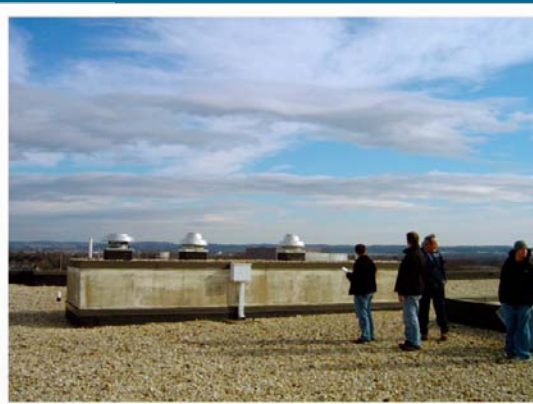


Guidelines for Home Energy Professionals: Update on the SWS for Multifamily Housing

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Jennifer Somers

Team Lead Training & Technical Assistance/
Senior Policy Advisor
Weatherization Assistance Program

August 18, 2011

WAP Webinar

\$ 80 Billion in Clean Energy

- \$12 Billion in Energy Efficiency
- \$8 Billion in Building Retrofits
- \$5 Billion to the WAP

| EE Programs | Total ARRA Funding (\$B) | Funding for Retrofits (\$B) |
|-------------------------------------|--------------------------|-----------------------------|
| Low-Income Weatherization | 5.2 | 5.2 (100%) |
| State Energy Programs (SEP) | 3 | 1.5 (50%) |
| Grants to Local Governments (EECBG) | 2.8 | 1.1 (39%) |
| BetterBuildings | 0.5 | 0.5 (100%) |
| Total* | 11.5 | 8.3 (71%) |

*Includes funds for Training and Technical Assistance

The Weatherization Assistance Program

On target to Weatherize more than 700,000 homes by the end of the Recovery Act

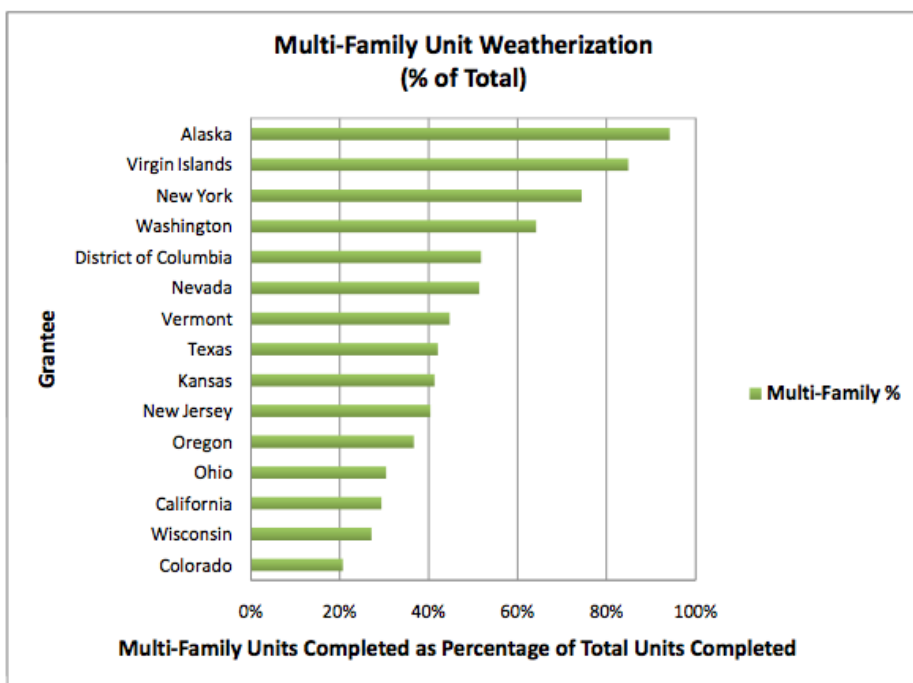
Created 15,400 new jobs

Cumulative Number of WAP Weatherized Homes (Starting 2009)



The Recovery Act: By the Numbers WAP Through June 30, 2011

Top 15 WAP ARRA Grantees Multi-Family Units Completed as Percentage of Total Units Completed

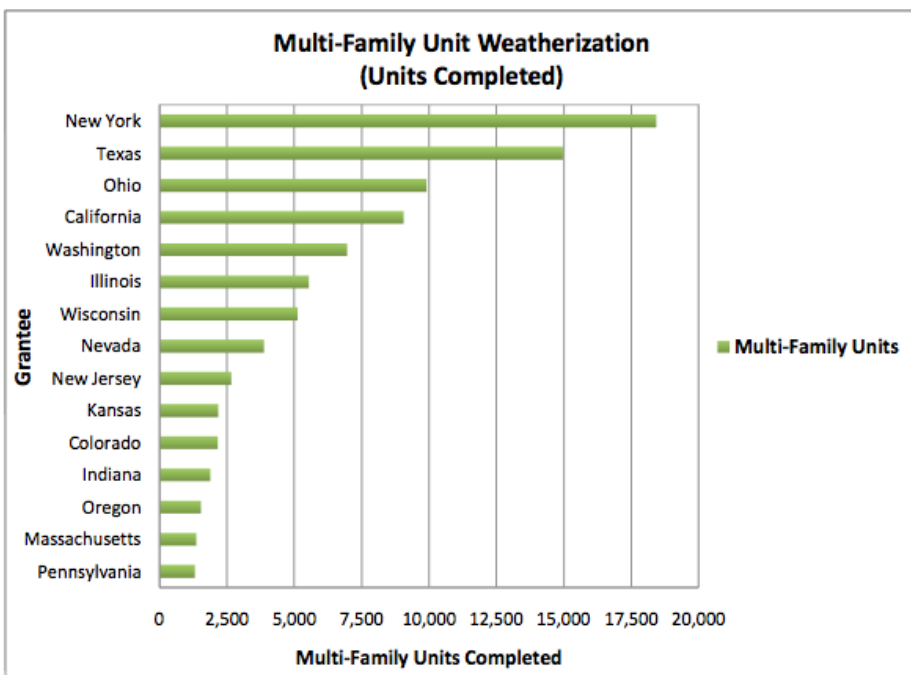


| Grantee | Multi-Family Units | Total Units Weatherized ¹ | Multi-Family % |
|-----------------------|--------------------|--------------------------------------|----------------|
| Alaska | 368 | 391 | 94% |
| Virgin Islands | 167 | 197 | 85% |
| New York | 18,415 | 24,773 | 74% |
| Washington* | 6,953 | 10,842 | 64% |
| District of Columbia* | 463 | 894 | 52% |
| Nevada | 3,865 | 7,533 | 51% |
| Vermont* | 934 | 2,092 | 45% |
| Texas | 14,947 | 35,562 | 42% |
| Kansas | 2,162 | 5,238 | 41% |
| New Jersey | 2,649 | 6,573 | 40% |
| Oregon | 1,521 | 4,156 | 37% |
| Ohio | 9,887 | 32,585 | 30% |
| California | 9,042 | 30,839 | 29% |
| Wisconsin | 5,107 | 18,845 | 27% |
| Colorado | 2,145 | 10,382 | 21% |
| Total | 78,625 | 190,902 | 41.19% |

The information in the above table and graph represent Grantee reported production data through June 30, 2011. This data was compiled on August 5, 2011.

The Recovery Act: By the Numbers WAP Through June 30, 2011

Top 15 WAP ARRA Grantees Number of Multi-Family Units Completed



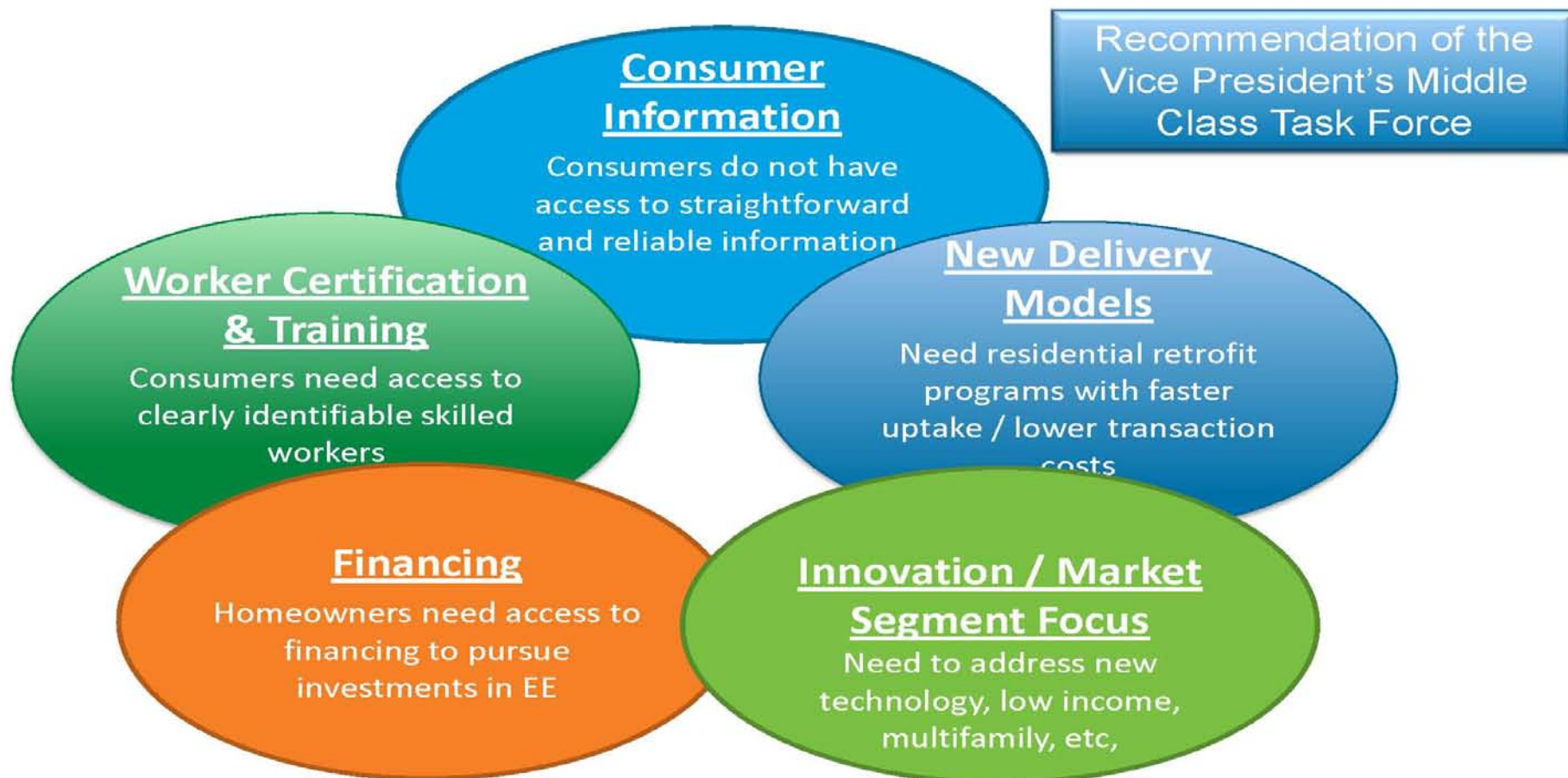
| Grantee | Multi-Family Units | Total Units Weatherized ¹ | Multi-Family % |
|---------------|--------------------|--------------------------------------|----------------|
| New York | 18,415 | 24,773 | 74% |
| Texas | 14,947 | 35,562 | 42% |
| Ohio | 9,887 | 32,585 | 30% |
| California | 9,042 | 30,839 | 29% |
| Washington* | 6,953 | 10,842 | 64% |
| Illinois | 5,527 | 30,817 | 18% |
| Wisconsin | 5,107 | 18,845 | 27% |
| Nevada | 3,865 | 7,533 | 51% |
| New Jersey | 2,649 | 6,573 | 40% |
| Kansas | 2,162 | 5,238 | 41% |
| Colorado | 2,145 | 10,382 | 21% |
| Indiana | 1,883 | 16,964 | 11% |
| Oregon | 1,521 | 4,156 | 37% |
| Massachusetts | 1,360 | 12,584 | 11% |
| Pennsylvania* | 1,303 | 22,277 | 6% |
| Total | 86,766 | 269,970 | 32.14% |

The information in the above table and graph represent Grantee reported production data through June 30, 2011. This data was compiled on August 5, 2011.

- Residential energy savings are a key component of DOE's long term strategy
- Low-Income weatherization represents a significant portion of those savings
- The WAP program must produce measurable results to be considered an effective component of DOE's larger goals
- The WAP is the national standard bearer for home energy retrofit knowledge. The program must leverage that expertise
- The WAP National Training and Technical Assistance Plan was developed to assist the WAP in producing quality work and training a qualified workforce

Whole Home Retrofits: Untapped Opportunity

Need Suite of Efforts to Overcome Market Barriers: Make home retrofits routine



Weatherization Assistance Program

National Weatherization Training & Technical Assistance Plan



December 2009



Prepared by the U.S. Department of Energy, Office of Weatherization & Intergovernmental Program
for the Weatherization Assistance Program

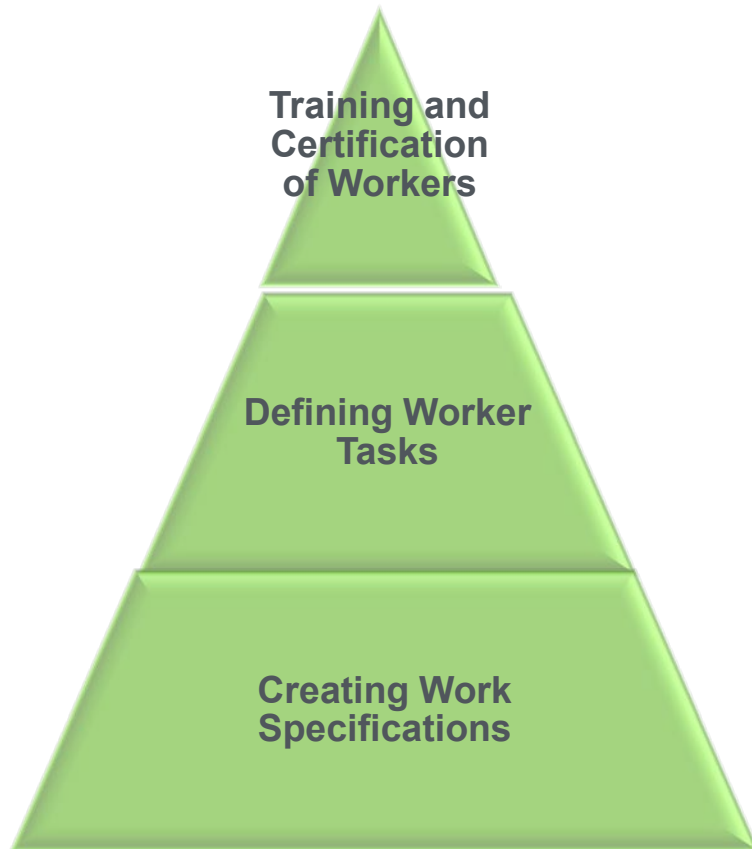
- ARRA increased T&TA funds from 10% to 20%
- \$1 Billion/ \$5 Billion T&TA
- The Weatherization Assistance Program National Weatherization Training and Technical Assistance Plan is the plan for \$138.5 M

Quality Work = Sustainability

The T&TA Plan is building tools and resources to ensure that the WAP is able to produce high quality work and demonstrate that quality to stakeholders.

As ARRA comes to an end, a framework for quality will allow workers to transition to other markets and allow the WAP program to make the case for its ongoing operation and expansion.

Professional Workers/ Quality Work



Market Expansion

- Multifamily
 - Energy Audit Tool
 - Standard Work Specifications
 - Weatherization Innovation Pilot Program
- Private Market Integration
 - Better Buildings
 - Building America
 - Energy Star
- Healthy Homes
 - Wx Plus Health
- Regulatory Changes
 - Grant to Loan
 - Appendix A
- National Evaluation
 - Non Energy Benefits Study

- Guidelines for Home Energy Upgrade Professionals
 - Standard Work Specifications
 - Job Task Analysis
- Training Program Accreditation
- Worker Certification
- Training Resources and Tools
 - WAP Standardized Curriculum
 - National Weatherization Training Platform
 - WAP Training Centers

Voluntary national guidelines to support *quality work* and a *skilled workforce* in the Weatherization Assistance Program and private residential energy efficiency upgrade industry

- **Developed by industry**, facilitated by NREL and EERE
- Second Round Public Comment Fall 2011

Single Family SWS & Certification Timeline

September 2010

1st draft
Standard Work
Specifications &
JTAs

**Winter 2010-
Winter 2011**

Technical and
Industry
Reviews

Revision

Winter 2011

OMB and
Federal
Agency
Review

Revision

Spring 2012

Single
Family Final
On-line

**Format
Revision**

Winter 2012

Certification
Pilot Testing

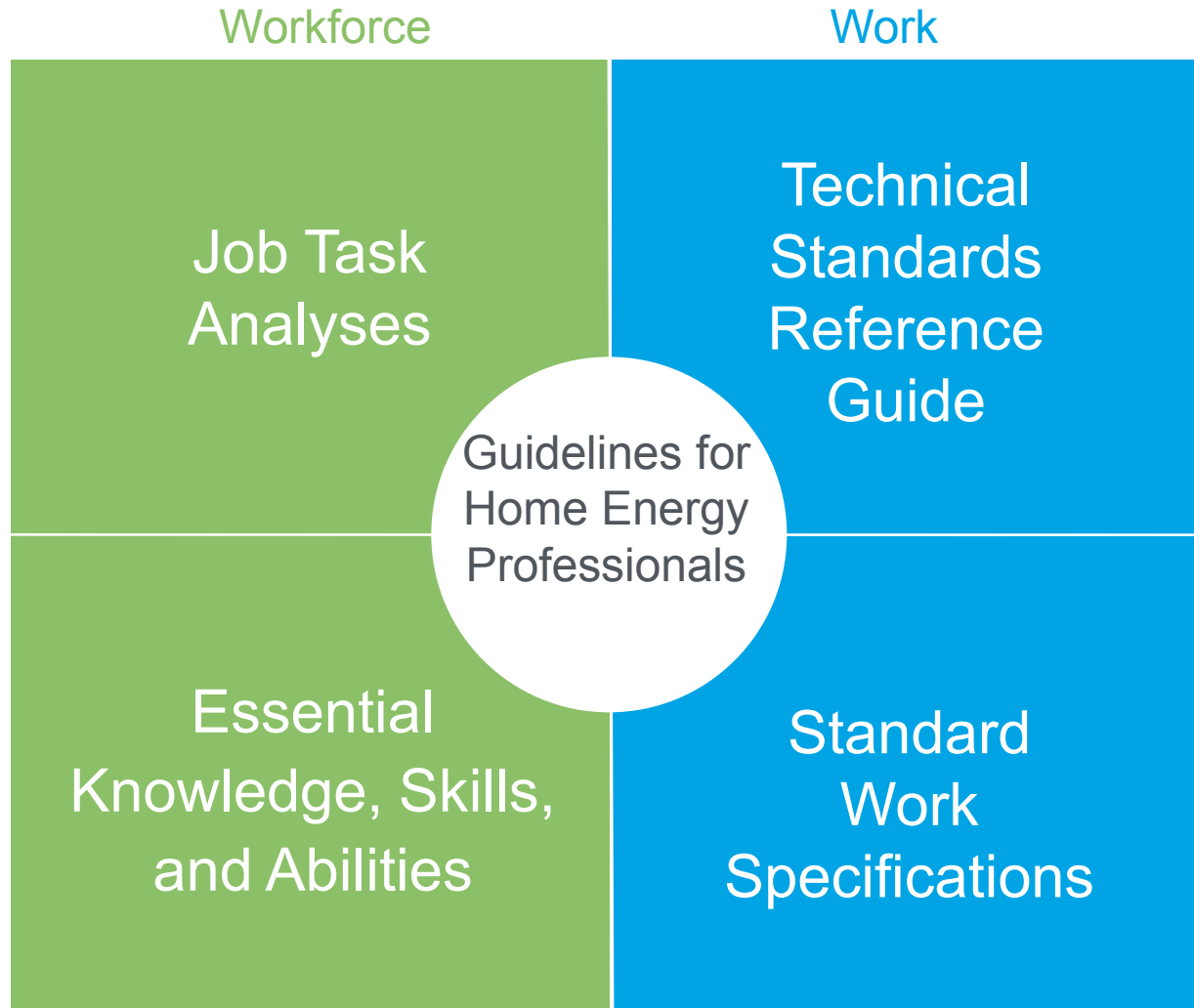
Summer 2012

Certifications
Available
Nationally
&
Issue

Single Family
SWSs

Printed

Four Components



- Define the minimum requirements for high-quality work and the conditions necessary to achieve the desired outcomes of a given energy efficiency retrofit measure
- Standard Work Specifications are outcome driven, but not prescriptive
- When applicable, SWS are based on existing technical standards
- Fill a critical niche in the “standards landscape”
- Work specifications = setting the bar for quality work

- Define the safety, materials, installation, and application standards, codes, and regulations applicable to residential energy efficiency retrofits
- Developed by government, industry, or third-party standards development organizations
- Examples
 - ASHRAE 62.2 (Ventilation for Acceptable Indoor Air Quality)
 - ASTM E1186 – 03 (Standard Practices for Air Leakage Site Detection)
 - OSHA 1926.28 (Safety and Health Regulations for Construction; Personal Protective Equipment)
- Workforce Guidelines for Home Energy Upgrades will contain a Technical Standards Reference Guide for industry

Draft SWS: Attic Insulation Prep Detail—Knee Wall

V.0.2.1

Topic: Attic

Subtopic: Knee Walls

12) Detail Name: Preparation for Batt Insulation

Desired Outcome:

- Airtight cavity and properly insulated knee wall

| Row | Title | Specification(s) | Objective(s) |
|-----|--------------------------|--|--|
| 1 | Knee wall prep for batts | <p>All knee walls will have a top and bottom plate or blockers installed using a rigid material</p> <p>All joints, cracks and penetrations will be sealed in finished material including interior surface to framing connections</p> | <p>Eliminate bending or movement that may result in air leakage</p> <p>Prevent air leakage through the top or bottom of the knee wall³³</p> |
| 2 | Installation | <p>Insulation will be installed using one of the following methods:</p> <p>New batts will be installed</p> <p>All existing batted insulation will be adjusted to ensure it is in full contact with the interior cladding and top and bottom plates</p> | <p>Eliminate misalignment of existing insulation</p> |
| 3 | Backing knee wall | <p>If rigid material is used, material will be installed to cover 100% of the surface of the knee wall</p> <p>If foam sheathing is used, sheathing will be listed for uncovered use in an attic, or covered with a fire barrier</p> | <p>Prevent insulation settling or movement</p> |

Specification(s)

All knee walls will have a top and bottom plate or blockers installed using a rigid material

All joints, cracks and penetrations will be sealed in finished material including interior surface to framing connections

Insulation will be installed using one of the following

Objective(s)

Eliminate bending, sagging or movement that may result in air leakage

Prevent air leakage through the top or bottom of the knee wall³³

Create an air barrier

³³ ASTM E1186 - 03(2009)

| Technical Standard | Standard Work Specifications | Knowledge, Skills, Abilities |
|---|--|--|
| <p>International Residential Code (Ch. 3, 6, 7, 8, 11, 31)</p> <p>International Energy Conservation Code (Ch. 4)</p> <p>ASHRAE (62.2, 119, 136)</p> <p>ASTM (C509, C920, C1363, C1642, C330M, E84, E779, E814, E2178)</p> | <p>Backing and Infill</p> <ul style="list-style-type: none"> • Provide backing or infill as needed to meet specified characteristics of the selected material and the hole • Infill will not bend, sag, or move once installed • <u>Objective</u>: Hole size small enough to use sealant, closure is permanent and supports any load <p>Sealant Selection</p> <ul style="list-style-type: none"> • Materials adhere and are continuous with intended surfaces, and meet ignition barrier requirements • <u>Objective</u>: Permanent; meet/exceed performance characteristics of surrounding materials <p>Insulation</p> <ul style="list-style-type: none"> • Use only non-combustible materials in contact with chimneys, vents, and flues • <u>Objective</u>: Do not create a fire hazard | <ul style="list-style-type: none"> • Ability to read and follow directions • Physical ability to climb ladders and work in enclosed spaces • Tolerance to heat and cold extremes • Knowledge and ability to identify and differentiate building elements including framing, plumbing, electrical, insulation, sheathing, HVAC, fasteners • Understanding of basic building science, including aligning barriers, stack effect, moisture transfer • Knowledge of and ability to install sealants, including methods and requirements • Ability to use tools including a tape measure, utility knife, hand and power saws, caulk and foam guns • Ability to recognize hazardous conditions requiring special treatment |

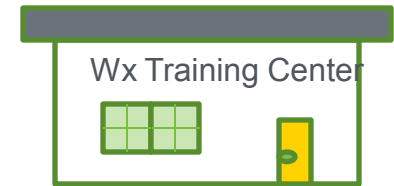
- Markets are driven by consumer confidence
- WAP's long history and extensive expertise support the development of consumer confidence
- Market rate programs can rely on the technical expertise within the WAP program to set standards for work quality and quality assurance
- WAP has a skilled workforce ready and able to transition into the middle-income market
- Common standards and certifications across markets and programs will ensure that the workforce is able to deliver a consistent product that consumers can trust
- WAP has spent 30+ years developing quality standards - a resource that can be utilized by all energy efficiency programs
- Standard Work Specifications (SWS) are outcome driven, but not prescriptive (*not protocols or best practices*)

Standard Work Specifications = setting the bar for quality work

National Workforce Certification Training Program Accreditation

Accreditation

- Is given to the **Training Program**
 - (Weatherization Training Center or other qualified program)
- Verifies that the Training Program meets a standard in both its operations as well as facilities



Certification

- Is given to individuals (**worker**)
- Certifies that an individual has the knowledge, skills, and abilities to perform a certain job.
- Is issued by an independent third party



Credential (generic term)

- Careful! - Can be a “Certificate for Completion” or License, or degree, or full Certificate



DOE is building toward full Wx worker certification

Credentialing Single Family: Key Challenges

1. Lots of different credentials
 - Certifications and certificates galore
 - Credentials are not always transferable across programs and geographies (impedes mobility)
 - What's a worker or a consumer to do?
2. Competencies (Job Tasks and KSAs) upon which certifications are built are all different and in need of strengthening
3. Certification exams need to better assess field capabilities
4. Many credentials are too expensive and are not always available in all locations

Proliferation of training and certificate programs for WAP and the Home Performance workforce

– industry, labor, government, educational institutions, NGOs

1. Major infusion of Federal and State training dollars with no standards
2. No objective measure (3rd party assessment) of training program effectiveness
3. No uniform way for workers seeking training to assess the quality of the program or provider



- Voluntary, third-party assessment of training provider quality
- Interstate Renewable Energy Council (IREC)
 - Currently accredits solar training programs
- ISPQ International Standard 01022
- IREC will use the *DOE Job Task Analysis and Knowledge, Skills, and Abilities* as the foundational document for accreditation

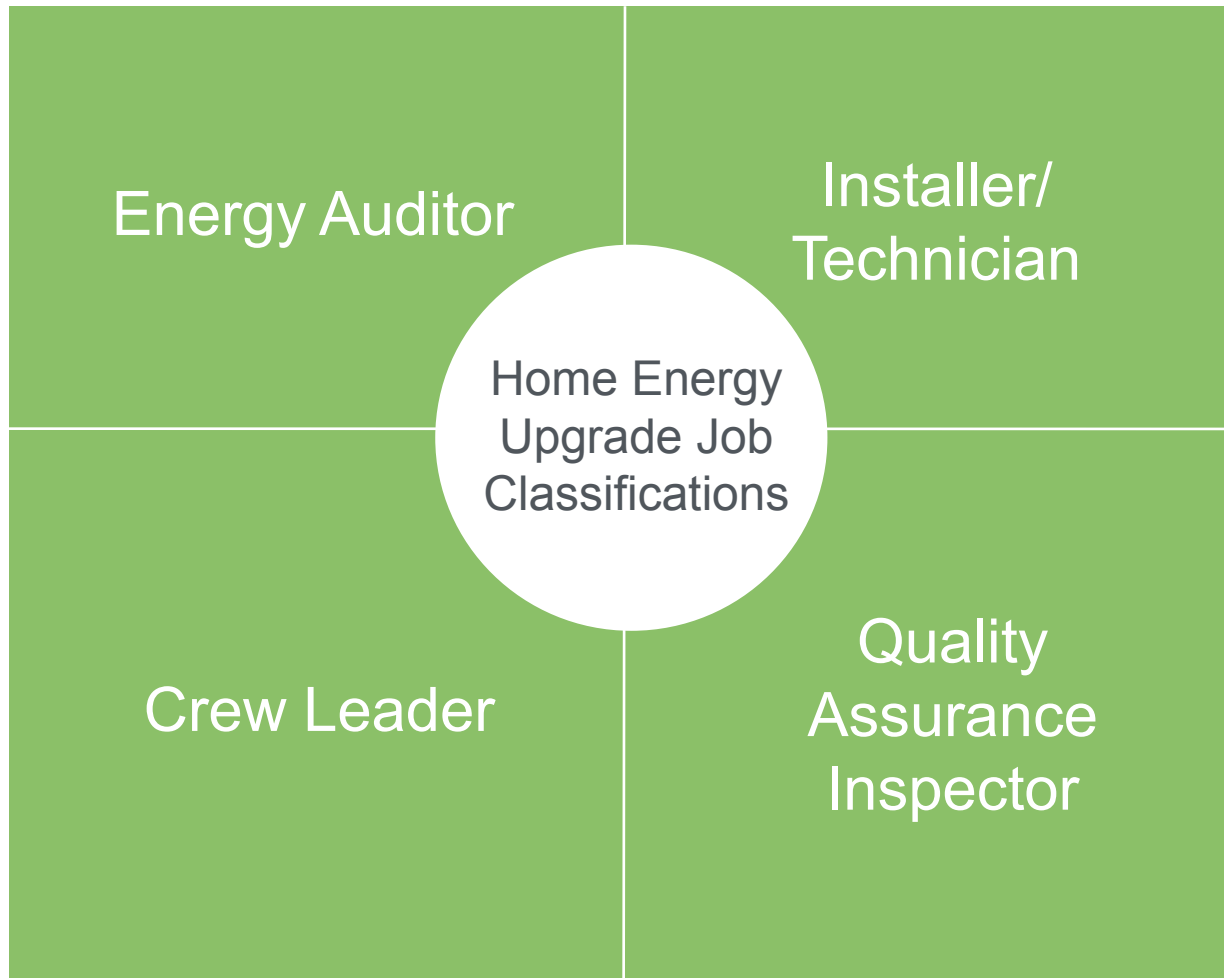
Job Task Analysis

- Identifies and inventories a job's critical tasks.
- A formal process for determining and cataloguing *what a worker does*.
- Tasks are classified as either *cognitive* (mental) or *psychomotor* (physical) skills, and as *critical*, *very important*, and *important* for job performance.
- **Example:** An Auditor needs to be able to:
 - set up blower door
 - run test in accordance with ASTM E779,
 - record results of blower door test in diagnostic software, etc.



The Job Task Analysis is a part of the
Guidelines for Home Energy Professionals

Four Home Energy Upgrade Job Classifications



- IREC has been accepting applications for accreditation since May
- ORISE is currently working with training programs to assist them in moving through the accreditation process
- NRCERT - Christiansburg, Virginia is acting as a pilot program working with ORISE to develop a robust package of tools to assist future programs in becoming accredited
- IREC has given numerous webinars outlining the accreditation process
- ORISE and SMS are developing a needs assessment tool and a curriculum crosswalk tool to assist training programs in meeting accreditation requirements

Expanding The Market

Guidelines for Home Energy Professionals: Update SWS for Multifamily Buildings

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Developing the Standard Work Specifications: Multifamily

- Collaboration between industry, labor and the building trades, and the DOE, HUD, USDA, and EPA
 - Continue collaboration with EPA on Protocols
- National Renewable Energy Lab, Advanced Energy, Association for Energy Affordability, Weatherization Assistance Program, Industry
- Will follow a process similar to the Single Family SWS development
- Multifamily is unique in that individual trade workers often play a larger role
- Overall Goal: Industry acceptance and market transformation!

- Build on the work and experience of the Guidelines for Home Energy Upgrade Professionals: Single Family
- Define Multi-Family building types
- Assess existing standard and resources for inclusion and reference in the SWS
- Fill gaps in existing materials through collaboration of market players
- Define professional job positions that will utilize the SWS

- Identified Need
 - Multifamily Energy Auditor
 - Multifamily Project Manager
 - Multifamily Building Operator
- Existing/New Resources in Development: Examples
 - BTP/NREL: Commercial Building Energy Auditor
 - BTP/NREL: Commercial Operating Engineer/Building Technician
 - BPI: Multifamily Building Analyst/Energy Auditor
 - Multifamily Energy Audit Standard
- Additional research is needed
- In order for MF to become an ISO 17024 certification will need to create JTA

- Outreach for Review of Multifamily SWS
 - Ensure all stakeholders are appropriately aware and/or engaged in development and review of standard work specifications
- Review Process:
 - Technical review, includes healthy homes and worker safety
 - Two industry reviews
 - Federal review
 - Two public comment periods
- Outreach Methods:
 - Email blasts
 - Webinars
 - Conferences and meetings
 - “Ambassadors”

Standard Work Specifications for Multifamily Buildings



Energy Efficiency &
Renewable Energy

The Timeline

Timeline for Industry
Participation in the Guidelines
for Multifamily Energy Upgrades

June 14–15, 2011 *(completed)*

*Standard Work Specifications for
Multifamily Energy Upgrades Market
Lead Event*

Raleigh, North Carolina

July 25–29, 2011 *(completed)*

*Standard Work Specifications for
Multifamily Energy Upgrades
Development Event*

Raleigh, North Carolina

If you would like to participate in
developing the Standard Work
Specifications for multifamily energy
upgrades, please email us at
workforce.guidelines@nrel.gov.

Future Timeline:

Webinars for Specific Audiences:

August, September, October 2011

Webinars for General Audiences:

September, 2011

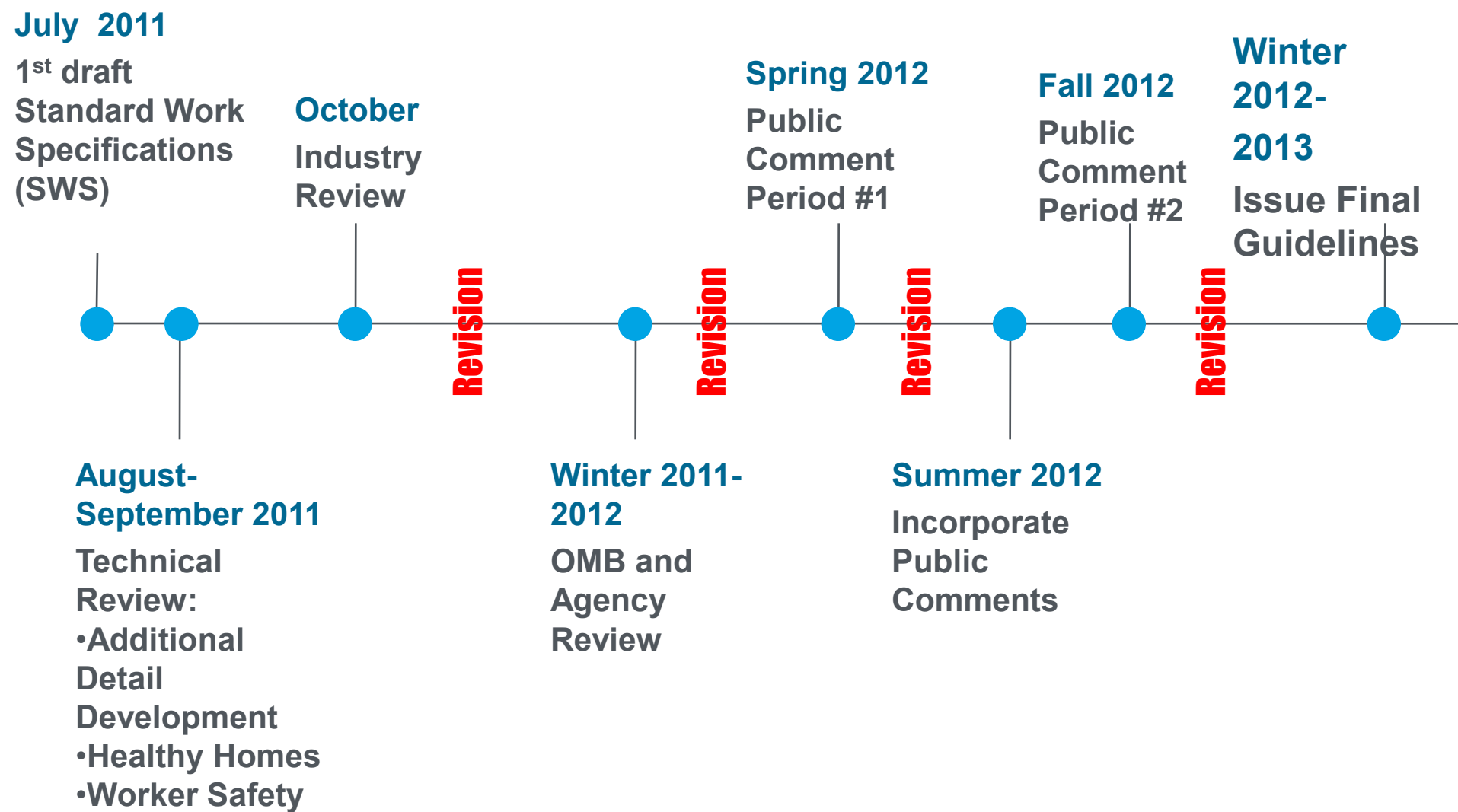
Industry Review:

Start date: October 10th

Guidelines Completion:

Winter 2012- 2013

Multi-Family SWS Timeline



Weatherization Training Centers

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



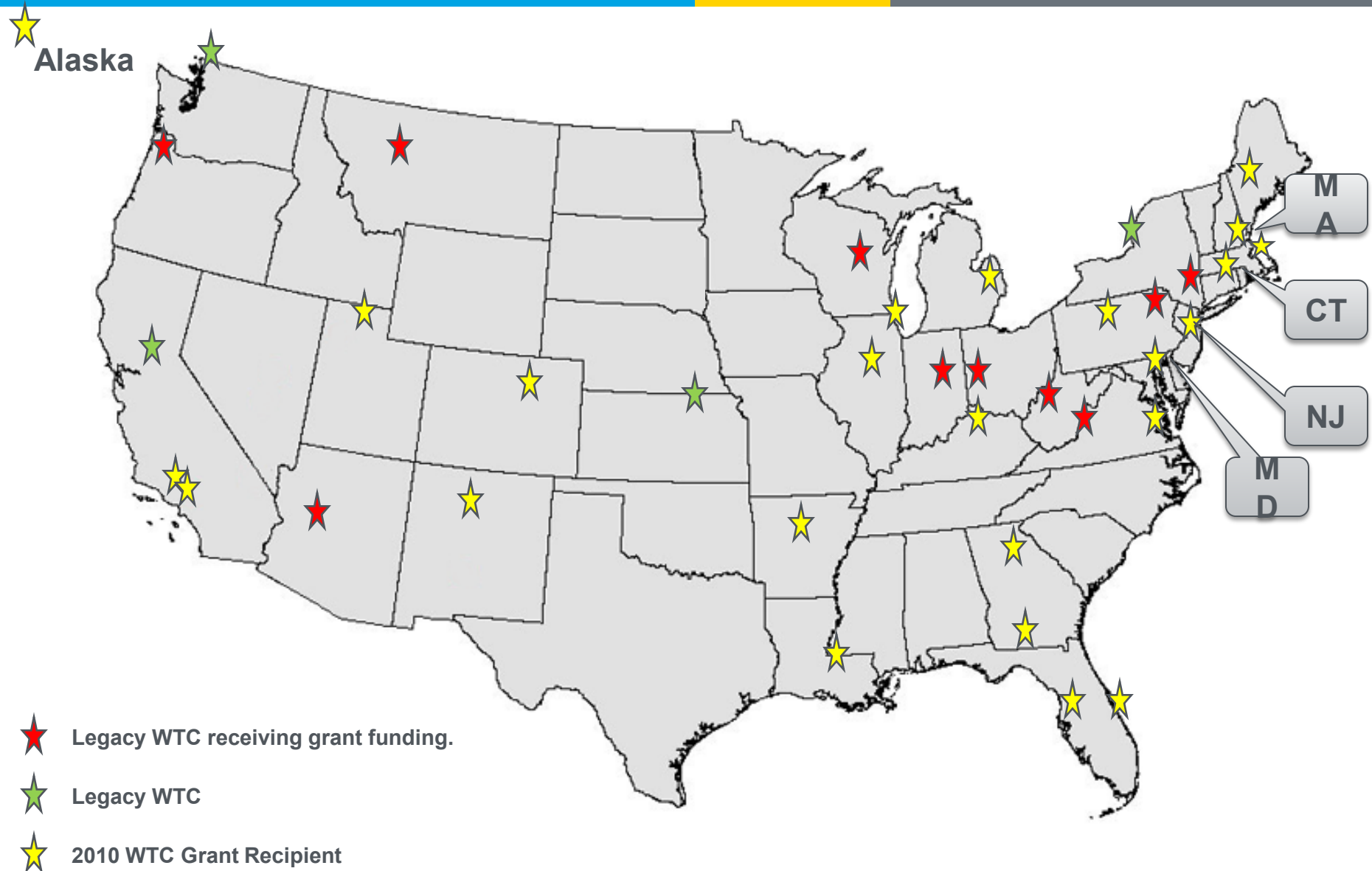
Weatherization Training Centers At a Glance:

- 39 Centers Nationwide in 29 States
- Hands-on, skills based training to workers, auditors, inspectors and program administrators
- Coursework built on the Weatherization Assistance Program's Standardized Training Curriculum and Core Competencies
- Supported by a network of over 1000 local agencies
- Backed by Training and Technical Assistance support from the national Weatherization Assistance Program
- Third-party accreditation and worker certification coming-soon.

Weatherization Assistance Program Training Resources

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



10 Modules Completed:

- Weatherization Installer/Technician Fundamentals
- Weatherization Installer/Technician Intermediate
- Weatherization Installer – Mobile Homes
- Crew Chief
- Energy Auditor – Single Family
- Energy Auditor – Multifamily
- Technical Monitor/ Inspector
- Heating Systems for Energy Auditors – Single Family
- Multifamily – HVAC
- Train the Trainer

In Development:

- Weatherization Program Manager

Available for Download at:
www.waptac.org/Training-Tools

Weatherization Plus Health

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



*Making connections
for healthier, more
energy efficient homes*



NASCSP

eere.energy.gov

The Department of Energy's Weatherization Plus Health Initiative is a national effort to enable the comprehensive, strategic coordination of resources for energy, health, and safety in low-income homes.

- Create and manage an online map and directory of WAP and healthy homes programs nationwide
- Produce individual reports on WAP and healthy homes activities in every state and territory
- Host regional conferences for WAP and healthy homes providers to identify gaps between existing partnerships and encourage new partnerships
- Collect and share best practices for referral systems between WAP and healthy homes programs
- Provide training and technical assistance for WAP and healthy homes practitioners
- Implemented through NASCSP

2011 Conference Dates and Sites

MAY 23-25

Portland, Maine

AUGUST 24-26

Bozeman, Montana

SEPTEMBER 13-15

Atlanta, Georgia

OCTOBER 4-6

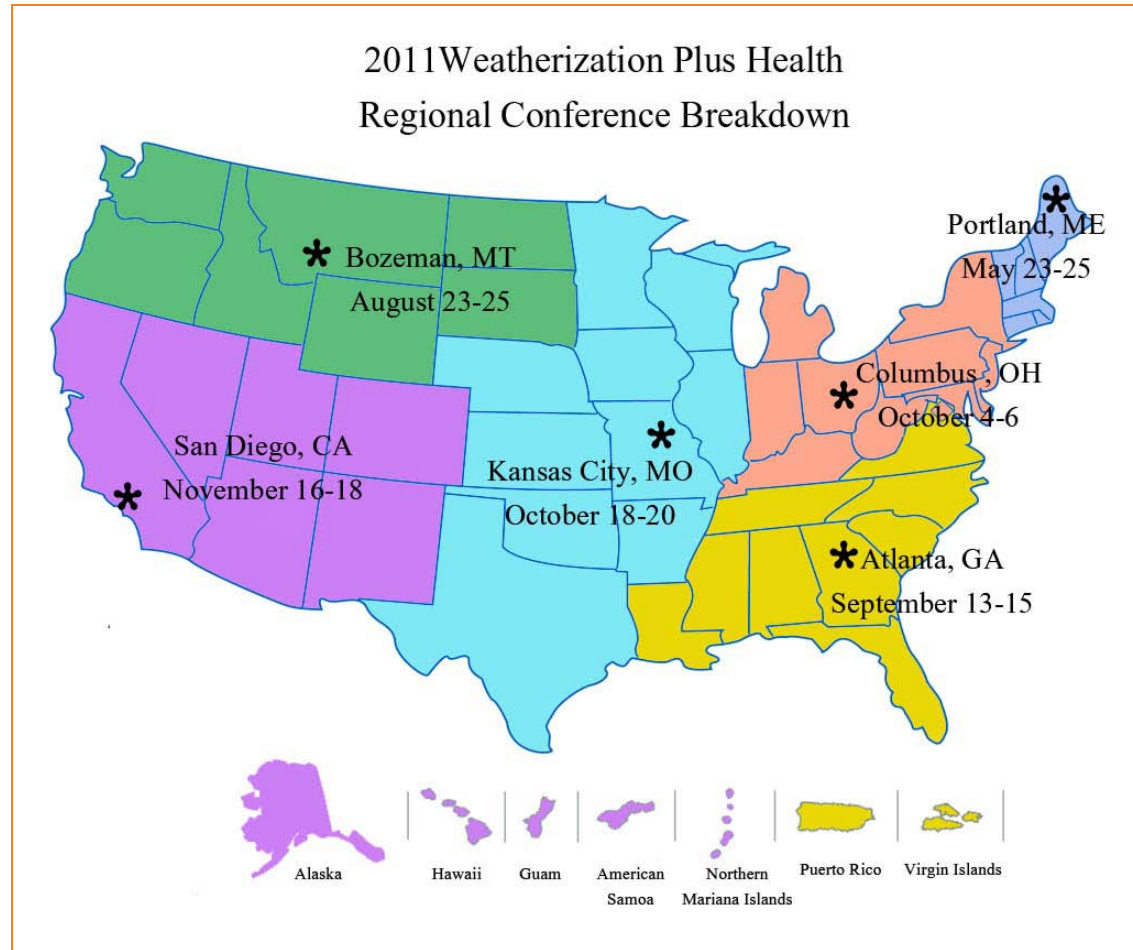
Columbus, Ohio

OCTOBER 18-20

Kansas City, Missouri

NOVEMBER 16-18

San Diego, California



Audit Tools

- Designed by ORNL in collaboration with HUD & DOE
- Performs whole-house health and safety audits including:
 - Site built single family
 - Mobile homes
 - Individual multifamily units
- Comprehensive checklist to identify potential H&S issues and recommend preventative and corrective measures
- Attempts to ensure health and safety of occupant and workers during and after weatherization
- Includes all the WAP health and safety and more
- Stand-alone module with potential for future efficiency audit integration
- Demo at <http://hyperion.ornl.gov/hud>

Multi-Family Audit Tool: ORNL and LBL Collaboration

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



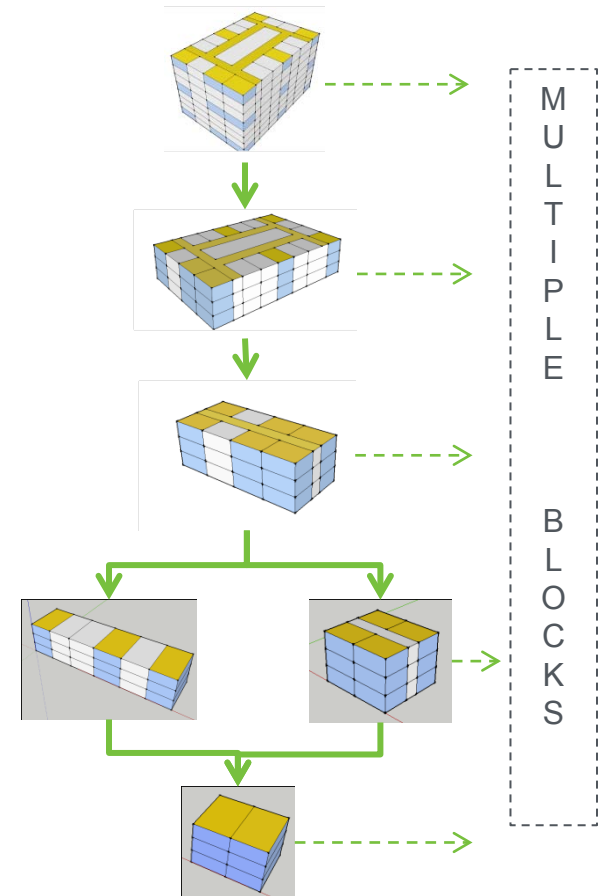
Develop Small Multi-Family and
Large Multi-Family Audit Tool and
Programmatic Elements for the WAP



Add Multifamily HES Consumer
(Home Owners) & HES Pro

Version 1 (December, 2011) Version 2 (2012)

- Two-step development planned with extensive front load of software development to implement initial version
- Version 1 - simpler buildings & systems, few extras
 - Low-rise walk ups
 - Individual dwelling unit space conditioning systems
 - Both dwelling unit and central plant domestic hot water systems
- Version 2 - more complex buildings & systems, additional capabilities
 - High-rise with core services
 - Central plant space conditioning systems



The Multifamily Audit Tool will:

- Provide energy auditors with an improved energy simulation and weatherization measure selection tool for multifamily buildings
- Expand and enhance the energy auditing capabilities of auditors in multifamily buildings
- Provide a DOE-sponsored multifamily energy audit instrument to complement the single-family (NEAT) and mobile home (MHEA) energy audits already supported by DOE under the Weatherization Assistance
- Help improve retrofit work quality and provide a foundation for quality assurance
- Assist training providers in developing better training materials
- Increase workforce mobility up career ladders and across career lattices
- Build confidence among consumers, building owners, and the energy efficiency finance community

Webinars for Specific Audiences—All at 3 p.m. EST

Thu Aug. 18: **For the Weatherization Assistance Program** (register:

<https://www3.gotomeeting.com/register/992747630>)

Tue Aug. 30: **For multifamily building operators** (register:

<https://www3.gotomeeting.com/register/879697470>)

Thu Sept. 1: **For multifamily developers, members of the multifamily finance community, and affordable housing organizations** (register:

<https://www3.gotomeeting.com/register/756258950>)

Tue Sept. 13: **For home energy upgrades industry professionals and organizations** (register:

<https://www3.gotomeeting.com/register/434637022>)

Thu Sept. 29: **Information about the multifamily standard work specifications' technical review by healthy homes experts** (register:

<https://www3.gotomeeting.com/register/538110878>)

Thu Oct. 6: **Information about the multifamily standard work specifications technical review by worker safety experts** (register: <https://www3.gotomeeting.com/register/271655622>)

Webinars for General Audiences—All at 3 p.m. EST

Thu Sept. 8: Register: <https://www3.gotomeeting.com/register/352148230>)

Tue Sept. 27: Register: <https://www3.gotomeeting.com/register/535705206>

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