

Building Technology Transfer Meetings: A Collaborative Model for Transferring DOE Research Results to Potential Users

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Transferring the technology and results from U.S. Department of Energy (DOE)-sponsored building energy research to potential users is a critical part of DOE's successful research programs. To assist in this transfer of information and technologies, the DOE Office of Building Technologies (OBT) has established Building Technology Transfer Meetings that are held twice each year at one of the 10 DOE Regional Support Offices. Meeting participants include DOE personnel and representatives from each of the national laboratories involved in OBT buildings energy research as well as representatives from the DOE Regional Support Offices and other agencies involved in the buildings sector.

Since 1991, OBT has held five meetings: Washington, D. C., San Francisco, Denver, Oak Ridge, and Seattle. The purpose of these meetings is twofold: (1) for DOE to share information about such topics as new research results, new technologies, and new ways to collaborate with industry and universities to leverage resources; and (2) for the participants to use this information within their region to accelerate the transfer and deployment of new energy-efficient building technologies.

The meetings include presentations, demonstrations, and tours. The meetings have provided an excellent opportunity for staff from the Regional Support Offices to learn about new technologies through their interactions with OBT and national laboratory program managers. Meeting tours and demonstrations have provided beneficial opportunities to get hands-on experience with new technologies and to see them in practice.

Introduction

To secure the deployment of its research activities from the national laboratories to actual users, the U.S. Department of Energy's (DOE) Office of Building Technologies (OBT) has initiated semiannual Building Technology Transfer Meetings with DOE's Regional Support Offices and the national laboratories. These meetings help OBT achieve the technology transfer goals that are part of its mission. OBT's technology transfer mission and the OBT Regional Support Offices, which OBT views as vital to fulfilling its technology transfer mission, are described in the following sections. This paper also describes the Building Technology Transfer Meetings, which are hosted by the Regional Support Offices, and the success of these meetings in accomplishing OBT's technology transfer goals.

OBT's Technology Transfer Mission

OBT's mission is to pursue advanced energy efficiency and renewable technologies and processes and to accelerate the rate of adoption of these technologies in the residential and commercial sectors through research, development, and deployment. The Building Technology Transfer Meetings are one way OBT can achieve its technology transfer goal to implement a system for efficient and effective transfer of research and development results to private- and public-sector users and to facilitate the exchange of information among energy service providers and users.

OBT has found the key to successful technology deployment is to be responsive to private-sector interests. OBT is committed to developing strong working relationships among all building-sector participants, including manufacturers, utilities, trade associations, community organizations, professional societies, universities, and state and local governments. OBT reaches these stakeholders through a variety of mechanisms. One successful mechanism has been collaboration with DOE's 10 Regional Support Offices.

OBT's Regional Support Offices

Each of DOE's Regional Support Offices has one or more staff members that have been designated as the lead for supporting buildings-related research and deployment in the region. Their responsibilities vary by region; however, in general their activities include the following:

- Coordinate with different federal agencies in their region on DOE Federal Energy Management Program (FEMP) projects.
- Provide technical and financial assistance to state energy offices.
- Sponsor workshops and training on incorporating energy efficiency into buildings.
- Coordinate with utility demand-side management (DSM) programs on new construction and major retrofit programs.

The Regional Support Offices function as an extended arm of DOE that allows greater interaction with organizations at the state and local levels. This interaction is a critical component when trying to deploy technologies developed by DOE and its national laboratories.

OBT funds several DOE national laboratories to conduct research and implementation activities related to codes and standards, building energy research, and FEMP. The DOE national laboratories include Brookhaven National Laboratory, Lawrence Berkeley National Laboratory (LBL), National Renewable Energy Laboratory (NREL), Pacific Northwest Laboratory (PNL), and Oak Ridge National Laboratory (ORNL).

Meetings

OBT initiated a series of semi-annual meetings hosted by the 10 DOE Regional Support Offices. Participants include project staff and technology transfer representatives from the national laboratories and DOE headquarters staff. Five meetings have taken place since April of 1991: in Washington, D.C., San Francisco, Denver, Oak Ridge,

and Seattle. The next meeting is planned for May 1994 in Washington, D.C. Tables 1 through 6 provide an outline of these meetings.

Table 1. First Buildings Technology Transfer Meeting - Washington D.C. April 1991

Presenter, Affiliation	Presentation
Donna Hawkins, DOE-HQ	Welcome and Overview
George Courvill, ORNL	Ground Source Heat Pumps
Bob Hassett, DOE-HQ	Solar Domestic Hot Water Heating
George James, DOE-HQ	Industrialized Housing
Barbara Pierce, BNL	Buildings & Integrated Resource Planning
Mary Margaret Jenior, DOE-HQ	HERS/EEMs

BNL = Brookhaven National Laboratory
 DOE-HQ = U.S. Department of Energy - Headquarters
 ORNL = Oak Ridge National Laboratory

The purpose of the meetings is twofold: (1) for DOE to share information about such topics as new research results, new technologies, and new ways to collaborate with industry and universities to leverage resources; and (2) for the participants to use this information within their region to accelerate the transfer and deployment of new energy-efficient building technologies. The meetings are viewed as a two-way process. Staff at the national laboratories can let those in the field (i.e., DOE Regional Support Office staff) know about new technology developments and those in the field can let staff at the national laboratories and at DOE Headquarters know what needs are out there that should be met and what is being done successfully. The goal is to make these interactions more horizontal rather than from the top down. The meetings also provide time for the regional support staff to interact with one another and share experiences from key projects in their regions. A mix of presentations, demonstrations, and tours is offered at each meeting.

Presentations

The presentations allow staff from various energy-related organizations to provide information about their on-going activities. Program managers from DOE Headquarters and the national laboratories provide information on their programs' proposed activities. Topics have ranged from ground source heat pumps, solar domestic hot water heaters, and compact fluorescent lamps, to integrated

Table 2. Second Buildings Technology Transfer Meeting - San Francisco, April 1992

Presenter, Affiliation	Presentation
Carol Gates, San Francisco RSO	Welcome
Michael Wilde, LBL	Overview
Art Rosenfeld & Fred Beck, LBL	Advanced Windows
Jim McMahon, LBL	Appliance Standards
Marion Diamond, LBL Hall of Science	Decade of the Brain Education Program
Ron Jarnagin, PNL	Building Energy Standards Program
Don Grether, LBL	LBL Overview
Michael Siminovitch & Francis Rubinstein, LBL	Compact Fluorescent Lamp and Fixture Application
Fred Beck, LBL	Advanced Window Testing
Al Hodgson, LBL	Indoor Environment Program
Jack Stacy, Kansas City RSO	Regional HUD Project

Demonstrations

- U.C. Berkeley Wind Tunnel, Indoor Simulation Lab, Sky Simulation User Facilities
- Art Rosenfeld & Jim McMahon, LBL, Whole Earth Access Store

Tours

- Pella Window Store
- Pacific Gas & Electric's Pacific Energy Center in San Francisco
- Fred Bauman, College of Environmental Design, U.C. Berkeley, Wind Tunnel, Indoor Simulation Lab, Sky Simulation User Facilities

LBL = Lawrence Berkeley Laboratory
 PNL = Pacific Northwest Laboratory
 RSO = Regional Support Office

resource planning, FEMP, thermal envelope issues, appliance standards, manufactured housing efficiency, and building energy code adoption and enforcement. Below are some detailed examples of presentations given at the meetings:

- Mark Ginsberg spoke on FEMP at two meetings. The focus of his discussions has been on the National Energy Policy Act of 1992 and how it requires federal agencies to reduce energy consumption by 20% by the year 2000. FEMP is responsible for providing assistance in meeting this energy reduction requirement for more than 500,000 buildings at 8,000 sites and 500,000 vehicles in 29 federal agencies. Mark's presentations were two of many providing overviews of FEMP projects at the meetings.
- At the third meeting in Denver, John Beldock of Environmental Plus provided a presentation on how the Denver Support Office and Environmental Plus

created a collaborative process with the General Services Administration (GSA), Public Service Company of Colorado (PSCo), and energy service companies to pursue energy improvements in federal facilities. The project yielded a GSA action plan for improvements at the Denver Federal Center, a first-ever Federal agency competitive bid to a utility DSM bidding program, a process for customized utility programs for Denver area federal customers, and a process for energy savings performance contracting at the Denver Federal Center.

- Staff from the power marketing agencies, Tennessee Valley Authority and Bonneville Power Administration, have given presentations on how they interface with various organizations in their regions to promote energy efficiency in residential and commercial buildings for both retrofit and new construction projects through utility programs.

Table 3. Third Buildings Technology Transfer Meeting - Denver, December 1992

Presenter, Affiliation	Presentation
Randy Jones, Denver RSO	Welcome
Mark Ginsberg, FEMP Headquarters	Update on FEMP
John Beldock, Environmental Plus	FEMP - Denver Federal Center Fast Track Project
Bob Dunn, Denver GSA	FEMP - Denver Federal Center Fast Track Project
Bill Currie & Jim Dirks, PNL	FEMP Software Tools
Donna Hawkins, DOE-HQ	Overview of OBT Technology Transfer

Demonstrations

- Bill Currie & Jim Dirks, PNL, Demonstrations of FEDS, LTSM, LSFT
- Bob Westby & Al Gough, NREL, Demonstration of FLEX

Tours

- Linda Smith, Colorado Office of Energy Conservation, Tour of Colorado Centennial Building Lighting Retrofit

DOE-HQ = U.S. Department of Energy headquarters

FEMP = Federal Energy Management Program

NREL = National Renewable Energy Laboratory

PNL = Pacific Northwest Laboratory

RSO = Regional Support Office

Demonstrations and Tours

The meetings have provided an excellent opportunity for staff from the Regional Support Offices to learn about new technologies, either in the developmental or early commercialization stages, through their interactions with OBT and national laboratory program managers. Meeting tours and demonstrations have provided beneficial opportunities to get hands-on experience with new technologies and to see them in practice.

No demonstrations were conducted at the first meeting in Washington, D.C., in April 1991; however, demonstrations and tours were included with each of the following meetings. Highlights of these demonstrations and tours are provided below.

Highlights of Demonstrations and Tours at the Second Buildings Meeting - San Francisco.

At the second Building Technology Transfer Meeting in San Francisco in April 1992 participants had the opportunity to participate in three tours. One tour was a visit to a commercial window store that sold a variety of energy-efficient, low-emissivity windows. The staff at the showroom discussed how the windows were marketed to consumers and how they had been received by the market.

A second part of the tour was a visit to a Berkeley retailer specializing in energy-efficient residential appliances. A discussion was given by Jim McMahon from LBL on the importance of DOE's minimum efficiency appliance standards and the impact they can have on products in the marketplace. Several models of energy-efficient appliances, such as washing machines and refrigerators, were on display.

Highlights of Demonstrations and Tours at the Third Buildings Meeting - Denver.

At the third Building Technology Transfer Meeting in Denver in December 1992 participants were offered two demonstrations and one tour. Staff from PNL demonstrated software developed for FEMP; this is one of several software tools developed by the national laboratories to assist federal energy managers in identifying and choosing cost-effective energy efficiency options. The Denver Support Office arranged for a classroom of computers so everyone could practice using the software.

Also in Denver, a tour was provided of the Colorado Centennial Building to demonstrate the building lighting retrofit project conducted by the Colorado Office of Energy Conservation. The project used energy

Table 4. Fourth Buildings Technology Transfer Meeting - Oak Ridge, May 1993

Presenter, Affiliation	Presentation
Pat Love, ORNL	Overview
George Courvill, ORNL	Welcome
Glenn Prosser, MMES	Technology Transfer Overview
Roger Carlsmith, ORNL	ORNL Activities
Marilyn Brown, ORNL	National Weatherization Evaluation Program
Phil Fairchild, ORNL	Heating & Cooling Center
Jeff Christian, ORNL	Bldgs Thermal Envelope Bill Mixon, ORNL DOE HUD Program
Ernie Freeman, DOE-HQ	DOE HUD Program
Bob Groberg, HUD-HQ	DOE HUD Program
Mark Ternes, ORNL	Exterior Wall Insulation Project
Mike MacDonald, ORNL	In-House Management
Ed Colston, TVA	Energy Programs
Pat Love, ORNL	Energy Efficient Buildings in the Southeast - Task Force
Donna Hawkins, DOE-OBT	Overview of OBT Technology Transfer

Demonstrations

- Terry Sharp & Mark Ternes, ORNL, WAP National Energy Audit - Blower Door Demonstration

Tours

- William Buchanan, OSTI, Tour of OSTI
- Connie Elliott, OSTI, OSTI - ITIS Access/Training
- Leota Kane & Sandy Hicks, OSTI, OSTI Publications
- Madelyn Wilson, OSTI, OSTI Distribution Services
- Jim Reitzel, OSTI, OSTI Printing/Graphics
- Self-Guided tour of Museum of Science & Energy
- Phil Fairchild, ORNL, ORNL Refrigeration & Heat Pump Technology
- Terry Sharp & Mark Ternes, ORNL, WAP National Energy Audit

DOE-HQ = U.S. Department of Energy - Headquarters

DOE-OBT = U.S. Department of Energy - Office of Building Technology

HUD-HQ = U.S. Department of Health and Human Services - Headquarters

MMES = Martin Marietta Energy Systems

ORNL = Oak Ridge National Laboratory

OSTI = DOE Office of Scientific and Technical Information

TVA = Tennessee Valley Authority

performance contracting to retrofit an 11-story building with electronic ballasts, T8 lamps, and timer controls.

Highlights of Demonstrations and Tours at the Fourth Buildings Meeting - Oak Ridge. At the fourth Building Technology Transfer Meeting in Oak Ridge in May 1993 participants were offered one demon-

stration and several tours. One tour offered at Oak Ridge was an actual audit of a home scheduled for rehabilitation; the audit included a blower-door test for air leakage and checking of crawl spaces for insulated pipes. A key buildings-related activity is to audit homes for rehabilitation and weatherization work; however, many of the meeting attendees had never been on an audit.

Table 5. Fifth Buildings Technology Transfer Meeting - Seattle, October 1993

Presenter, Affiliation	Presentation
Diana Shankle, PNL	Overview
Arun Jhaveri, Seattle RSO	Welcome
Kathy Vega, Seattle RSO	Welcome
Floyd Barwig, PNL	PNL Activities
Mark Ginsberg, FEMP	Update on FEMP
Katherine Mayo, NREL	FEMP Energy Audits
Kirk Bond, Kansas City RSO	LCC Training
Melanie Chambers, Dallas RSO	FEMP-Magic Software
Curtis Framel, WSEO	Electric Ideas Clearinghouse
John Hogan, City of Seattle	Energy Code Enforcement
Kevin Madison, WSEO	Energy Code Adoption
Newell Flood, U.S. Army	Ft. Lewis FEMP
John Nixon, EUA	Ft. Lewis ESCO
Jon Paxton, Tacoma Public Utilities	Ft. Lewis Utility Co.
Allen Lee, PNL	Manufactured Housing
Stephen Onisko, BPA	Manufactured Housing
Donna Hawkins, OBТ	Update on Energy Policy
Steve Baden, Alaska SEO	HERS/EEMs

Demonstrations

- Gil McCoy, WSEO, BallastMaster Demonstration
- Michael Wilde, LBL, OBТ Kiosk

Tours

- Michael Lane, Seattle Lighting Design Lab, Lighting Design Lab
- Bernie Richmond, Ft. Lewis, Madigan Army Hospital

BPA = Bonneville Power Administration

NREL = National Renewable Energy Laboratory

OBТ = U.S. Department of Energy - Office of Buildings Technology

PNL = Pacific Northwest Laboratory

RSO = Regional Support Office

WSEO = Washington State Energy Office

Highlights of Demonstrations and Tours at the Fifth Buildings Meeting - Seattle. At the fifth Building Technology Transfer Meeting in Seattle in October 1993 participants could participate in two demonstrations and two tours. One tour took participants through the Lighting Design Lab, which is a cooperative arrangement between several utilities and other organizations in the Pacific Northwest. The second tour took participants through the recently opened Madigan Army Hospital. This hospital was specifically designed for energy efficiency.

Benefits and Successes of the Building Technology Transfer Meetings

The Building Technology Transfer Meetings provide significant benefits to participants in terms of the opportunities they provide for face-to-face interaction among program staff. Several specific examples of technology transfer have occurred at the meetings as well.

Table 6. Sixth Buildings Technology Transfer Meeting - Washington D.C., May 1994

Presenter, Affiliation	Presentation
Lou Divone	Welcome
Donna Hawkins, OBT	Overview
Michael McCabe and Ted Capus	Discussions with OBT Program Managers
Linda Sandahl, PNL	Building Energy Standards Regional Workshops
EPA	EPA Green Programs
Rich Zelinski	Rebuild America
Beth Shearer	GSA
Rich Zelinski	DOE HUD Initiative
Bill Becker	Disaster Response Plan
Scott Crowder	Enhancing Communications
Michael Wilde	Electronic Bulletin Board
Kris Garnjost	EREC: Energy Efficiency and Renewable Energy Clearinghouse
Peter Scofield	National Program Plan
Jack Stacy	Managing Tech Deployment
Demetrius Fowler & FEMP Staff	FEMP Presentations

Tours

- Donna Hawkins, Solar Energy Industries Association Tour

OBT = U.S. Department of Energy - Office of Building Technology

PNL = Pacific Northwest Laboratory

Interactions

The meetings provide the DOE Regional Support Offices with an opportunity for proactive technology transfer; the offices have resources and regional experience that can be brought to bear to aggressively advance the implementation of energy conservation and renewable energy in federal facilities. The meetings also provide Regional Support Office staff with an excellent opportunity to better understand the technologies under development at the national laboratories and to see how they get transferred to the marketplace. Time spent at the national laboratories during the meetings has given the support office staff a much better understanding of the types of work being conducted and the types of opportunities that might be available for collaboration. Staff from the national laboratories have an opportunity to review technical aspects of each other's work and to answer questions on how the new technologies could impact the marketplace. Regional Support Office staff develop a better understanding of how they can be partners in a collaborative process to transfer technologies from the national laboratories to end users.

The Building Technology Transfer Meetings have also provided DOE Headquarters and the national laboratories with an opportunity to better understand the capability available at the Regional Support Offices. The Support Offices are in an excellent position to be a conduit for many of the needed technology transfer activities that must occur to get the work from the laboratories out into the marketplace. Frequently staff from DOE's Regional Support Offices are aware of new projects in their region that might be appropriate for inclusion in various DOE programs.

A unique and positive aspect of the meetings has been the continuity in the persons attending the meetings. As the attendees have come to know one another, discussions have become more candid and, therefore, more meaningful. The regional support staff now contact one another regularly in between meetings to discuss projects and other activities they are working on and to consult with one another. They also contact staff at the various national laboratories to learn more about specific programs or to receive technical assistance.

Specific Examples. One example of a major outreach program initiated by the technology transfer meetings is a task force on energy-efficient buildings in the southeast. The task force was formed in 1992 with the mission of bringing together the stakeholders of the southeast to discuss problems within the buildings community. Members include ORNL, DOE Atlanta Support Office, Southern States Energy Board, Georgia Power Company, Southeast Energy Institute, Duke Power, North Carolina Alternative Energy Corporation, Florida Energy Office, Kentucky State Energy Office, U.S. Department of Housing and Urban Development, Tennessee Valley Authority, and Atlanta Gaslight.

DOE programs such as FEMP and the Building Energy Standards Program have benefitted from the meetings because time is allocated at the meetings to discuss ways to develop relationships and discuss activities that could improve outreach efforts. With increased recognition, these programs can be more effective for DOE. FEMP has begun to provide numerous opportunities for collaboration among the Regional Support Offices, utilities, and federal facilities to develop energy efficiency projects. Similarly the Building Energy Standards Program is beginning to focus on the Regional Support Offices as part of their infrastructure to get building energy standards adopted, implemented, and enforced in the states.

The demonstrations and tours that were part of the Building Technology Transfer Meetings provided excellent technology transfer experiences for participants. Some of these experiences are highlighted below:

- The Berkeley tour of the energy-efficient appliance store during the second meeting in San Francisco let participants see the end result of DOE-funded technology and standards research in retail settings and helped reinforce the need for an accelerated technology transfer program because of the benefits that can accrue from these efforts. These visits also showed the attendees how salespeople deal with “real-world” energy-related questions from consumers.
- A tour of a commercial window showroom in Berkeley demonstrated the real success the energy-efficient windows program at LBL has had in getting technology deployed in the marketplace.
- At the Denver meeting, participants took part in a demonstration of the FEMP software. The Denver Support Office arranged for a classroom of computers so everyone could get hands-on practice with the software. This type of experience can be a tremendous help in winning over program staff to the capabilities of a software program so that they, in turn, can communicate its usefulness to others.
- The home rehabilitation audit offered at Oak Ridge provided another excellent opportunity for the attendees to get hands-on experience to help them better understand the needs of those in the building industry.

Conclusions

As the Building Technology Transfer Meetings continue to evolve, new forms of collaboration will continue to develop between the Regional Support Offices, DOE Headquarters, and the national laboratories. It is imperative that these groups work together to promote the transfer of energy-efficient building technologies and processes so the full benefits can be derived.

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