SERI/TP-260-3881
DE90000369
UC Category: 233

A Planning Framework for Transferring Building Energy Technologies

Executive Summary

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August 1990

Prepared for the Office of Building Technologies
U.S. Department of Energy
Under Task No. AS925440

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A Division of Midwest Research Institute

1617 Cole Boulevard
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Prepared for the
U.S. Department of Energy
Contract No. DE-AC02-83CH10093

NOTICE

Printed in the United States of America
Available from:
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Price: Microfiche A01
Printed Copy A03

Codes are used for pricing all publications. The code is determined by the number of pages in the publication. Information pertaining to the pricing codes can be found in the current issue of the following publications which are generally available in most libraries: *Energy Research Abstracts (ERA)*; *Government Reports Announcements* and Index (*GRA* and I); *Scientific and Technical Abstract Reports (STAR)*; and publication NTIS-PR-360 available from NTIS at the above address.

PREFACE

On April 19, 1990, the Assistant Secretary for Conservation and Renewable Energy (CE), J. Michael Davis, announced a reorganization of his office within the U.S. Department of Energy (DOE). The Office of Building and Community Systems (OBCS), for which this study was conducted, was replaced by an Office of Building Technologies (OBT), headed by Deputy Assistant Secretary John P. Millhone. Within OBT, three offices now exist: (1) the Office of Buildings Energy Research (OBER), (2) the Office of Codes and Standards (OCS), and (3) the Office of the Federal Energy Management Program (FEMP).

The key results of the planning effort summarized in this report apply to OBT programs in a crosscutting sense. Technology transfer functions may, in the future, be located in a different unit within the CE organization as a result of the reorganization; however, the recommendations of this report apply regardless of the organizational unit in which technology transfer functions reside. Therefore, references to the building energy technologies R&D program are now made by referring to OBT and are intended, in general, to include the crosscutting aspects of technology transfer for that program.

The Office of State and Local Assistance Programs (OSLAP), also mentioned in this study, was included in the reorganization at DOE. In its stead, an Office of Technical and Financial Assistance (OTFA) has been formed. Three offices report to Frank Stewart, the Deputy Assistant Secretary for Technical and Financial Assistance: (1) The Office of National Programs, including the Energy-Related Inventions Program (ERIP); (2) the Office of Grants Management, including the Weatherization Assistance Program (WAP) and the Institutional Conservation Program (ICP); and (3) the Office of Technical Assistance, incorporating federal information programs.

A DOE and U.S. Department of Housing and Urban Development (HUD) joint initiative is another significant development relevant to this study. The potential for joint DOE/HUD activities is explored in the final report of this study, *A Planning Framework for Transferring Building Energy Technologies* (SERI/TP-260-3729; available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161). The agencies currently plan to work together to save energy and improve comfort in a wide range of HUD programs mentioned in this report. The joint initiative is expected to reduce federal expenditures for energy and reduce emissions of gases damaging to the environment. A 25% energy savings in public housing nationwide, for example, could provide savings of approximately $200 million while increasing occupants' comfort. Emissions from power plants could be reduced by more than 3 million tons of carbon dioxide, 8,000 tons of sulfur dioxide, and 5,000 tons of nitrogen oxides. The DOE-HUD agreement was put in motion by an exchange of letters between W. Henson Moore, Deputy Secretary, DOE, and Jack Kemp, Secretary, HUD. The cooperative program will be directed by J. Michael Davis, DOE, and Anna Kondratas, Assistant Secretary, Community Planning and Development, HUD.

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ACKNOWLEDGMENTS

The Office of Building Technologies gives special thanks to the Solar Energy Research Institute for coordinating the Interlaboratory Advisory Group on Technology Transfer and to Lawrence Berkeley Laboratory, Oak Ridge National Laboratory, and Pacific Northwest Laboratory for their technical support to this document.

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EXECUTIVE SUMMARY

After the Oil Producing and Exporting Countries (OPEC) oil embargo in 1973-74, energy efficiency in U.S. buildings improved substantially. The known benefits of energy efficiency in buildings, transportation, and industry include saving finite energy supplies, reducing the cost of energy services, improving national security, improving the competitiveness of U.S. industry, reducing acid rain, slowing global climate change, and reducing ozone depletion. However, efficiency gains have been reversed in the past 3 years, and future increases in building energy use are anticipated. Although the technological potential for reducing the amount of energy consumed in buildings remains significant--on the order of 25% for existing buildings and 50% for new buildings with technologies that already exist--the impediments to actualizing that potential lie in the technology transfer arena. For energy efficiency to contribute to its full potential, diverse intermediaries and consumers will have to decide to invest in it. Market availability and acceptance are pivotal to an effective role for building energy efficiency in the national energy equation.

This report presents the key results of an interlaboratory planning effort in support of the U.S. Department of Energy's (DOE's) Office of Building Technologies (OBT) (formerly the Office of Buildings and Community Systems) and its Analysis and Technology Transfer (A&TT) Program. OBT manages the nation's energy technology research and development (R&D) program in buildings. This effort dealt specifically with technology transfer related to energy efficiency in buildings, and particularly with the aspects of technology transfer that cut across the entire OBT program. These results are presented in greater detail in the final report of the interlaboratory planning effort (SERI/TP-260-3729).

Approach

Transfer of energy efficiency technologies in buildings can be accomplished rapidly by using mandatory standards and regulations. This study is based on the assumption that such regulation would not occur; it addresses how to accomplish technology transfer effectively without mandatory processes. This is a much more difficult problem. Although OBT has already successfully transferred some technology, OBT management decided that planning was needed to explore ways to increase the Office's effectiveness in this area. A guiding assumption for planning was that OBT's program, as an R&D program, should forge linkages with already existing programs whose goals involved actually enhancing energy efficiency in buildings.

An *ad hoc* Technology Transfer Advisory Group, which included representatives from OBT management and four national laboratories, reviewed the current program, brainstormed technology transfer approaches, identified applicable research results and references, and developed a framework that management could use in deciding on the best investments of technology transfer resources. Representatives of some 22 other programs and organizations were interviewed concerning their perceptions of the potential for transferring energy efficiency technologies through active linking with OBT.

The list of organizations and programs interviewed is in no sense intended to be exhaustive. Instead, it represented a preliminary effort to identify potentially significant near-term opportunities to enhance energy efficiency in buildings through effective technology transfer. Many other organizations are equally or even more worthy of attention and of being included in OBT efforts to transfer technology through existing programs. Since this was a planning effort, it was not possible to include every possible organization. In the future, however, OBT may well expand its efforts to interact with existing networks.

The organizations included in this study were as follows:

DOE Programs:

Energy Extension Service (EES)
State Energy Conservation Program (SECP)
Institutional Conservation Program (ICP)
Weatherization Assistance Program (WAP)
Energy Related Inventions Program (ERIP)
Federal Energy Management Program (FEMP)
Small Business Innovation Research (SBIR)

Federal Information Services:

Conservation and Renewable Energy Inquiry and Referral Service (CAREIRS)
National Appropriate Technology Assistance Service (NATAS)
Solar Technical Information Program (STIP)
Federal Laboratory Consortium (FLC)

Other Federal Programs:

Housing and Urban Development (HUD) Public Housing
Other HUD Programs
National Institute of Standard and Technology (NIST) Office of Research and Technical Applications (ORTA)
NIST Center for Building Technologies (CBT)

Trade and Professional Organizations:

National Association of Regulatory Utility Commissioners (NARUC)
National Association of State Energy Officials (NASEO)
The U.S. Conference of Mayors
National Association of Home Builders (NAHB)
NAHB Research Center
National Institute of Building Sciences (NIBS)
Building Thermal Envelope Coordinating Council (BTECC)

Several key issues in transferring building energy technologies were identified:

1. Defining technology transfer clearly to include, for example, both scientific information exchange and activities that result in technologies actually being adopted and used

2. Deciding whether OBT should transfer technologies developed only by its own program or technologies developed by others (including foreign countries) as well

3. Identifying appropriate roles in technology transfer for the national laboratories

4. Identifying the research and analysis support needed for an integrated OBT technology transfer program

5. Identifying the management support needed for effective technology transfer

6. Identifying the most effective means to link the OBT R&D program with other programs and organizations within and beyond DOE to accomplish technology transfer.

OBT managers said they were particularly interested in obtaining evidence concerning the effectiveness of technology transfer strategies and mechanisms in achieving the actual use of energy efficiency technologies and practices in buildings.

Program Overview

In the past, OBT emphasized three technology transfer strategies: (1) contracting R&D to industrial partners, (2) influencing key intermediaries, and (3) working with broker organizations. Existing models suggest that through such techniques as segmenting user audiences and tailoring strategies to different stages of the technology development process, OBT can improve the effectiveness of its technology transfer program. The Office-wide program funds projects that are crosscutting in nature, benefit from standardized formatting, or have significant economies of scale.

The OBT R&D program focuses on technologies, tools, and practices that will directly or indirectly result in decreased energy use in buildings. The program concentrates on only a few technologies, because the necessary research is time-consuming and expensive, and budgets are limited. These projects involve long-term, high-risk research that private enterprise cannot conduct. Thermally activated heat pumps and Stirling engines are examples of technologies requiring such long-term development. The transfer of this equipment, as it is developed, occurs with the involvement of a handful of product manufacturers. These technologies will not be ready for commercialization for some years. Nevertheless, early awareness and involvement on the part of entrepreneurs, venture capitalists, and manufacturers can hasten technologies' eventual production and marketing. The earlier that manufacturers are aware of and actively engaged in the research, development, and demonstration (RD&D) process, the more quickly these types of technologies can be produced and commercialized. Most of the relevant technology transfer with respect to these R&D products occurs at the program and project level, not at the Office level.

The balance of the OBT program's activities--the shorter-term R&D, software development, and other products--have broader audiences and require more assistance for transfer to be successfully accomplished. Three types of technologies, tools, and practices are (1) existing off-the-shelf technologies requiring no further federal assistance to commercialize, (2) existing off-the-shelf technologies requiring some additional federal assistance to hasten market saturation, and (3) those almost ready for transfer. To be effective in reaching the goal of reducing building energy use, OBT has to promulgate these products widely to a variety of audiences. Transfer of this technological information occurs both at the project and OBT-wide levels.

The OBT program has generated three successful technologies in recent years that appear to require no further assistance to reach full market acceptance. These are (1) low-e windows, (2) DOE-2, and (3) dielectric coatings. OBT has also generated five other technologies that are ready for use but appear to require some additional federal assistance to reach their full market potential. These are (1) solid-state ballasts for lighting, (2) unequal parallel compressor systems for supermarket refrigeration, (3) flame retention head oil burners for home heating, (4) heat-pump water heaters for homes, and (5) radiant barriers used with attic insulation for homes in hot climates. OBT program managers, in a recent study, evaluated 42 tools, technologies, and practices that they defined as nearly ready for commercialization. Of these, 25 (or 60%) were judged to require some federal assistance for successful diffusion. They are shown in the box on page 4.

Tools, Technologies and Practices Almost Ready for Transfer
Urban heat islands
Integrated utility planning processes
Utility analytical tools
Solid fuel appliances measurement methods
Shared savings
Diagnostic protocols and analysis methods
Corrosiveness of insulation
Maintenance and upgrade of DOE-2
Perfluorocarbon tracer system
Commercial standards
Roof Research Center
Simplified thermal analysis of roofs
Large-scale climate simulator
Roof thermal research apparatus
Superlite
Multifamily audit handbook
Diagnostic tool development
Radiant barrier modeling
Loose fill attic insulation settling
Acoustic testing of attic insulation
Moisture guidelines for residences
Core commercial daylighting
Energy tracking system
Thermal bridges design catalog
Advanced residential ventilation systems

Audiences

Eight kinds of audiences for OBT tools, technologies, and practices based on functional roles were defined:

1. Building researchers
2. Product manufacturers
3. Energy intermediaries
4. Energy service deliverers
5. Federal programs
6. Information intermediaries
7. Communities
8. Energy end users.

These functional audiences are distributed across a wide variety of organizational types or structural audiences. For example, energy program implementers may be found at utility companies, small consulting firms, community action agencies, state energy offices, and national laboratories. These functional audiences form networks across structural audiences, or organizations, based on common needs for information. To reach functional audiences effectively, OBT needs to be sophisticated in its approach to its audiences through a variety of organizational conduits, using segmentation techniques to provide credible information through trusted channels.

A Planning Framework

Four central technology transfer functions were defined for Office-level technology transfer:

1. Transferring research results
2. Transferring new and existing OBT-developed technologies
3. Transferring non-OBT energy technologies
4. Increasing awareness of the OBT program.

Some part of the technology transfer resources that are available should be used for each of these functions. OBT management could vary the emphasis assigned to these functions over time; for example, an early push to increase program awareness could be slowly phased down as audiences became more aware of the OBT program. In contrast, transferring non-OBT technologies could be given increasing emphasis.

The Advisory Group developed a framework by creating a matrix using technology transfer functions as column heads and general functional target audiences as row heads. Two of these frameworks were produced by completing the cells of the matrix in two different ways: (1) identifying the organizational conduits (structural audiences) to reach each functional target audience, and (2) identifying activities to accomplish the function for the identified functional type of audience. For instance, using the framework on organizational conduits as a heuristic device, one cell of the matrix suggests that to promulgate OBT research results among federal buildings planners and managers, OBT could work with the National Institute of Standards and Technology (NIST), the Federal Energy Management Program (FEMP), the General Services Administration, the Department of Defense, and the Construction Engineering Research Laboratory.

Matrix of Technology Transfer Functions by Target Audiences

Target Audiences	Technology Transfer Functions* (1)	(2)	(3)	(4)
Building researchers				
Federal Buildings				
Conservation programs				
Legislative				
State and local Buildings				
Conservation programs				
Legislative concerns				
Private sector Product manufacturers and distributors				
Energy intermediaries				
Conservation programs				
Consumers/end users				
Internal DOE staff and national laboratories				

*(1) = Research results
(2) = New and existing OBT tools, technologies, and practices
(3) = New and existing non-OBT tools, technologies, and practices
(4) = Program awareness

About 60 examples of technology transfer activities were developed; these were suggested by program managers, group members, existing projects, and outside sources. Using the criteria developed, the group evaluated and ranked these activities; 20 of them emerged as the most important examples for OBT to consider in planning and funding its technology transfer program.

Summary of Advisory Group Recommendations

1. A technology transfer strategy that OBT could use effectively is to link its R&D program with programs and organizations whose established missions involve disseminating energy efficiency information, implementing measures, regulating energy production and use, or representing relevant trades and professions. Based on a partial exploration of the opportunities for such linkages, the team concluded that OBT would find it particularly useful to pursue liaisons with FEMP, U.S. Department of Housing and Urban Development (HUD) programs, the National Association of Home Builders (NAHB), and NIST. Other significant opportunities for linkages exist with DOE's Office of Technical and Financial Assistance (OTFA), the National Appropriate Technology Assistance Service (NATAS), the National Association of Regulatory Utility Commissioners (NARUC), and the National Association of State Energy Officials (NASEO). OBT should continue to explore the potential for linking with other trade and professional organizations to develop a repertoire of working relationships that will affect technology transfer in a positive way.

2. OBT management should undertake a systematic, ongoing review of the Office's technology transfer activities. This process could be initiated with an internal management review of technology transfer; convening technology transfer roundtables with extramural laboratory, government, and private-sector participation; and establishing a Technical Review Panel for Technology Transfer as a standing committee.

3. OBT should use seven criteria to assess candidate technology transfer activities. These criteria relate to

   - Energy savings potential
   - Cost-effectiveness in transferring technology
   - Leveraging existing resources of other organizations
   - Effectiveness in reaching unreached or underreached key audiences
   - Congruence with OBT functions and strategy
   - The use of innovative approaches
   - The contribution to a balance across functions and audiences.

4. OBT should use the framework recommended as a heuristic device in planning its technology transfer activities. This framework can be used (1) to discern the specific structural audiences that will reach functional audiences and (2) to exhibit a way that already-funded and proposed activities can be evaluated against target audiences and technology transfer functions to test the program's balance.

5. The portion of OBT technology transfer dedicated to scientific information exchange appears to be working well in keeping buildings researchers informed about the program and its scientific progress. Standing and special-purpose review committees also appear to effectively involve the private sector with the program. These portions of the Office's technology transfer program should be preserved. Production of *Buildings Energy Technology, Research in Progress* and similar publications should be continued at about the same level of support.

6. OBT should engage at the Office-wide level in transferring new and existing OBT tools, technologies, and practices by working through product manufacturers and energy intermediaries--those actually producing, designing for, and implementing energy efficiency measures.

7. OBT should transfer new and existing tools, technologies, and practices developed by others, particularly through the Center for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET) and the Building Efficiency and Conservation Network (BEACON), if established. To fulfill its function of leading a national effort to increase the energy efficiency of the nation's buildings, OBT should include the transfer of any demonstrably workable technologies.

8. OBT should engage in activities to increase program awareness across the range of audiences potentially interested in the results of the R&D program. These activities should enhance the probability of users' awareness and use of the program's R&D results for scientific, educational, design, manufacture, construction, and other purposes to aid in increasing energy efficiency in buildings. Audiences would include public- and private-sector scientists, legislators, government officials, and consumers.

9. These four technology transfer functions--

   - Research results
   - New and existing OBT tools, technologies, and practices
   - New and existing non-OBT tools, technologies, and practices
   - Program awareness

   --should each receive some emphasis, and attention should be given to their relative importance over time.

10. Finally, OBT should engage in effective technology transfer activities that address each function. The example activities recommended as most important, not presented in rank order but organized by technology transfer function, are as follows.

    a. Research Results

    The portion of Office-wide technology transfer devoted to publishing bibliographies, research-in-progress reports, program overviews, and technology overviews should be continued at about the current level of effort. The use of standing and special-purpose committees should be preserved. The national laboratories should continue to be supported in promoting scientific information exchange through the normal scientific processes of conferences, peer review, and publication.

    b. Management and Research Support Activities

    1. Technology transfer handbook--presenting planning, procedures, resources, evaluation, and the significance of technology transfer in program effectiveness for OBT program managers, principal investigators at national laboratories, and other personnel.

    2. OBT technology transfer roundtable(s)--assessing needs and sharing the technology transfer experiences of buildings industries and other users of OBT tools, technologies, and practices.

3. Technical Review Panel for Technology Transfer--establishing a standing committee of private-sector, public-sector, and laboratory representatives to review the technology transfer program.

4. Research on segmentation of OBT user audiences--characterizing the users of tools, technologies, and practices under development to permit information products and other activities to be tailored specifically for them.

5. Development of an evaluation design for technology transfer programs--formulating a quasi-experimental design to permit systematic evaluations of existing federal information programs' effectiveness in transferring building energy technologies.

6. Evaluation of technology transfer effectiveness--using indicators such as requests for publications and software packages, numbers of copies sold, and the like.

7. Technology transfer in performance evaluations--rewarding OBT program managers for excellence in transferring technology through their programs.

8. Providing technical assistance and requiring a technology transfer plan as part of all R&D projects--proactively planning and reviewing the technology transfer aspects of OBT programs at headquarters and in the laboratories.

9. Annual overall OBT technology transfer plan--developing a milestone schedule of technology transfer products and events for the entire OBT program.

10. OBT Technology Transfer Award--displaying management's commitment to technology transfer through significant monetary and honorary awards for headquarters and laboratory staffs.

11. Electronic mail network for OBT and its national laboratories--enhancing communication between laboratories and headquarters staffs to facilitate the transfer of research results and program management.

c. Transfer of OBT and non-OBT Tools, Technologies, and Practices

1. Center for the Analysis and Dissemination of Demonstrated Energy Technologies (CADDET)--participating in international technology transfer with International Energy Agency (IEA) countries to promote adoption by industry of successful energy efficiency technologies.

2. Trade magazine news releases and articles--sending news releases to various trade organizations and newspapers; assisting in the publication of more lengthy articles.

3. Building Efficiency and Conservation Network (BEACON)--providing credible and accessible performance information on building energy technologies to building practitioners and the general public through a normalized data base cooperatively administered through NIST, industry associations, utilities, and other concerned organizations.

4. Computer-based information systems for technology transfer--demonstrating to the building community efficient and innovative approaches for technology transfer using multimedia, such as CD-ROM, video memos, and information kiosks.

5. National laboratory host for ACSA Summer Institute on Energy and Environmental Systems--fostering understanding between architecture faculty and laboratory scientists on building energy technologies issues.

6. Curriculum materials for technical schools--initiating a program to improve the effectiveness of practitioner training in the buildings industries.

7. Implementing advanced building technologies by adopting architectural firms as information brokers--establishing a dialogue with architectural and engineering firms to form joint building technology application partnerships in the early phases of design commissions to foster research and communication of results to the building design community.

d. Program Awareness

1. Modular display of OBT research accomplishments--constructing a display on the OBT program to be used at trade shows for builders; heating, ventilation, and air-conditioning (HVAC) contractors; and building material suppliers.

2. Information kiosk on the OBT program--constructing an advanced-technology (such as a computer touch screen) information kiosk providing a hands-on exhibit to promote awareness of the OBT program at trade and professional association meetings and other shows and expositions.

These activities are described in more detail in the final report.

OBT management should expect technology transfer processes to take several years to achieve notable results in the marketplace. To support the efforts of its offices, the Department of Energy is developing a departmental technology transfer strategy. OBT should coordinate its efforts with those of OTFA and the DOE-wide strategy to enhance its technology transfer effort. Significant potential to reduce the energy consumed in U.S. buildings will be realized by accelerating the adoption of new and existing cost-effective technologies.

GLOSSARY

Abbreviation	Stands for
ACEC	American Consulting Engineers Council
ACSA	Association of Collegiate Schools of Architecture
AGA	American Gas Association
AHAM	Association of Home Appliance Manufacturers
AIA	American Institute of Architects
ASEAM	A Simplified Energy Analysis Method
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
BCS	Office of Buildings and Community Systems (now OBT)
BEAS	Building Energy Accounting System
BECA	Building Energy-Use Compilation and Analysis
BEP	Building Energy Programs
BET	Building Energy Technology
BTECC	Building Thermal Envelope Coordinating Council
BTESM	Building Thermal Envelope Systems and Materials
CADDET	Center for the Analysis and Dissemination of Demonstrated Energy Technologies
CAREIRS	Conservation and Renewable Energy Inquiry and Referral Service
CBT	Center for Building Technology (within NIST)
CCB	Construction Criteria Base (within NIBS)
CDBG	Community Development Block Grant
CE	Office of Conservation and Renewable Energy (within DOE)
CLPHA	Council of Large Public Housing Authorities
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DSM	demand-side management
EBER	Existing Buildings Efficiency Research
ECPA	Energy Conservation and Production Act
ECUT	Energy Conservation and Utilization Technology
EEI	Edison Electric Institute
EES	Energy Extension Service
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ER	Energy Research
ERIP	Energy Related Inventions Program
ESCO	Energy service company
EUR	Energy Utilization Research
FEMP	Federal Energy Management Program
FHA	Federal Housing Authority
FLC	Federal Laboratory Consortium
GNMA	Government National Mortgage Association
GPO	Government Printing Office
GRI	Gas Research Institute
GSA	General Services Administration
HBAs	Home Builder Associations
HBI	Home Builders Institute
HUD	Housing and Urban Development
IAQ	Indoor air quality
ICP	Institutional Conservation Program
IEA	International Energy Agency
IOU	investor-owned utility

GLOSSARY (Concluded)

Abbreviation	Stands for
IUPP	integrated utility planning processes
LBL	Lawrence Berkeley Laboratory
LCC	life-cycle costing
LCUP	Least-Cost Utility Planning
LIHEAP	Low-Income Home Energy Assistance Program
MIT	Massachusetts Institute of Technology
NAHB	National Association of Home Builders
NAHRO	National Association of Housing and Redevelopment Officials
NARUC	National Association of Regulatory Utility Commissioners
NASA	National Aeronautics and Space Administration
NASEO	National Association of State Energy Officials
NATAS	National Appropriate Technology Assistance Service
NCSBCS	National Conference of States on Building Codes and Standards
NESC	National Energy Service Council
NIBS	National Institute of Building Sciences
NIST	National Institute of Standards and Technology (within DOC)
NTIS	National Technical Information Service
OBT	Office of Building Technologies
OECD	Organization for Economic Cooperation and Development
OPA	Office of Public Affairs (within DOE)
ORNL	Oak Ridge National Laboratory
ORTA	Office of Research and Technical Applications
OSTI	Office of Scientific and Technical Information (at ORNL)
OTC	Office of Technology Commercialization (within NIST)
OTFA	Office of Technical and Financial Assistance
PHAs	Public Housing Authority
PUC	Public Utilities Commission
PVE	petroleum violation escrow
R&D	research and development
RFP	request for proposals
SBIR	Small Business Innovation Research
SBSE	Society of Building Science Educators
SECP	State Energy Conservation Program
SEO	state energy office
SERI	Solar Energy Research Institute
STIP	Solar Technical Information Program
TIG	technical information guide
TIS	Technical Inquiry Service
VA	Veterans Administration
WAP	Weatherization Assistance Program

Document Control Page	1. SERI Report No. SERI/TP-260-3881	2. NTIS Accession No. DE90000369	3. Recipient's Accession No.

4. Title and Subtitle

A Planning Framework for Transferring Building Energy Technologies: Executive Summary

5. Publication Date
August 1990

6.

7. Author(s)
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8. Performing Organization Rept. No.

9. Performing Organization Name and Address

Solar Energy Research Institute
1617 Cole Boulevard
Golden, Colorado 80401-3393

10. Project/Task/Work Unit No.
AS925440

11. Contract (C) or Grant (G) No.
(C)
(G)

12. Sponsoring Organization Name and Address

13. Type of Report & Period Covered
Technical Report

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

Accelerating the adoption of new and existing cost-effective technologies has significant potential to reduce the energy consumed in U.S. buildings. This report summarizes some of the key results of an interlaboratory technology transfer planning effort in support of the U.S. Department of Energy's Office of Building Technologies (the full report is published under SERI number TP-260-3729). A guiding assumption for planning was that OBT's R&D program should forge linkages with existing programs whose goals involved enhancing energy efficiency in buildings. An ad hoc Technology Transfer Advisory Group reviewed the existing analysis and technology transfer program brainstormed technology transfer approaches, interviewed DOE program managers, identified applicable research results, and developed a framework that management could use in deciding on the best investments of technology transfer resources. Representatives of 22 organizations were interviewed on their views of the potential for transferring energy efficiency technologies through active linking with OBT. The report describes in summary these programs and interview results; outlines OBT tools, technologies, and practices to be transferred; defines OBT audiences; identifies technology transfer functions and presents a framework devised using functions and audiences; presents some example technology transfer activities; and summarizes the Advisory Group's recommendations.

17. Document Analysis

a. Descriptors
Energy efficiency ; buildings ; technology transfer ; information dissemination ; US DOE ; Solar Energy Research Institute

b. Identifiers/Open-Ended Terms

c. UC Categories
233

18. Availability Statement

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

19. No. of Pages
16

20. Price
A03

Form No. 0069 (3-25-82)