter 3 Initiating a TEM Program discusses the importance of cooperation of the facility staff, owners and governing board for the successful initiation and maximum effectiveness of a TEM program.
- Chapter 4 Developing Energy Consumption Data describes the development of data on historical and ongoing patterns of energy use in the hospital for the following purposes: direction of initial efforts, estimation of budget impact, operational overview, and comparison with similar facilities. The concept of the Energy Utilization Index is introduced and the related factors are clearly developed.
- Chapter 5 Conducting the Facility Survey explains to the non-surveyor what to expect from a facility survey conducted by consulting engineers. It discusses what data and materials should be provided to the surveyor and what information the final report should supply.
- Chapter 6 Developing and Implementing the Basic Plan describes the steps to be taken by the nursing home management team following the facility survey. These include: survey analysis, categorizing options, preparing the basic plan, setting the TEM goal, implementing the basic plan, and extending the basic plan.
- Chapter 7 Communication and Motivation suggests public relations and information activities that can be of substantial value in promoting a TEM program.

- Chapter 8 Monitoring Your Program And Keeping It Effective briefly describes monitoring efforts in terms of quality of implementation and in terms of energy consumption reduction.
- Chapter 9 Guidelines for Energy Conservation provides comprehensive information on building systems in long-term care facilities which must be considered in the survey and survey report. It identifies specific methods which should be utilized to reduce energy consumption. This information is especially helpful when limited or no outside expertise is utilized.
- Appendix A Building Information for Total Energy Management provides sample survey data sheets.
- Appendix B Sources of Information on Energy Management provides a list of sources from whom further information on energy management may be obtained.
- Glossary Provides a list of terms used in total energy management.
- Bibliography Provides a list of 43 references used to develop this publication.
- Comments: This guide is an introduction to the practice of total energy management in nursing homes and other long-term care facilities. It concentrates on the administrative duties involved in the planning, implementation, and ongoing phases of the program. The sources of information in the appendices and bibliography are necessary and helpful supplements to the text.
- Price: Free.
- Available Division of Energy Policy and Programs
From: Center Building, Room 1022
 3700 East West Highway
 Hyattsville, Maryland 20782

YOUR ENERGY-EFFICIENT HOUSE:
BUILDING AND REMODELING IDEAS

ANTHONY ADAMS
1977

A compendium of inexpensive, simple design techniques which can make houses more energy efficient. These conservation ideas can be used to remodel existing homes, or can be applied in designing new houses. (118 pp.)

CONTENTS

Prologue reviews historical changes in the sources and cost of energy.

- Section 1 Who Are You? identifies where the homeowner fits in to the process of designing or redesigning a home. It considers residents' desires and problems, the cost of energy, new housing needs, means of self-expression, and opportunities for renovation. It includes a step-by-step procedure for building design.

- Section 2 Site Selection & Evaluation describes the factors to consider when choosing a building site. It addresses solar exposures, large scale wind effects, and regional and local wind effects.

- Section 3 Site Planning examines the interrelationship between site, energy savings, and life style. It reviews the factors which must be considered in deciding where to locate. This discussion covers the maximum use of natural elements and site features, sun variations, wind variations, existing vehicular and pedestrian patterns, utilities, the use of views, consideration of undesirable elements, and the inventory of natural features. The foregoing factors are synthesized into diagrams for sun and wind access, and cultivation patterns.

- Section 4 Planning the Building explains how to plan for the different functions of a house. Elements of the plan include food preparation/preservation, storage, quality and character of spaces, and the importance of inhabitant circulation. This chapter describes how to diagram concepts of circulation, wind and sun orientation, forms and volumes, and renovation designs.

- Section 5 Putting the House Together offers a general description of the design characteristics of different aspects of home construction. This section considers the different types of foundations, flat and pitched roofs, structure-bearing systems, insulation, heat loss, windows, ventilation, infiltration, vapor barriers, and radiation losses.

- Section 6 Building Systems discusses the difficulties encountered in designing a zero energy house. Among the systems considered are: heating, ventilation, and air conditioning, and lighting systems, as well as major appliances.

Section 7 Working Up the Site follows through on previous observations. This section recapitulates site needs and the ways and kinds of plants that can be grown for wind breaks, shading, sources of natural ventilation, and environmental tempering.

Section 8 New Directions suggests new things to expect in the future. Topics covered include solar heating, wind power, organic sources, super-insulation, gravity air distribution, and thermal capacity.

Comments: Although the publication makes interesting reading, homeowners should not expect to be able to design and construct their own houses based on the material presented here. A list of recommended do-it-yourself homebuilding manuals is provided.

Price: \$4.95

Available From: Garden Way Publishing
Department EE
Charlotte, Vermont 05445

BE YOUR OWN CHIMNEY SWEEP

C. CURTIS AND D. POST
1979

This book provides directions on cleaning chimneys, stoves, cook stoves and fireplaces. It is designed for the layman.

CONTENTS

- Chapter 1 Why Chimneys Need Cleaning explains creosote formation and factors in creosote buildup. A checklist on what to do if a chimney fire occurs is included.
- Chapter 2 How to Avoid Creosote Buildup includes suggestions on selecting proper stove size, type of wood to burn, and when to clean.
- Chapter 3 Cleaning Your Stove itemizes the tools needed and provides a step-by-step explanation of how to clean simple and complex stoves.
- Chapter 4 Cleaning a Cook Stove lists equipment needed and explains the cleaning procedure.
- Chapter 5 Cleaning the Stovepipe explains when and how to clean, and lists equipment needed. Directions for assembling a stovepipe are included.
- Chapter 6 Cleaning the Chimney explains chimney diameter and height in relation to its capacity, lists resistance coefficients for different chimneys, tells how to clean prefabricated chimneys from the outside and inside, and how to clean masonry chimneys from inside and from the roof. Guidelines for chimney safety are included.
- Chapter 7 Cleaning Fireplaces explains how to clean the firebox, the smokebox, the flue and the smoke chamber. Guidelines for fireplace safety are included.
- Chapter 8 Hiring a Professional Sweep is a one-page checklist of what to look for in a person hired to clean chimneys.
- Comments: A simple, direct and easy-to-understand book written for the layman. The text includes many photographs.
- Price: For information on price and availability, contact:

Garden Way Publishing
Charlotte, Vermont 05445

BUILD YOUR OWN
SOLAR WATER HEATER

STU CAMPBELL AND DOUGLAS TAFT
1978

A beginner's book which describes the parts of a solar water heater and which provides the homeowner with instructions on building one.

CONTENTS

- Chapter 1 Dollars and Sense discusses methods families can use to control hot water use. It also discusses the cost of a solar water system.
- Chapter 2 Some Words About the Sun describes in simple terms the effect of the sun on the earth. It is a descriptive, not a practical, "how-to"-oriented chapter.
- Chapter 3 Harvesting Energy from the Sun identifies and describes the different types of solar collectors and lists the advantages and disadvantages of each.
- Chapter 4 Designing Your Collector System provides a criteria for determining the type of collector system, including building codes, zoning laws, solar interference, wind and snow interference. Also included are corrections pointing, mounting and tilting collectors. Complete directions for installation are given.
- Chapter 5 Building Solar Collectors includes directions for building absorber plates and collector boxes, and selecting a collector glaze. Criteria for selecting types of plates, boxes and glazes are included.
- Chapter 6 Storing and Protecting Your Solar Energy gives instructions on selecting, installing and insulating a storage tank.
- Chapter 7 Building the Transfer System provides directions on selecting an appropriate type of plumbing, the plumbing layout and installation.
- Chapter 8 Free-Circulating Systems and Heat Exchanges explains how thermosyphour systems work, the disadvantages of a free-circulating system, how heat exchangers work, and how one is made.
- Chapter 9 Forced Circulation Systems gives instructions on installing heater parts, collector loops, hot water loops, and thermostatic controls, and explains how the heating system works.

Chapter 10 Solar Heated Swimming Pools describes procedures for installing solar heating panels and pool covers to utilize the sun's heat.

Appendix Lists manufacturers in the Solar energy field.

Price: \$7.95

Available Garden Way Publishing
From: Charlotte, Vermont 05445

DESIGNING AND BUILDING A SOLAR HOUSE

DONALD WATSON

1977

A practical manual which includes information on active and passive systems, and which includes site planning, design and construction checklists, criteria for equipment selection, and ways of reducing cost. The book functions as a guide to solar house design and construction. (281 pp.)

CONTENTS

- Chapter 1 Solar Heating Now traces the history of solar heating in America and describes early solar houses.

- Chapter 2 How Solar Heating Works provides an introduction to the objectives of solar house design: collecting, storing, distributing and retaining the sun's heat.

- Chapter 3 Passive Systems includes an explanation of how solar windows and masonry construction can collect and deliver the sun's heat. Methods of eliminating heat loss at night and controlling overheating during the day are covered.

- Chapter 4 Active Systems identifies the three basic parts of the system--collectors, storage, and distribution--and describes steps involved in each part. Various types of collectors are described, including flat plate and tubular types.

- Chapter 5 Active Systems: How the Parts Work Together describes how the three general types of active solar heating systems operate. Topics covered are solar photovoltaic conversion, which uses solar cells to convert the sun's rays to electricity, and the more common systems which operate by using the sun's heat radiation.

- Chapter 6 Ecodesign: Designing a Building for Energy Conservation outlines the principles of building for energy conservation, and includes solar designs for different U.S. climates. Topics include fireplace design, internal zoning, underground massing, and high insulation standards.

- Chapter 7 Solar House Design in Northern Climates contains an economic comparison of six solar heating alternatives in cold climates. A combination of passive and active systems is shown to be the best choice for short-term payback. Also discussed is the effect of fuel cost rise on solar system selection.

- Chapter 8 Building a Solar House includes comprehensive instructions for construction. Site planning, design, and construction checklists are provided, as are criteria for selecting solar equipment, and four basic ways to reduce cost.
- Appendix I Resources contains resources for the solar house builder, including publications, solar house designers, and equipment manufacturers.
- Appendix II Solar Design Calculations includes simple methods for calculating solar heat gains, storage capacity, and estimated fuel savings.
- Comments: This book contains some theoretical material but much practical, how-to information as well. A good resource for solar house builders. The book contains over 400 illustrations.
- Price: \$9.95
- Available
From: Garden Way Publishing
 Charlotte, Vermont 05445

547 EASY WAYS TO SAVE ENERGY
IN YOUR HOME

ROGER ALBRIGHT
1978

An introductory book on ways to make a home more energy efficient.

CONTENTS

- Chapter 1 Getting Ready for Winter provides energy-saving tips on window and door insulation, including weather stripping and caulking instructions.
- Chapter 2 Long Johns and a Warm Hat lists types of insulation materials, suggests the amounts needed in different areas, and gives directions on how to install the insulation.
- Chapter 3 Keeping Comfy Room by Room includes general conservation tips for summer and winter--economical lighting, use of the thermostat, use of carpeting, and use of appliances.
- Chapter 4 Economy in the Kitchen lists tips on oven, refrigerator, and freezer use.
- Chapter 5 Solving the Hot Water Problems includes energy-saving ideas for using the dishwasher, the bathroom and the laundry.
- Chapter 6 Save With Solar describes simple methods of collecting and using sun heat and taking best advantage of the sunlight.
- Chapter 7 Good News in Your Garden, discusses vegetable drying and storing methods, efficient ways to can vegetables, methods of indoor gardening, and use of cold frames and greenhouses.
- Chapter 8 The Wood Fuel Trip lists methods of making the fireplace an efficient heating tool, and provides a complete listing of types of wood, a description of the value of each for fireplace use, suggestions for splitting wood, and tips for using a wood stove.
- Chapter 9 Some Old-Timer's Wisdom includes energy-saving ideas which our forefathers used, and which are still practical in today's world.
- Chapter 10 Taming the Guzzler lists tips which will reduce gas consumption. These tips cover driving habits and car maintenance.

Comments: A practical guide for the homeowner. Tips are general and useful.

Price: \$4.95

Available Garden Way Publishing
From: Charlotte, Vermont 05445

HOW TO SAVE ENERGY AND MONEY IN YOUR HOME
ENERGY WORKBOOK #1

NEW YORK STATE ENERGY OFFICE
1978

A workbook for home dwellers on how to rate energy consumption. The guided tour method is the means by which the consumer is shown how to determine if and where conservation measures need to be taken. Estimated power costs are noted.

CONTENTS

Part 1 Quick Quiz briefly asks questions about temperature settings, draft conditions, insulation measurements, and heating systems.

Part 2 The Tour Starts Here provides a checklist to be used in each Activity Center which gives recommendations for heating and cooling controls, lights and appliances use with cost estimates. The "energy tour" proceeds to the bath and to the kitchen, one of the greatest energy usage rooms. The refrigerator, oven, and other appliances are featured. The consumer is then directed to the laundry, the attic and the basement where ventilation, insulation, and foundations should be checked. Heating and cooling systems are also discussed, as well as protective measures for outside the house.

The energy-saving worksheet provided at the end of the workbook allows the house dweller to review the areas which require further actions. The consumer's attention is directed to the sources to seek to begin installation and/or retrofit of the home. Financing tips are outlined.

Comments: This preliminary workbook (one of two) for house dwellers who wish to learn of opportunities to repair or adjust household habits and energy-usage systems is a practical walk-through guide for New Yorkers. It can be of value also to residents of other geographic regions.

Price: For information on price and availability, contact:

The New York State Energy Office
Energy Building #2
Empire State Plaza
Albany, New York 12223

HOW TO SAVE ENERGY AND MONEY IN YOUR HOME
ENERGY WORKBOOK #2

NEW YORK STATE ENERGY OFFICE
1978

An easy to follow, practical guide with a strong emphasis on insulating the home. There are pictorial illustrations of the areas which need insulation, as well as guidance on how and where to insulate. (22 pp.)

CONTENTS

- Preface: Explains that the workbook is for do-it-yourself homeowners interested in learning: where, what materials to use and how to conserve energy in the home.
- Part 1 Your Home and Heat Loss defines how and where heat escapes.
- Part 2 Insulation. Minimum standards for New York State are listed for roofs, ceilings, walls, floors, with the resistant values of the kinds of insulation available. Safety precautions to the installer are emphasized along with step-by-step direction on how to equip the attic, the basement, masonry walls, crawl spaces and floors. Electric and gas water heater insulation techniques and safety measures are explained with illustrations.
- Part 3 Caulking, weather stripping, storm windows and doors are illustrated, as well as thermostat adjusting.
- Part 4 Financing. In the event of assistance needed to improve the home, there are listed grantors and the type of financing (minimum + maximum) available for single, dual or three-family homes. Also listed are the terms for repayment of grants and loans.
- Part 5 Getting the Work Done shows where one should look and how to select a contractor if necessary.
- Part 6 Estimating Energy Savings. A checklist form is provided along with calculation guidelines on how to determine the most economical means to install insulation and conserve energy. The estimated savings factors are based on research and construction practices.
- Comments: While the techniques and materials discussed in the workbook are addressed to New York residents, this "how-to" manual can be invaluable to home owners in like weather zones of the entire nation. The New York State Energy Office is

desirous of hearing from those who utilize the workbook and provides a self-addressed stamped form for replies.

Price: For information on price and availability, contact:

The New York State Energy Office
Energy Building #2
Empire State Plaza
Albany, New York 12223

MULTI-FAMILY HOUSING
ENERGY CONSERVATION WORKBOOK

New York State Energy Office
1979

This handbook, designed for owners and managers of multi-family buildings, illustrates how to reduce energy use and how to save on operating costs. (120 pp.)

CONTENTS

- Section 1 Energy Measures Cost and Payback Table is designed as a tool to aid managers and owners in assessing cost and payback from implementing a given conservation measure. The degree of cost is representative of low to high costs; actual dollar costs are not included because of varying installation costs.
- Section 2 Operational and Maintenance Table is designed to help the manager or owner initiate an ongoing energy savings program at little or no cost. The table is in the form of a check-list. A detailed description of each of the items can be found in the Energy Measures section.
- Section 3 Energy Survey Worksheets are tools to be used during a walk-through survey to determine what energy conservation opportunities exist. There are nine worksheets, from a lobby and corridor worksheet to a heating plant worksheet.
- Section 4 Energy Measures--Operational Maintenance Modifications divides these types of modifications into nine groupings according to problem area: infiltration, ventilation, domestic hot water, heating plant, heating distribution, lighting, insulation, and cooling and laundry. Each modification is matched with a code number which designates an operational change or retrofit.
- Section 5 Analytical Methods contains calculation procedures, which in many cases have been simplified into graphical techniques, to determine the related energy and dollar savings. Step-by-step procedures for performing the calculations are included.
- Comments: Each section of the book relates to the whole. The manager will use the Energy Survey Worksheet during the building walk-through, filling in the blanks. The blanks which are filled correspond to energy measures indicated by numbers beside the blanks. If a measure sounds feasible, the manager or owner can analyze the savings by using the Analytical Savings section.

Price: Free.

Available

From: New York State Energy Office
Energy Building #2
Empire State Plaza
Albany, New York 12223

THE PASSIVE SOLAR ENERGY BOOK

EDWARD MAZRIA

1979

A presentation in clear format of the fundamental concepts of passive solar design and application, as well as the numbers and mathematical equations necessary for performance calculations. (687 pp.)

CONTENTS

- Chapter I Using the Book gives the basic purpose of the book--to provide technical information on passive solar heating and cooling systems in layman's language. It discusses the contents of the book and suggests a method for reading it related to its format.
- Chapter II Natural Processes describes the sun and earth--the origin of the sun, solar radiation, radiation and the earth's atmosphere; radiation and matter--solar intensity on a surface, reflection, transmission and absorption; and the characteristics of heat--heat transfer and heat storage.
- Chapter III Passive Solar Systems discusses the two basic approaches to solar heating--active and passive--and the basic elements in a passive solar heating system. Direct gain (living space directly heated by sunlight), indirect gain (sunlight absorbed by a thermal mass and transferred to living space), and isolated gain (solar collection and thermal storage isolated from living space) are discussed in detail; and the advantages and disadvantages of passive solar systems are described.
- Chapter IV Design Patterns contains 27 patterns (most with visual representations) for the application of passive solar energy systems to building design. Each pattern is related to the preceding patterns; the problem for each is stated; and a recommendation is given. Together the patterns form a coherent picture of a step-by-step process for the design of a passive solar-heated building. They can also be used to analyze existing buildings or designs. Subjects are included such as building location, appropriate materials, solar windows, wall details, and summer cooling.
- Chapter V Fine Tuning first addresses heat transfer as a basis for calculating thermal performance of each space in a building design, then addresses the calculation of system performance itself. The method of calculation is given in six steps: rate of space heat loss, space heat gain, average daily indoor temperature, daily indoor temperature fluctuation, auxiliary space heating requirements, and cost effectiveness of the system.

- Chapter VI The Tools describes how the sun works, provides the cylindrical sun chart for predicting the sun's movement, and shows the method for developing a sun chart. It discusses various solar radiation calculators (which are included in an envelope at the back cover of the book) as well as the shading calculator (also included in the envelope), which is used to determine the times when direct sunlight is blocked from reaching a given surface.
- Appendix A Properties of Solids and Liquids lists specific materials and compares them for specific heat, density, and thermal conductivity.
- Appendix B Time Lag of Heat Flow Through Walls and Roofs demonstrates time lag in hours for brick, concrete, glass, stone, and frame, and for various constructions of roofs.
- Appendix C Percentage of Solar Radiation Absorbed by Various Substances lists the substances and presents figures for the percentages of the intensity of solar radiation striking the surface.
- Appendix D Emissivity of Various Materials expresses the emissivity ratio of the materials according to various surface conditions of the materials.
- Appendix E Insulating Values of Construction Materials represents (1) conductivities, conductances, and resistances of building and insulating materials; (2) thermal conductivity of industrial insulation for indicated mean temperatures; (3) U values of solid wood doors; (4) U values of windows, skylights, and light-transmitting partitions; and (5) resistance values of air surfaces.
- Appendix F Average Daily Solar Radiation (1) lists average daily radiation on a horizontal surface for various locations in North America by month; (2) gives monthly maps of average daily solar radiation on a horizontal surface; and (3) presents a graph showing the conversion of horizontal incident solar energy to the amount of energy transmitted through two sheets of vertical south-facing glass.
- Appendix G Average Daily Temperatures (°F) in North America (1) lists temperatures monthly by location and (2) illustrates average daily temperatures by monthly maps.
- Appendix H Degree-Days (1) lists normal degree-days by month for U.S. cities; (2) lists normal degree-days by month for cities in Canada; and (3) presents monthly maps of heating degree-days in the U.S. with a base of 65 °F.

- Appendix I Clear-Day Solar Heat Gain first tabulates solar heat gain through vertical single glazing at various orientations (in Btu/sq. ft.) by month, giving half-day totals, then gives the same format for vertical double glazing. The next table demonstrates solar heat gain through south-facing, tilted single glazing at various orientations; the final table demonstrates solar heat gain through south-facing, tilted double glazing at the same orientations.
- Appendix J Percentage of Enhancement of Solar Heat Gain With Specular Reflectors for Vertical South-Facing Glazing (reflectance 0.8) gives these percentages by month for various latitudes at various tilt angles of the reflector/collector.
- Appendix K Heat Equivalents of Fuels and Other Energy Sources lists solids, liquids, gases, and other sources; their heating values (and the sources for these figures); and, where known, the heat obtainable from each source.
- Appendix L Conversion Tables gives (1) conversion factors (such as how to convert acres to square feet, Btu to kilowatt-hours, etc.); (2) Fahrenheit-Centigrade conversion table.
- Appendix M Forms for Calculating System Performance includes:
- Step 1. Calculating Space Heat Loss
 - Step 2. Calculating Space Heat Gain
 - Step 3. Determining Average Indoor Temperature
 - Step 4. Determining Daily Space Temperature Fluctuations
 - Step 5. Calculating Auxiliary Space Heating Requirements

Glossary
Bibliography

Comments: This book is clearly presented and amply illustrated with photographs, figures, and tables. Included in an envelope on the back cover are three solar radiation calculators and a shading calculator to aid the reader. It makes technical information available to architects, builders and owner-builders as well as to the layman, and provides a coherent picture of a step-by-step process for choosing and sizing any system suited to one's particular needs.

Price: \$24.95

Available From: Rodale Press
Emmaus, Pennsylvania

PLANNING AND BUILDING YOUR FIREPLACE

MARGARET AND WILBUR EASTMAN

1976

How to plan construction and estimate costs, how to build a fireplace in a new home or add one to your present home--a practical guide to building a fireplace.

CONTENTS

- Chapter 1 How Efficient is a Fireplace discusses in brief the function of heat transfer. A major part of the chapter is a description of the history of fireplace use.

- Chapter 2 Component Parts of a Fireplace identifies and describes the function of each fireplace part, including the jambs, damper, flue, smoke shelf, spark arrester, hood, and cricket. The importance of each of these items in the total fireplace design is explained.

- Chapter 3 Constructing a Fireplace provides a comprehensive overview of fireplace design--from instructions on obtaining a permit to requirements for laying the foundation, for constructing the hearth, for installing the damper, smoke shelf, flue, lintel, and chimney. Basic principles of fireplace width, depth, and height are covered.

- Chapter 4 Constructing a Fireplace - Details provides tips and instructions on building fireplace foundations and on adding a second fireplace. Topics covered include the use of several flues in one chimney, thickness of chimney walls, flashing, the cricket, screens and spark arresters, and ventilators.

- Chapter 5 Cost of a Fireplace lists tips for building a fireplace in a cost-efficient manner. Criteria for selecting a mason and information on materials and equipment needed are discussed.

- Chapter 6 Getting More Heat from the Fireplace describes attempts to reduce heat loss through natural convection or through mechanical assistance. Details are provided on modified fireplaces and various types of fireplace grate.

- Chapter 7 Freestanding Fireplaces discusses the advantages and disadvantages of this type of fireplace. Tips on locating and installing a freestanding fireplace are also included.

- Chapter 8 Styles and Designs reviews the various types of facing, hearth, mantel, hood, wall, and ornamentation which can be used to build an attractive fireplace.

Chapter 9 How to Stop a Fireplace from Smoking lists reasons why a fireplace smokes--lack of oxygen, drafts, the fire chamber, the flue--and provides strategies for solving the problems.

Chapter 10 Wood and Other Fuels provides information on how to buy firewood, the best types of wood for burning, seasoning and storing wood, building a fire, and safety precautions.

Chapter 11 Maintenance and Use gives instructions on soot removal and on inspection procedures for cleaning and repairing.

Comments: This text is designed for the homeowner who is interested in building or cleaning and repairing a fireplace. The book provides basic information for the beginner in fireplace construction.

Price: For information on price and availability, contact

Garden Way Publishers
Charlotte, Vermont 05445

SOLAR HOMES AND SUN HEATING

GEORGE DANIELS

1976

A homeowners' guide to solar heating. The guide covers building solar heating systems in new and existing houses and instruction on how to utilize this free source of energy. (177 pp.)

CONTENTS

- Chapter 1 The Windows That Heated a House tells the story of architects George and Fred Keck's solar home project of 1941. The chapter shows how the south-faced house utilized the sun's energy. Until recently this innovative technology was lost or forgotten. Pictured are illustrations of different types of solar systems which are described in further detail in subsequent chapters.
- Chapter 2 How Sun Heating Works--the Basics explains how the winter sunlight can heat a house. The most popular system, the flat-plate solar-heat collector system, is used to explain how much heat can be collected and transferred from outside to inside. Since estimates of heat collecting space vary in different locales, measuring insolation helps to determine the needed heat collecting area. The use of maps is suggested; examples are provided. The heat collector types are described as well as storage possibilities and freeze preventives, and back-up systems.
- Chapter 3 Fourteen Ways to Free Heat presents the most useful systems of solar heating for new and existing homes. Selection is based on tried systems which are designed to meet different requirements. The basic principles of the system are illustrated by diagrams and photos along with explanations.
- Chapter 4 The R Value - How to Hold On to Stored Heat. Emphasis is placed on heat retention and avoidance of waste for non-sunlight hours. Guidance is given on how to calculate the amount of leakage and insulation necessary.
- Chapter 5 Solar Heat for An Existing House shows how to determine if it is reasonable to equip a house with a solar heating system. Type selection and planning are required, considering the situation of the house, existing plumbing and heating systems. Testing on a small scale is suggested.
- Chapter 6 How to Build a Flat-Plate Solar-Heating System discusses the cost-efficiency in building a system. How and when to purchase low-cost materials and what is needed are illustrated in step-by-step manner. There are several figures and photos illustrating the procedures to follow.

Chapter 7 Things to Come describes how the sun is harnessed now for heating, and explains new technologies which would supply solar-generated electric power for general use in the future.

Chapter 8 Decorating Tips for Solar Houses provides tips, practical as well as aesthetic. Such suggestions include outside landscaping and indoor window coverings and color selection.

Comments: This easy-to-read and easy-to-follow guide provides basic information and direction to the prospective solar system designer and builder. The technology is described in layman's terminology.

Price: \$9.95

Available Harper & Row Publishers, Inc.
From: 10 East 53rd Street
 New York, New York 10022

WAGE THE ENERGY WAR AT HOME

JOSEPH C. DAVIS AND CLAXTON WALKER
1978

A comprehensive manual for the homeowner committed to saving energy and money. There are informative chapters on how to stop waste, and conserve power. Guides are available on what materials to select, and how to figure savings. (255 pp.)

CONTENTS

Introduction discusses ways for the homeowner or tenant in new or older homes to avoid energy waste, save money and consider alternative sources of power.

- Chapter 1 Basic Engineering and Energy Terms discusses the basic energy sources and uses in the home. The factors of heat transfer are illustrated. Electricity, gas and oil are covered in terms of time, rate and cost to the consumer. For efficiency there is guidance on how to read meters.
- Chapter 2 Insulation gives the reader the basic knowledge of the types and grades of insulation available, and the areas which should be covered. (Illustrations show construction elements to be considered.) Cost comparison guidelines are available, as well as instructions for the do-it-yourself installer.
- Chapter 3 Windows, Doors and Walls discusses the most efficient types of windows, glasses, and how to replace inefficient ones and how to construct storm types. Door construction and heat transfer and infiltration through them is covered. Illustrations are provided which show efficient use and construction of various types of doors. Information is given on how to shade and devices used such as awnings to utilize the sun's energy. Also, caulking and weather stripping doors and windows for best results are discussed and illustrated.
- Chapter 4 Climate Control Equipment. The various types of heating systems are described as well as the methods of distribution of air. The advantages and disadvantages are shown for each system. A method for estimating the necessary heating capacity is easy to follow. Maintenance tips are also given. For those who must have air cooling systems, the various options are considered. The energy efficiency rating formula is given as well as the capacity determination method. References are cited for those who seek more information on air conditioners. A section is devoted to heat pumps, ventilation fans, and furnace blowers as energy-saving devices for heating or cooling.

- Chapter 5 Fireplaces and Stoves. Certain measures to avoid wasting energy of fireplaces are shown. Freestanding, Franklin center-of-the-room and modified types are discussed. Ducts, flues and dampers are given consideration. References are cited for further information on fireplaces. Information on wood and coal stoves is given along with illustrations of the various types and what to look for when selecting a stove.
- Chapter 6 Household Appliances and Fixtures. Energy is saved by improving performance and by following maintenance procedures on major and minor appliances. There are guidelines on what to look for when selecting appliances such as dishwashers, refrigerators and ovens. The types of hot water heater are shown, and rules given for estimating the required size needed, as well as the most efficient features and disadvantages to look for. Plumbing fixtures, televisions, radios, lighting fixtures are considered in light of energy use, and what to do to save money and energy.
- Chapter 7 House Design, Construction, Landscaping and Orientation discusses the multiple designs, and the potential for heat gain and loss. Given the alignment of the house, certain factors are considered such as sunlight, and prevailing winds. Suggestions in the areas of shading and landscaping are presented for already built homes. When homes are under construction there should be checks made and techniques applied early to avoid costly retrofitting and adaptation.
- Chapter 8 Household Hints and Energy Saving Routines describes many routine practices widely known, but worth repetition. In many cases behavioral changes are necessary. Room-by-room suggestions are enumerated and participation by family is encouraged.
- Chapter 9 Novel Ideas, Innovative Energy Savers and Gadgetry describes some of the recent inventions to save energy, in the areas of systems such as Annual Cycle Energy System being developed to conserve heat and cold in residential buildings. There are home mechanics ideas and devices to consider. In addition, there is information provided for the would-be inventor.
- Chapter 10 Solar Energy Systems presents economic as well as technical application considerations of heating by the sun. Various components and installation are discussed regarding heating areas and water, and even swimming pools. References are included to allow method descriptions, and auxiliary systems of heating and cooling are illustrated.

- Chapter 11 Energy from the Winds describes the history of producing electricity using the wind. It also discusses current projects using this source of power. There is information for a do-it-yourself windmill constructor, along with references to knowledgeable sources.
- Chapter 12 Citizens' Influence on Utility Rates discusses the involvement of citizenry in affecting inflated cost of power. This opposition is based on the unfair rate schedule where greater users of electricity are charged less. The difficulties encountered by the utility are cited. The chapter lists references for people who wish to challenge the utility companies.

Comments: This is an easy-to-read book which gives the homeowner some of the basics of saving money and energy. The figures and formulas illustrated are simple to follow. A glossary and bibliography provide good references.

Price: \$9.95

Available From: Emerson Books, Inc.
Reynolds Lane
Buchanan, New York 10511

WOOD ENERGY
A PRACTICAL GUIDE TO HEATING WITH WOOD

MARY TWITCHELL
1978

A practical guide for selecting, installing and cleaning a wood stove. Also includes tips on reducing heat loss in fireplaces.

- Chapter 1 Fireplaces are listed as an inefficient heating method, but several ways to reduce heat loss, such as grates, shields, reflectors, and doors, are outlined. Troubleshooting techniques for smoking fireplaces, such as flue extension, flue tile joints, chimney hoods, and spark arresters, are also provided.

- Chapter 2 Wood Stoves - Old and New provides a description of the wood stove heating process, lists items to look for when buying old stoves, and identifies options on new stoves. Various stove designs are explained in detail, and criteria are provided for selecting a particular type of stove. Radiant airtight heaters, circulating stoves, and barrel stoves are described.

- Chapter 3 Stove Location and Installation provides instructions on where to place a wood stove, and steps to take to install one safely. National Fire Protection Agency standards are listed. Installation procedures covered include venting into an existing flue, assembling a heat shield, installing stove pipes, dampers, and elbows. Instructions for different fireplace connections are given: blocking the fireplace, up the flue installation, and venting into the fireplace above the dampers, out into the window, through an exterior wall, or through ceilings and roof.

- Chapter 4 Getting Your Wood Supply provides instructions for buying or cutting, felling, limbing, hauling, splitting, and storing wood. Safety precautions are discussed, in addition to types of equipment used to fell and split trees.

- Chapter 5 Operating the Stove describes prevention of creosote buildup, use of heat exchangers to increase heating efficiency, ash removal, and stove cleaning and care. Also included is information on preventing chimney fires.

- Chapter 6 Beyond the Wood Stove lists the advantages and disadvantages of

wood furnaces. Installation types are included for residential as well as industrial facilities.

Catalog provides a detailed listing of wood stoves by manufacturer, including information on dimensions, firebox and flue size, wood length, material, and weight.

Comments: This guide contains practical information for the homeowner interested in heating with a wood stove.

Price: For information on price and availability, contact:

Garden Way Publishers
Charlotte, Vermont 05445

WOOD HEAT

JOHN VIVIAN, ILLUSTRATED BY LIZ BUELL
1978, Second Edition

A practical sourcebook on how to best utilize wood as fuel. Personal experiences serve as guides, and illustrated instructions for do-it-yourself stove builders. (477 pp.)

CONTENTS

Introduction gives the history of the author's interest and experiences in using wood for heating. Explanation is given of first attempts at setting up the wood stove, almost fatal mistakes made, and the learning process undertaken to assure safe and economic use of wood. The book discusses the chemistry of wood heat, chimneys and flues. The major types of stoves available and their attributes and drawbacks are also explained. Methods to make fireplaces more efficient and advice on selecting wood, whether purchased or self-cut, is included. The appendices are devoted to the future of wood heating.

- Chapter 1 The Science and History of Wood Heat explains the chemical process that occurs when wood burns. Safety measures and tools are discussed. Preventive maintenance devices are also included. The discussion of historical fuel heating in America includes wood, coal, oil, natural gas, and the comparative costs over the years.
- Chapter 2 Chimneys and Flues, Old and New explains the various types of chimneys used in different geographical areas, and the development of the flue. Basic principles are explained. Methods of evaluating the existing structures for repair or rebuilding are included. Also discussed are building codes, masonry, repairing exterior and interior flues, safety measures, and materials needed. All steps are illustrated.
- Chapter 3 Heating With Wood Stoves. For the person who wants to have a wood stove, the location and number of stoves to install are discussed in terms of efficiency. How to figure one's needs, such as size and heating capacity, is explained. A good portion of the chapter is devoted to the types of stoves available and how to purchase one, be it old and in need of repair or new. There is, in addition, instruction on how to build your own stove. Central wood heating installation is given consideration along with draft control and operation safety. Methods of starting the fire and problems that can be encountered are illustrated.

COMMUTER VAN POOLING OPERATIONS GUIDE FOR EMPLOYERS

CHRYSLER CORPORATION

1979

A guide to assist business firms and organizations in starting a van pooling program for employees. Experience, background information and operating procedures are discussed. (27 pp.)

CONTENTS

- Section 1 Organization provides information on what services the employer agrees to furnish and pay for.
- Section 2 Administration describes the responsibilities of the administrator of the van pool program, which include vehicle acquisition, maintenance, disposal, insurance, van pool fares, riders, and driver interviews.
- Section 3 Promotion of Program illustrates the employees' role in making van pooling successful.
- Section 4 Fare Calculations shows how to determine the appropriate monthly fare for at least nine riders. Both variable and fixed costs are considered.
- Section 5 Evaluations suggests how to do a useful evaluation with periodic reports.
- Exhibit I Manual Techniques for Matching of Employees aids in grouping potential van pooling by home location and working hours. Chrysler Corporation relates its experience.
- Exhibit II Computerized Matching of Employees shows how the computer generates three lists of names. The first is a general list of all employees interested in van pooling; the second describes interested employees who live within common grid areas, including their working hours; and the third list presents groups of ten persons who live within common grid areas.
- Exhibit III Employee Solicitation Folder.
- Exhibit IV Chrysler Commuter Van Pool Orientation Meeting Guide.
- Exhibit V Chrysler Commuter Van Program Operating Agreement.
- Exhibit VI Prospective Passenger Agreement in Chrysler Commuter Van Program.

Exhibit VII Commuter Van Program Revenue and Expense Monthly Report.

Exhibit VIII Van Pool Driver Log.

Exhibit IX Van Pool Program Costs.

Exhibit X Sample Fare Calculation.

Comments: This guide is logically arranged and the exhibits provide a clear picture of what is involved in setting up a vanpool. A useful book which can be used to plan and start a commuter driving program or to use as a checklist if a present arrangement is not working well. The name, address, and phone number of a person to whom questions should be directed is included.

Price: Free.

Available From: Mr. H. C. Wood
Manager, Consumer Relations
Chrysler Corporation
P. O. Box 1919
Detroit, Michigan 48231

TRUCKER'S GUIDE TO FUEL SAVINGS

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL PROTECTION AGENCY

1975

A guide to reduced fuel consumption for truck operators (20 pp).

Sample topics include:

- Power, and the kinds of resistance it can be used to overcome
- Engine-tuning, including particular items that should be checked regularly
- Diagnosing chassis problems by measuring tire wear
- The potential of payload increases, reduced wind resistance and reducing the number of drive axles
- Add-on equipment, such as temperature modulated fans and turbocharging kits
- A general method for matching engines, transmissions and axles for best fuel efficiency.

Comments:

This booklet makes up in brevity and clarity what it lacks in detail. Its best instructional use would be either as a pre-class reading or a post-class reminder.

Price:

Free.

Available
From:

Publications Distribution
Office of Administrative Services
Department of Energy
Washington, D.C. 20585

CHILTON'S MORE MILES-PER-DOLLAR GUIDE

RONALD M. WEIERS & CHILTON AUTOMOTIVE EDITORIAL DEPARTMENT
1977

A handbook for today's motorist that explains how the car works, how to trouble-shoot and correct potential problems, and how to improve fuel economy. (245 pp.)

CONTENTS

- Chapter 1 The Costs of Driving provides methods for calculating the fixed and variable costs of operating an automobile. Fixed costs include insurance, taxes, and depreciation. Variable costs include gasoline, tires, maintenance, and repairs.
- Chapter 2 The Science of Saving describes how different types of resistance (i.e., air, rolling, acceleration, gravity, and engine) and weather, atmospheric and road surface conditions contribute to reduced fuel economy.
- Chapter 3 Buying for Economy offers advice for the prospective automobile buyer. Standard and optional features are discussed, including body weight and style, transmission type, power accessories, tires, and color. In addition, it considers the economical purchase of gasoline, oil, replacement tires, and accessory items that will not sacrifice performance.
- Chapter 4 Driving for Economy discusses driving techniques in many types of situations that will improve a vehicle's fuel efficiency.
- Chapter 5 Maintaining for Economy describes standard maintenance practices, including a simple tune-up, that will improve an automobile's performance and its fuel efficiency.
- Chapter 6 Planning for Economy discusses planning activities that can result in better gas mileage on short and long trips.
- Chapter 7 55 MPG on a Sunday Drive is an account of an economy run in which the author, his family, and the family automobile participated. During an economy run, participants follow a pre-planned route in their automobiles and compete for greatest ton-miles per gallon of gasoline.

- Chapter 8 Trucks, Recreational and Other Vehicles suggests ways, in addition to those offered in the previous chapters, for drivers to reduce fuel consumption in the use of these vehicles.
- Chapter 9 Alternate Power Sources describes the operation of wankel engines, stratified charge engines, and diesel engines and their use in place of the conventional internal combustion engines.
- Chapter 10 125 Ways to Improve Your Gas Mileage contains a list of tips for fuel efficiency.
- Chapter 11 The Basics of Engine Operation presents a basic view of what goes on inside the engine that will enable the reader to use the troubleshooting guides provided throughout the remainder of the book.
- Chapter 12 The Starting System describes the chain of mechanisms that crank the engine and provides a detailed step-by-step troubleshooting checklist.
- Chapter 13 The Ignition System explains how it works and provides a detailed step-by-step troubleshooting checklist. Included is a section on electronic ignition systems.
- Chapter 14 The Fuel System explains typical carburetor operation and provides a detailed step-by-step troubleshooting checklist.
- Chapter 15 Compression explains what it is and how a compression test is performed. Included is a detailed troubleshooting checklist.
- Chapter 16 The Cooling System explains the flow of coolant through the engine and provides a detailed step-by-step troubleshooting checklist.
- Chapter 17 Poor Engine Performance describes how to evaluate spark plug appearance and vacuum gauge readings. Charts in this chapter will help the reader use the material in the previous sections most effectively.
- Chapter 18 The Tune-Up details the procedures used in tune-ups and emission control checks.
- Chapter 19 The Electrical System explains basic electrical principles and how the automobile charging system works. It also covers the operation of dash gauges and indicators, fuses, circuit breakers, fusible links, windshield wipers, and lights. Troubleshooting checklists for each are provided.

- Chapter 20 The Air Conditioning System describes the refrigeration cycle and provides a detailed step-by-step troubleshooting checklist.
- Chapter 21 Manual Transmission and Clutch explains how they work and provides a detailed step-by-step troubleshooting checklist for each.
- Chapter 22 The Automatic Transmission explains how it works and provides a detailed step-by-step troubleshooting checklist.
- Chapter 23 The Rear Axle explains how it works and provides a detailed step-by-step troubleshooting checklist, including the driveshaft and universal joints.
- Chapter 24 The Front Suspension and Wheel Alignment explains how the front suspension works and provides a detailed troubleshooting chart for wheel alignment.
- Chapter 25 Brakes explains how hydraulic systems and power brake boosters work and provides a detailed troubleshooting chart for each.
- Chapter 26 Steering Systems explains how manual and power steering systems work and provides a detailed troubleshooting chart for each.
- Chapter 27 Tires describes different types of tires and provides tips for maintenance and selection.

Appendix supplies conversion tables, 1977 EPA ratings, and other information which can assist the do-it-yourself car mechanic.

Comments: The book is illustrated with graphs, charts, and photographs which are easy-to-understand and useful for interpreting the semi-technical text. Chapters 1 through 10 are easy enough to follow by the average motorist; the remaining chapters are intended for readers with a technical inclination and/or a background in auto mechanics.

Price: \$5.95

Available Chilton Book Company
From: Radnor, Pennsylvania 19089

HOW RIDESHARING CAN HELP
YOUR COMPANY

U.S. DEPARTMENT OF TRANSPORTATION
1979

A manual for employers who wish to learn how to initiate and administer a ridesharing program. (34 pp.)

CONTENTS

- Section 1 What Ridesharing Can Do For Your Company discusses the advantages of carpooling--from cleaner air to reduced congestion.
- Section 2 What Ridesharing Can Do For Your Employees discusses employee benefits as well as barriers which can prevent successful ridesharing.
- Section 3 Issues for Management Consideration discusses ways to enlist management and staff support and lists criteria for evaluating the feasibility of a ridesharing program.
- Section 4 Program Promotion and Organization includes ideas on rider surveys and matching, soliciting interest, and developing employee incentives.
- Section 5 Costs of Start-Up and Administration estimates pooling costs, providing examples from different companies.
- Section 6 Considerations Unique to Vanpools discusses driver selection and van acquisition, including leasing, maintenance, fares, Federal and other financial and legal considerations.
- Section 7 Where Can I Get Help? provides ideas on places to contact for further information.
- Appendix 1 A. Selected HOV Projects and Preferential Treatments for Ridesharing Pools provides short case studies.
- B. Employer Sponsored Vanpool Programs
- C. Federal Highway Administration Division Offices
- D. State and Local Ridesharing Agencies
- E. State Departments of Transportation
- Appendix 2 F. Estimated Annual Cost of Maintaining Various Company Carpool Programs
- G. Start-Up Costs for Company-Sponsored Vanpool Programs

- H. Costs of Maintaining Company-Sponsored Vanpool Programs
- I. Vanpool Driver/Coordinator Cooperative Agreement
- J. Vanpool Cost and Fare Calculation
- K. Vanpool Subscription Agreement
- L. Sample Employer Interest Survey

Comments: A practical guidebook for company owners and managers. The appendices provide charts which correspond to the narrative.

Price: For information on price and availability, contact:

U.S. Department of Transportation
Washington, D. C. 20590

This and other pertinent information is available from metropolitan planning organizations and local ridesharing agencies.

GAS SAVERS GUIDE

EDITORS OF CONSUMERS GUIDE
1979

A book of tips for the automobile owner on saving gasoline and money.
(64 pp.)

CONTENTS

- Introduction** Cutting Fuel Expenses emphasizes that the driver's habits have a greater impact on fuel consumption than an untuned engine or the indiscriminate use of an air conditioner, and that efficient driving requires no special sacrifice or change in lifestyle.
- Part One** Driving Efficiently describes ways to become a smoother, thrifter driver and thereby get the most miles per gallon from your car. This section suggests such measures as planning ahead to cut the number of short trips; route planning to avoid stops for traffic lights, heavy traffic, or school buses; cutting down on weight in the car and distributing weight evenly; warming up a cold engine quickly; and efficient and economical practices for buying gas.
- Part Two** Maintaining Your Car recommends following service instructions in your owner's manual and checking any unusual signs in your car's operation. Some specific tips include getting regular tune-ups, washing your engine, changing spark plugs promptly, and other suggestions for keeping your automobile running at its peak efficiency. This section includes blank charts for calculating gasoline mileage.
- Part Three** Buying a New Car lists new and used cars by manufacturer, year, and style according to data compiled by CONSUMER GUIDE on gas mileage/economy. This information is followed by general recommendations for features to consider in selecting an automobile.
- Comments:** This handbook is a concise, specific guide to the individual automobile owner. It contains over 200 useful, easily implemented tips for saving gasoline and money in operating a car.
- Price:** For information on price and availability, contact:
- Publications International, Ltd.
3840 West Oakton Street
Skokie, Illinois 60076

FILMS;
FILMSTRIPS;
VIDEOTAPES

"GREAT GAS SAVE-IN"

U.S. POSTAL SERVICE

1975

This film shows logical methods for gasoline conservation by both vehicle drivers and fleet operators. It is applicable to any large business, government office, or individual interested in gasoline conservation.

Comments: 13 minutes, color, sound, 16 mm

Price: \$75.50 (Sale)
\$12.50 (Rental); Identification No. 009961

Available From: National Audiovisual Center
General Services Administration
Order Section
Washington, D.C. 20409

"NO FUELIN' - WE'RE POOLIN'"

U.S. POSTAL SERVICE
1976

This film describes the role of the employer in vanpool programs, including carpool matching, driver selection, and determining fares. It explains the concept of employer-sponsored vanpooling programs and encourages employees to participate in the program.

Comments: 8 minutes, color, sound, 16 mm

Price: \$46.50 (Identification No. 008639)

Available From: National Audiovisual Center
General Services Administration
Order Section
Washington, D.C. 20409

Free Loan Copies From:
Eastern Region
U.S. Postal Service
P.O. Box 8601
Philadelphia, PA 19101

"DOES IT HAVE TO BE THIS WAY?"

U.S. ENVIRONMENTAL PROTECTION AGENCY
1976

This film shows how car costs, the demand for energy, and the ulcer rate can be cut. It also stresses the importance of using mass transit, car pools, and other efficient means of transportation.

Comments: 10 minutes, color, sound, 16 mm

Price: \$58.00 (Identification No. 008597)

Available From: National Audiovisual Center
General Services Administration
Order Section
Washington, D.C. 20409

Free Loan Copies From:
Modern Talking Pictures
Suite 4
2000 L Street, N. W.
Washington, D.C. 20036

"A CAP IN THE GAP"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

This is a film on low-income home weatherization. It is a step-by-step instructional presentation, showing in detail the processes and materials used in the insulation of a typical house. It is intended for individual homeowners and other non-professionals in the insulation installation field. It is suitable for showing at civic meetings and at seminars and workshops staged by various organizations for citizen groups. The film may be used in conjunction with "The Home Energy Savers Workshop," "In the Bank or up the Chimney," and other such Federal publications available from the U. S. Government Printing Office.

Comments: 25 minutes, color, sound, 16 mm.

Price: \$140. (Includes reel and shipping case)

Available From: Monumental Films, Inc.
2160 Rockrose at Malden Avenue
Baltimore, Md. 21211

Free loan copies from DOE Regional Offices and
DOE Industrial Technical Assistance Office,
Washington, D.C. 20461

"CONSERVING ENERGY THROUGH APPLIANCE LABELING"

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
1976

Explains the purpose and goals of the labeling program begun in 1973. Explains how the information on the labels can help a consumer buy the most efficient model for his or her needs and save energy and money in the process. Gives a look at room air conditioner energy guide labels. Room air conditioners are the first appliances to be labeled under the appliance labeling program. Show is aimed at consumer groups, home economics teachers and classes, and adult education courses; can also be used by retail appliance stores as a training aid for salepeople. Guide included.

Comments: 7 minutes, 56 2x2 slides, color, 1 audiocassette,
1 script, 1975.

Price \$12.00 (Sale)

Available From: Available on loan from National Bureau of Standards,
Washington, D. C. 20234.

Source of purchase is National Audiovisual Center,
GSA, Attn: Order Section, Washington, D. C. 20409.

"ENERGY CONSERVATION FOR THE HOME: OR,
HOW TO LOWER YOUR UTILITY BILL"

UNIVERSITY OF ARIZONA
1976

This is a special short course at the lay level for the homeowner, builder, building material supplier, and real estate agent. This series of lectures is intended to provide the homeowner with the information needed to substantially reduce home energy consumption. The lectures start with an introduction on heat, energy and power. Topics covered in the lectures include fundamental definitions and units (What's a BTU?); tips on simple ways to reduce utility bills without major renovation; operating efficiencies of different types of heating and cooling systems (EER ratings); insulating properties of typical building materials (What's an R or a U value?); benefits and losses of shading devices and reflective coatings; and how to estimate heat gains and losses from various elements of a house. While the lectures are tailored more for warm climates, where air conditioning accounts for a significant part of home energy consumption, comments are included which make the lectures quite useful for cold climate regions as well.

Comments: The book associated with the course has the same title.

Price: Book: \$2.50/copy

Videotape:
Sale: \$810.00
Rental: \$360.00

Available From: Book:
University of Arizona
Engineering Experimental Station
College of Engineering
Tucson, Arizona 85721

Videotape:
Genesys Systems, Inc.
1121 East Meadow Drive
Palo Alto, CA 94303

"THE ENERGY GAME"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

This film is somewhat similar to "A Cap in the Gap" but is intended for a more general audience, as opposed to a low-income audience or emphasis. It deals with home insulation and other energy-saving tips. It features the "Home Energy Savers Workbook" and encourages its use for obtaining additional details on home energy conservation. The film was produced for FEA's Office of Energy Conservation and Environment by the Argonne/ERDA Laboratories in Chicago.

Comments: 16 minutes, color, sound, 16mm.

Price: \$50 (includes reel and shipping case)

Available From: Eagle Film Labs
4971 North Elston Street
Chicago, Illinois 60630

Free loan copies from DOE Regional Offices and DOE Industrial Technical Assistance Office, Washington, D.C. 20461

"HOUSEHOLD ENERGY MANAGEMENT"

FLORIDA POWER CORPORATION
1976

The filmstrip first makes the viewer aware of the extent to which energy is used in the home. It then relates energy use to actual energy cost. A look at the thermal efficiency of a home develops an awareness of do-it-yourself ways to cut energy consumption without lowering levels of comfort. Helpful tips on cooking and the use of hot water along with positive steps to reduce waste and use energy more wisely throughout the home develop an understanding of the need for responsible energy use.

A discussion guide is supplied with the filmstrip which is geared primarily toward 7th - 12th graders, and adult civic and consumer groups.

Comments: 35mm sound filmstrip/20 minute cassette tape/74 frame color filmstrip.

This version of the filmstrip is currently available on loan to school systems in the 32-county area serviced by the Florida Power Corporation. Plans are being solidified to re-package the filmstrip for sale.

Price: Minimum order of 50 kits (filmstrip and accompanying cassette) at \$15.00 per unit.

Available From: Florida Power Corporation
3201 34th St., S.
P. O. Box 14042
St. Petersburg, FL 33733
Attn: R. F. Van Camp

"INDUSTRIAL INSULATION"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1976

This technically-oriented film is intended for audiences of industrial managers and is suitable for use as an industrial training film for employees as well. The presentation covers in outline form much of the material contained in the detailed, highly technical FEA publication, "ETI - Economic Thickness for Industrial Insulation."

Comments: 25 minutes, color, sound, 16mm.

Price: Book:
\$2.70 (GPO, Stock No. 041-018-00115-8) (with a discount for orders of 100 or more copies).

\$7.75 (NTIS, Order No. PB 259 937)

Film:
\$140.00 (includes reel and shipping)

Available Book:
From: Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Film:
Monumental Films, Inc.
2160 Rockrose at Malden Ave.
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices and from DOE Industrial Technical Assistance Office, Washington, D.C. 20461

"IT'S DOLLARS AND SENSE"

U. S. HEALTH RESOURCES ADMINISTRATION
1976

Aimed at the administrators, executives and engineering staffs of hospitals and other health institutions. Explains how the steps taken to reduce the use of energy have resulted in substantial dollar savings without affecting the quality of patient care. Explains load-shedding practices, heating and ventilation practices, efficiency testing and equipment maintenance, lighting, new innovations and designs and other measures which can be applied by hospitals interested in stretching their budgets by conserving energy.

Comments: 28 minutes, sound, color, 16mm.

Price: \$127.00 (Sale)

Available From: National Audiovisual Center
GSA, Attn: Order Section
Washington, D. C. 20409

For address of loan source, contact:
National Audiovisual Center
GSA, Attn: Reference Section
Washington, D. C. 20409

"SAVING ENERGY AT HOME"**RAMSGATE FILMS****1976**

This film identifies major sources of home energy use and provides specific tips on where energy is often wasted and how to reduce this waste. The areas covered are thermostat regulation, insulation, windows, air conditioning, water heating, dishwashing, washer and dryer, refrigeration, food preparation and lighting.

Comments: 13 minutes.

Price: Sale: \$180.00
Rental: \$17.00 (3 days)

Available From: Ramsgate Films
704 Santa Monica Blvd.
Santa Monica, CA. 90401

"SAVING ENERGY ON THE ROAD"

RAMSGATE FILMS

1976

The film illustrates a variety of ways to reduce driving costs and maintain safe driving habits. Section One: Choosing the Right Car gives tips about determining the best car size and accessories to suit individual driving needs. Section Two: Driving Techniques demonstrates such practical gas-saving techniques as proper acceleration, braking, uphill driving, and optimal speeds. Section Three: Maintenance shows simple methods for keeping a car in condition for maximum economy, as well as for selecting the best gasoline and oil. Section Four: Driving Less suggests ways to cut down on car use without inconvenience. The final segment reviews and summarizes the major energy-saving points made in the film. This film is commonly used in driver training courses.

Comments: 15 minutes, color.

Price: Sale: \$225.00
Rental: \$20.00 (3 days)

Available From: Ramsgate Films
704 Santa Monica Blvd.
Santa Monica, CA 90406

"UP THE POWER CURVE"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

This film looks at energy conservation in business, the home and the automobile. It concentrates on the easy, affordable measures that are within easy grasp of most interested individuals. The recommended audiences are high school and college, business groups, adult groups and organizations, civic and youth groups, churches.

Comments: 10 minutes, color, sound, 16mm.

Price: Loaned at no cost.

Available From: Loan copies are available from the Department of Energy,
Office of Communications and Public Affairs, Washington, D. C.
20461.

"WASTE HEAT MANAGEMENT - ENERGY UTILIZATION FOR PROFIT"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)
1976

This film is designed for use by industrial managers. It examines the basic concept of waste heat management and shows examples of waste heat recovery systems. It also features industry spokesmen describing some of their experiences with waste heat management. The film may be used at seminars and workshops and is especially well suited for industrial association or individual company training programs for employees.

The film mentions and encourages use of the "Waste Heat Management Guidebook," which is an FEA/National Bureau of Standards publication which offers detailed information on this highly technical subject.

Comments: 25 minutes, color, sound, 16mm.

Price: Guidebook - \$2.75 (GPO Order No. C13.11:121, Stock No. 003-003-01669-1) (25 percent discount on 100 copies or more)

Film - \$122.50 (Order No. 008-729)

Available From: The Guidebook is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Loan copies of the motion picture are available from DOE Regional Offices or from the Industrial Technical Assistance Office of DOE, Washington, D.C. 20461.

Sale copies of the film are available from the National Audiovisual Center, General Services Administration, National Archives and Records Service, Washington, D. C. 20409.

"ENERGY-EFFICIENT ELECTRIC MOTORS"

FEDERAL ENERGY ADMINISTRATION
(NOW DEPARTMENT OF ENERGY)

1977

This film brings viewers up to date on the latest data on electric motors which are very widely used throughout industry. It also emphasizes the fact that today's electric motors are capable of doing more work while using less energy if used properly. This film is another in the series of DOE films for industrial audiences.

Comments: 25 minutes, color, sound, 16mm.

Price: \$140 (includes reel and shipping case)

Available From: Monumental Films
2160 Rockrose at Malden Ave.
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices and DOE Industrial Technical Assistance Office, Washington, D.C. 20461

"HIGH ENERGY EFFICIENCY - AN IMPERATIVE
FOR TOMORROW"

DEPARTMENT OF ENERGY
1977

This film features new techniques for home energy systems and new building designs that will result in maximum energy efficiency.

Comments: 25 minutes, color, sound, 16 mm

Price: \$140 (includes reel and shipping case)

Available Monumental Films
From: 2160 Rockrose at Malden Avenue
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices and DOE Industrial
Technical Assistance Office, Washington, D.C. 20461.

"THE INSULATION STORY"

NATIONAL MINERAL WOOL INSULATION
ASSOCIATION, INC.
1977

Useful information for homeowners who want to insulate their homes but are uncertain how to approach the problem. Answers the question: Why insulate? What is insulation? How much insulation is needed? Where should you insulate? How do you insulate? and, How do you select a contractor?

CONTENTS

Why to Insulate discusses heat loss, factors to keep in mind, money saved and house resale value.

What Insulation Is describes various types of insulation for inside and outside application; (mineral wool, cellulose, urea formaldehyde) and R factors.

How Much Insulation is Needed instructs the viewer that he can add R factors if adding insulation, and how he can determine area to be insulated. Heating zones requiring different R factors are discussed and safety precautions are outlined.

Where Should a House be Insulated diagrams clearly nine places where insulation is needed.

How to Insulate shows how to install insulation in attic floors, walls, and basement ceilings.

If You Hire a Contractor outlines some good ideas for the homeowners to consider in selecting a reliable company or individual.

Comments: 80 slides, color, 25 minutes.

Price: \$25.00 postpaid per set of 80 slides with script.
20% discount to educational institutions.

Available From: National Mineral Wool Association
382 Springfield Avenue
Summit, New Jersey 07901

"TRUCK/FLEET OPERATOR"

DEPARTMENT OF ENERGY

1977

This film deals with management and routing techniques that will result in more efficient fuel use. The companion film is "TRUCK-OWNER/TRUCK OPERATOR".

Comments: 15 minutes, color, sound, 16 mm

Price: \$110 (includes reel and shipping case)

Available From: Monumental Films
2160 Rockrose at Malden Avenue
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices and DOE Industrial Technical Assistance Office, Washington, D.C. 20561.

"TRUCK OWNER/TRUCK OPERATOR"

DEPARTMENT OF ENERGY
1977

This film covers driving techniques and operation/maintenance practices which will result in more efficient fuel utilization. The companion film is "TRUCK/FLEET OPERATOR".

Comments: 15 minutes, color, sound, 16 mm

Price: \$110 (includes reel and shipping case)

Available From: Monumental Films
2160 Rockrose at Malden Avenue
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices and DOE Industrial Technical Assistance Office, Washington, D.C. 20461.

"VANPOOLING"

DEPARTMENT OF ENERGY
1977

This film is directed towards general audiences through civic organizations and DOE-sponsored workshops and seminars. It will encourage greater participation in vanpooling programs by individuals and by business firms.

Comments: 25 minutes, color, sound, 16 mm

Price: \$140 (includes reel and shipping case)

Available From: Monumental Films
2160 Rockrose at Malden Avenue
Baltimore, Maryland 21211

Free loan copies from DOE Regional Offices, and DOE Industrial Technical Assistance Office, Washington, D.C. 20461.

"BUILD YOUR OWN GREENHOUSE
- SOLAR STYLE - "

DANAMAR FILM PRODUCTIONS
1978

This film is for use in a workshop of volunteers--groups or homeowners--interested in using the warmth of the sun for year-round gardening, water conservation, and heating adjoining buildings. It is directed toward an audience that wishes to inform and interest the public in this alternative energy source. The technology on how to design and cost-effectively build a solar project is demonstrated. The film comes with two books, "The Food and Heat Producing Solar Greenhouse," and "An Attached Solar Greenhouse."

Comments: The film (16 mm, color/sound, 21 minutes) has been produced by experienced professionals whose interest is in attracting public participation in conserving energy by use of the oldest source of heat. Optional materials are offered to purchasers only:

"Educational Guide" - \$3.00 - suggests small projects for upper elementary to college-age students. It includes a bibliography.

"Workshop Construction Guide" - \$3.00 - shows how to organize workshops and operate the solar greenhouse.

Price: \$315.00 (to purchase)
\$ 55.00 (to rent)

Available

From: Danamar Film Productions
275 Kilby
Los Alamos, New Mexico 87544

(505) 672-9766

"CONSERVATION - INVESTING IN TOMORROW"

DEPARTMENT OF ENERGY LIBRARY
1977

A multidirectional film on ways to save energy in industry, auto manufacturing, and housing.

Comments: This film (6:30 minutes, #517) can be borrowed by schools, television stations, and the general public.

Price: Free (to borrow).

Available

From: Department of Energy Film Library
Technical Information Center
Post Office Box 62
Oak Ridge, Tennessee 37830

To purchase, contact:

National Audiovisual Center
National Archives and Records Service
General Services Administration
Order Section FF
Washington, D. C. 20409

or call (301) 763-1891

"ENERGY CONSERVATION IN
INSTITUTIONAL FOOD SERVICE"

CONSOLIDATED EDISON COMPANY OF NEW YORK

The food service industry is a major user of energy. This slide presentation recommends methods for in-service personnel and managers to conserve energy.

Comments: Consolidated Edison will arrange programs for food industry professionals.

Price: For information on price and availability, contact:

Consolidated Edison Company of New York
Office of Consumer Affairs
Four Irving Place
New York, New York 10003

or call (212) 460-5171

"RUNNING ON EMPTY -
THE FUEL ECONOMY CHALLENGE"

DEPARTMENT OF ENERGY LIBRARY
1978

This film illustrates various means of saving money and fuel for the automobile operator. It is directed toward the general public.

Comments: The film (27 minutes, #531) would be appropriate for use by organizations and civic groups who wish to reach the public, whose participation is required.

Price: Free (to borrow).

Available

From: Department of Energy Film Library
Technical Information Center
Post Office Box 62
Oak Ridge, Tennessee 37830

To purchase, contact:

National Audiovisual Center
National Archives and Records Service
General Services Administration
Order Section FF
Washington, D. C. 20409

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