



Workforce Guidelines for Home Energy Upgrades

Benjamin Goldstein,
Project Lead

December 9, 2010

- 1 Overview: Workforce Guidelines for Home Energy Upgrades
- 2 Standard Work Specifications and You!
- 3 Calling All Public Comments
- 4 From Guidelines to Training and Certification

1 Overview: Workforce Guidelines for Home Energy Upgrades

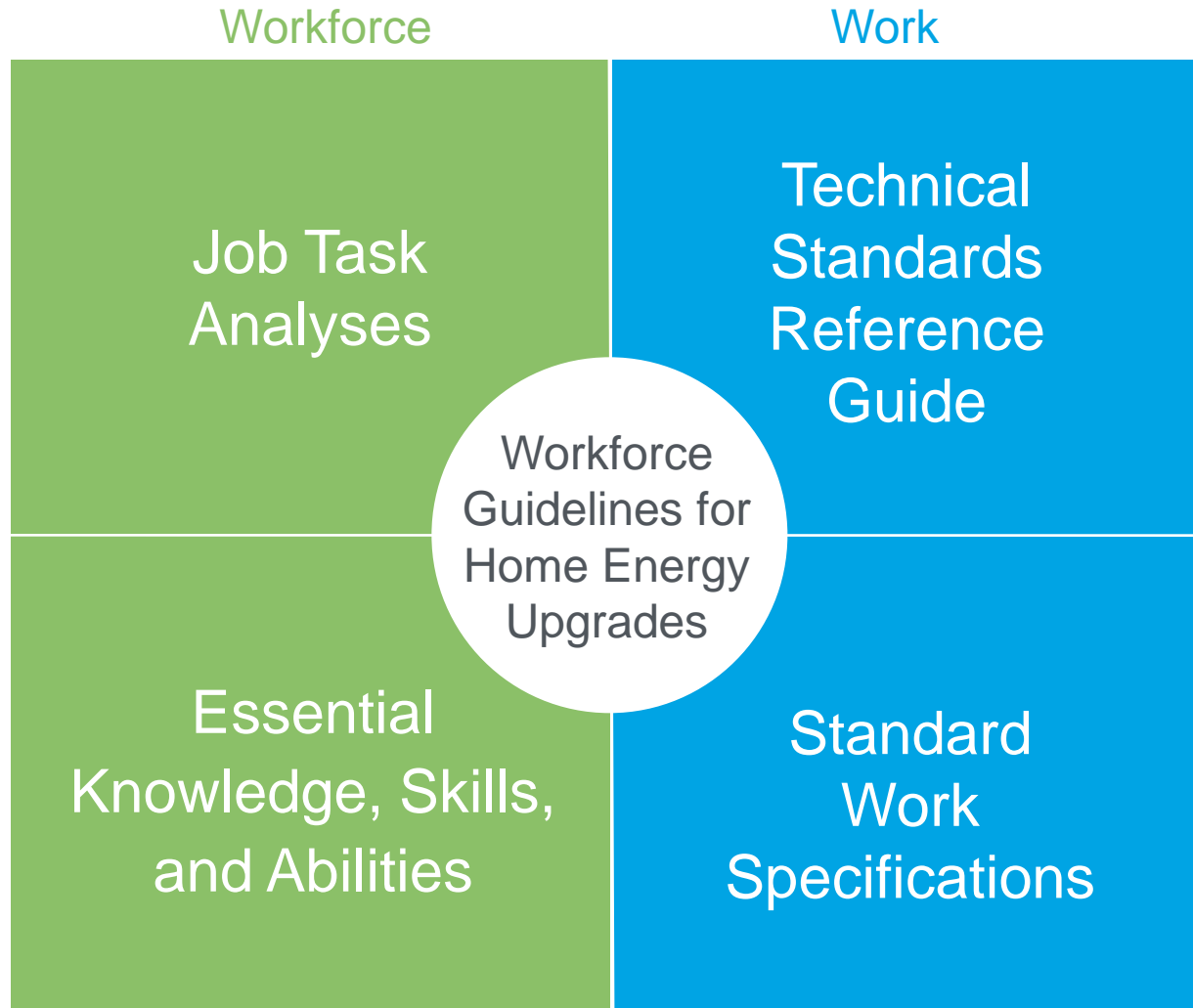


Workforce Guidelines for Home Energy Upgrades

Voluntary national guidelines for the work and workforce involved in residential energy efficiency retrofits

- Developed by NREL and Industry
- Delivered to EERE for Weatherization Assistance Program and the Vice Presidential Recovery through Retrofit program

Four Components



Help increase the quality of work performed
and enhance the skills of the workforce
involved in the home energy retrofit industry...

These workforce guidelines will benefit:

- **U.S. Workers**, by establishing a clear skill set upon which to base worker credentials and support workforce mobility up career ladders and across career lattices
- **American Homeowners**, by increasing confidence among consumers and the energy-efficiency finance community that retrofit work will produce the expected energy savings
- **The Retrofit Industry**, by providing a clear definition and baseline for quality retrofit work
- **Training Providers**, by assisting them in developing and upgrading course content and training curriculum, leading to better and more consistent training programs and a skilled workforce that can produce high-quality retrofit work

Weatherization Assistance Program (WAP) Training and Technical Assistance (T&TA) Plan: Task 6

Develop national weatherization
certification and accreditation standards.

Develop a national weatherization
worker certification framework.

Develop a national weatherization
**training accreditation program
and trainer certification program.**

May, 2009: Vice President Biden called on the Council of Environmental Quality to develop a plan for federal action to lay the architecture for a self-sustaining home energy efficiency retrofit industry.



MIDDLECLASS TASK FORCE
THE VICE PRESIDENT *of the* UNITED STATES

- 1) Develop a national Home Energy Score and audit tool
- 2) Develop energy performance scale and label for homes
- 3) Support municipal energy finance programs
- 4) Improve energy efficiency mortgages
- 5) Expand state energy revolving loan funds
- 6) Establish voluntary national standards for workforce certification and training program accreditation.**

- No comprehensive set of standards for entire range of whole-home energy retrofit interventions
- BPI Technical Standards and WAP field guides = assortment of technical standards, core competencies, work protocols, and best practices
- WAP community, home performance industry, consumers, financiers, manufacturers, and retrofit program administrators all looking for consistent national standards
- Time for federal leadership and industry partnership

- Government involvement in “standards” is complicated
- National Technology Transfer and Advancement Act and OMB Circular A-119
- ANSI Essential Requirements require “consensus”
- “Guidelines” proposed by Office of Information and Regulatory Affairs (OIRA—OMB)
- Government and industry can partner on developing voluntary “guidelines”

Description

Evaluation/assessment of skill standards in accordance with ANSI 17024 Standard for Personnel Certification (or equivalent)

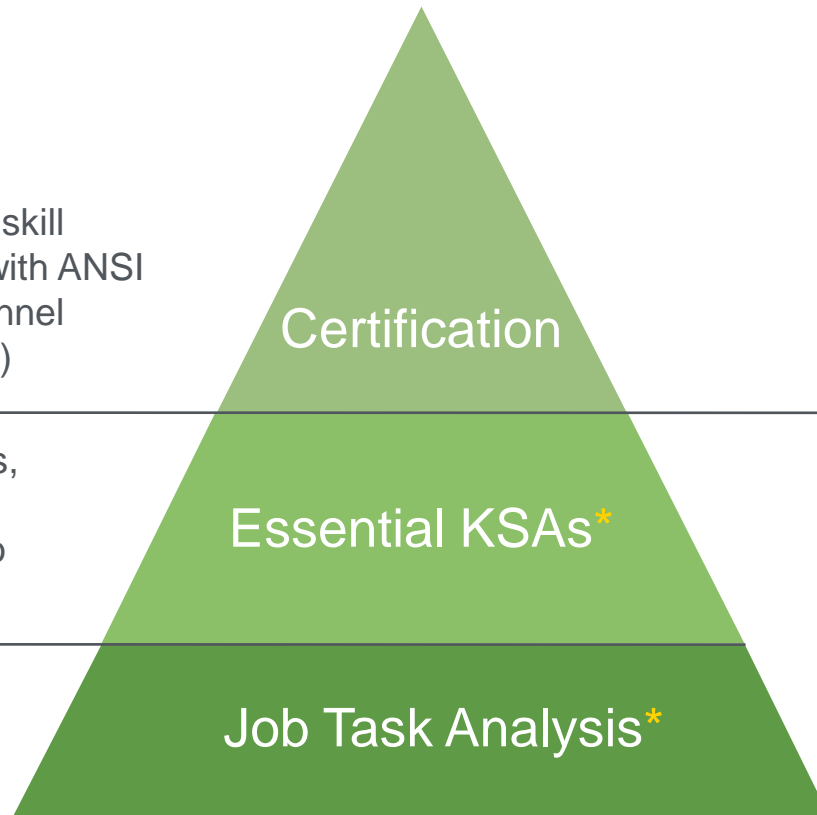
Minimum knowledge, skills, and abilities (KSAs) that workers should possess to perform high-quality work

Identifies and inventories a job's critical tasks

Developed by

Accredited certification bodies

Retrofit technicians, trainers, and program officials with professional psychometricians



* Workforce Guidelines for Home Energy Upgrades

Draft deliberative, for discussion purposes only. Not for citation.

Retrofit Work Pyramid

Description

Techniques, methods, or processes believed to be the most efficient and effective way of meeting the Standard Work Specifications (SWS)

Sets of guidelines or rules that govern work procedures and often invoke SWS and technical standards

Define the minimum requirements for high-quality work and conditions needed to achieve desired outcomes

Define safety, materials, installation, and application standards relevant to residential retrofits

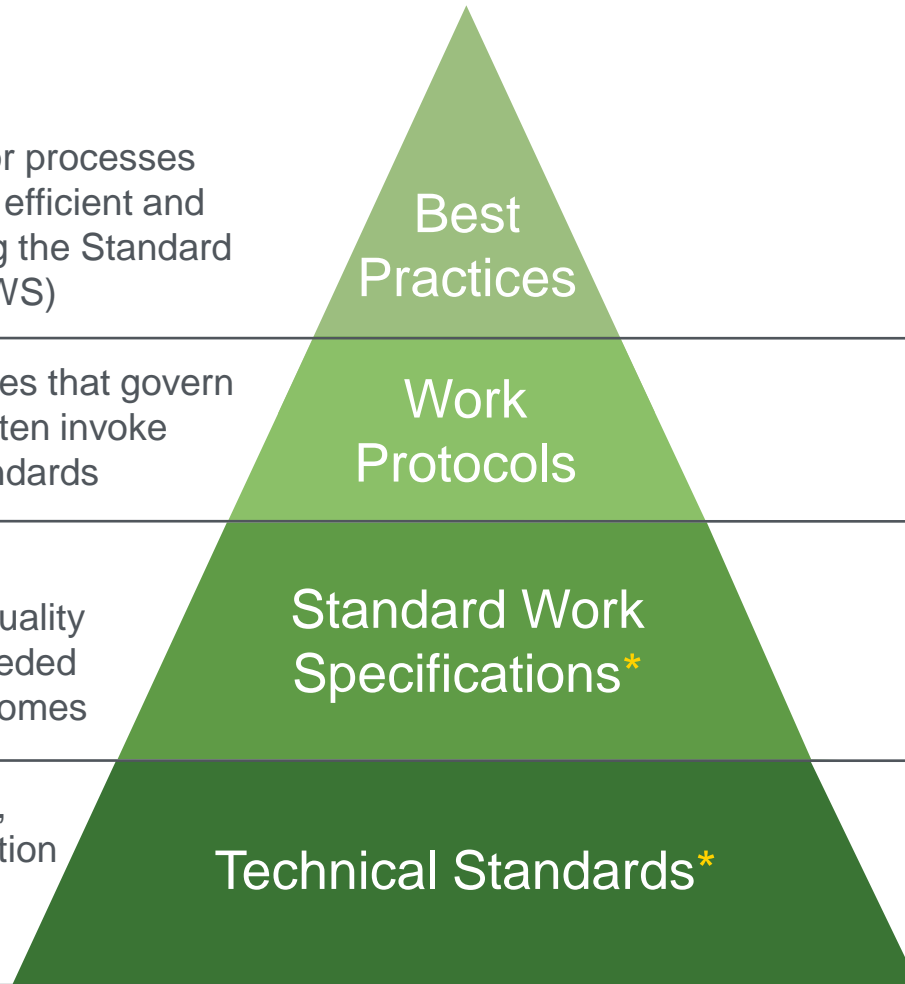
Developed by

Companies, retrofit crews, or individuals

Retrofit program administrators or individual companies

Technicians and retrofit industry representatives (including building trades, manufacturers, and building scientists)

Industry or third-party standards development organizations, such as ASHRAE, ASTM, and BPI



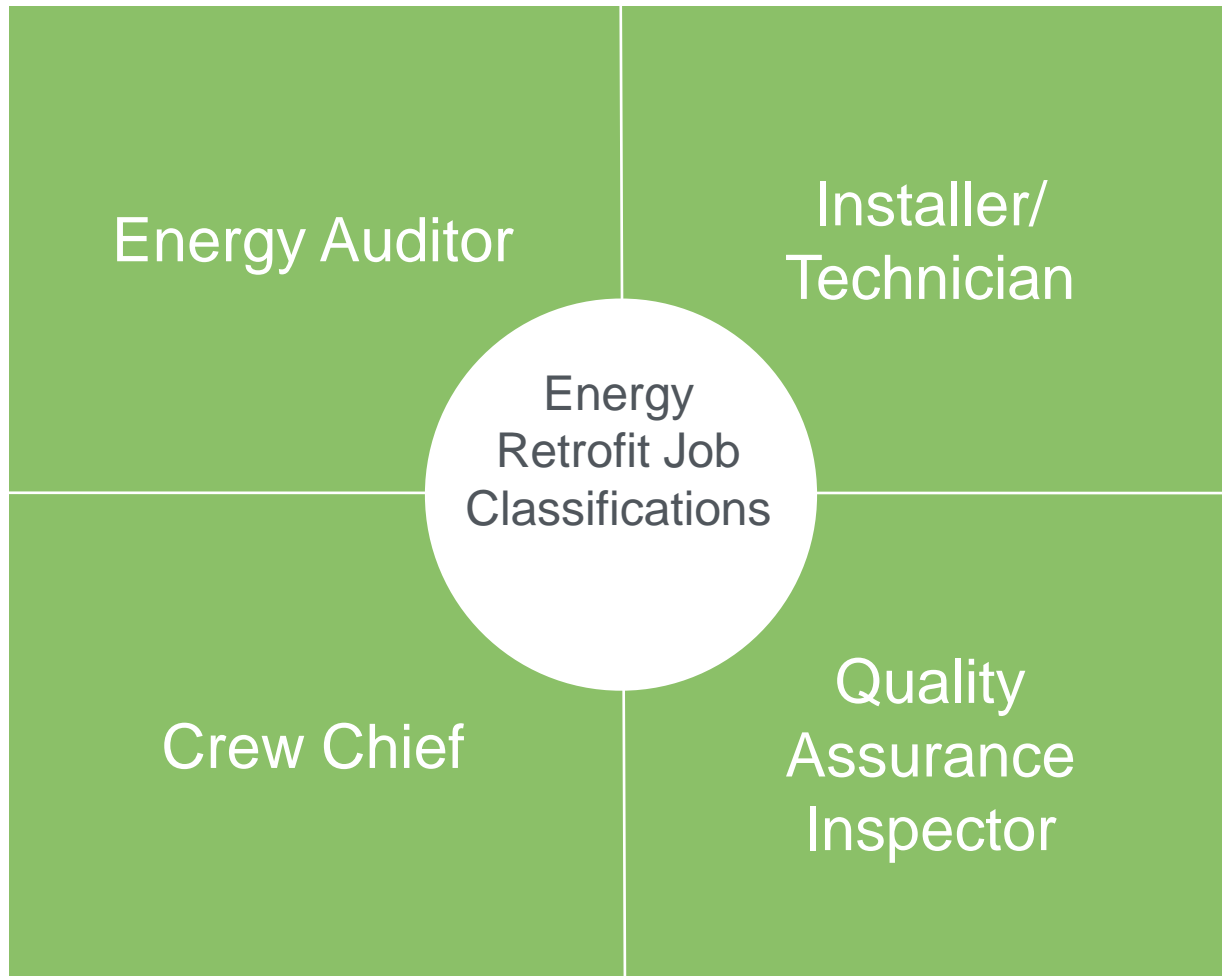
* Workforce Guidelines for Home Energy Retrofits

Draft deliberative, for discussion purposes only. Not for citation.

- Identifies and inventories a job's critical tasks.
- For a given job, a formal process for determining and cataloguing *what a worker does*.
- Tasks are classified as either cognitive or psychomotor skills, and as *critical*, *very important*, and *important* for job performance.
- Examples: set up blower door, run test in accordance with ASTM E779, record results of blower door test diagnostic software, etc.



Four Home Energy Retrofit Job Classifications



- Identify the minimum *knowledge, skills, and abilities* that workers should possess to perform high-quality work
- Each Job Task has a corresponding set of essential KSAs
- Examples:
 - Demonstrate ability to blow insulation at appropriate air pressure and material quantity to ensure complete coverage and manufacturer's recommended density to achieve prescribed R-value
 - Demonstrate ability to prioritize air sealing measures to inhibit moisture migration into attics and other interstitial spaces
 - Demonstrate knowledge of basic building science, including aligning barriers, stack effect, moisture transfer

- 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)
- Residential Retrofit Guidelines will contain a Technical Standards Reference Guide for industry

2 Standard Work Specifications and You!



- 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

Standard Work Specifications: Whole Wheat Bread

DESIRED OUTCOME(S):

1. Fully cooked loaf of whole wheat bread
2. Bread slices fit evenly in a standard toaster
3. No holes in slices of bread
4. Brown crust that does not flake or break when sliced

	Specifications	Desired Outcomes
Loaf height	Loaf height shall not exceed 5.5"	Bread slices fit evenly in a standard toaster
Bread consistency	No slice shall have a hole greater than 2 centimeters	Slices accept spreads without falling through
Crust	The outer crust of the bread shall be lightly browned and must not flake or break when slicing	Crust maintains a clear border completely around each slice
Oven	Bread must be baked in an oven capable of maintaining a constant temperature of 350 degrees	Evenly-baked bread

Draft SWS: Attic Access Hatches and Doors

Topic: Attic

Subtopic: Attic Openings

22) Detail Name: Access Doors and Hatches

Desired Outcome:

- Attic access door properly sealed and insulated

Row	Title	Specification(s)	Objective(s)
1	Installation	Access hatches will be insulated to the same R-Value as adjoining insulated assembly	Achieve uniform R-value
2	Sealing	Access hatch frames will be continuously weather stripped A latch or lock will be installed to ensure hatch remains closed	Prevent air leakage ⁶⁸
3	Attachment	Insulation will be permanently attached in complete contact with the access hatch	Insulate to prescribed R-value
4	Durability	Material integrity will meet a minimum expected service life of 20 years	Ensure a minimum expected service life
5	Occupant education	Purpose of insulation will be communicated to occupant ⁶⁹	Educate occupant on how to use the hatch to ensure integrity of insulated assembly throughout service life

⁶⁸ ASTM E1186 - 03(2009)

⁶⁹ 16CFR460.17

Draft SWS: Attic Insulation Prep Detail—Knee Wall

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Subcontract No. 68W6-K35L4-5
 Prime Contract No. DE-AC06-85OR21400

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, sagging or movement that may result in air leakage</p> <p>Prevent air leakage through the top or bottom of the knee wall³³</p> <p>Create an air barrier</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>

³³ ASTM E1186 - 03(2009)

DRAFT FOR PUBLIC REVIEW

281



NATIONAL RENOVABLE ENERGY LABORATORY

SWS Are Not Protocols or Best Practices

Bread Baking Protocols (Recipe)

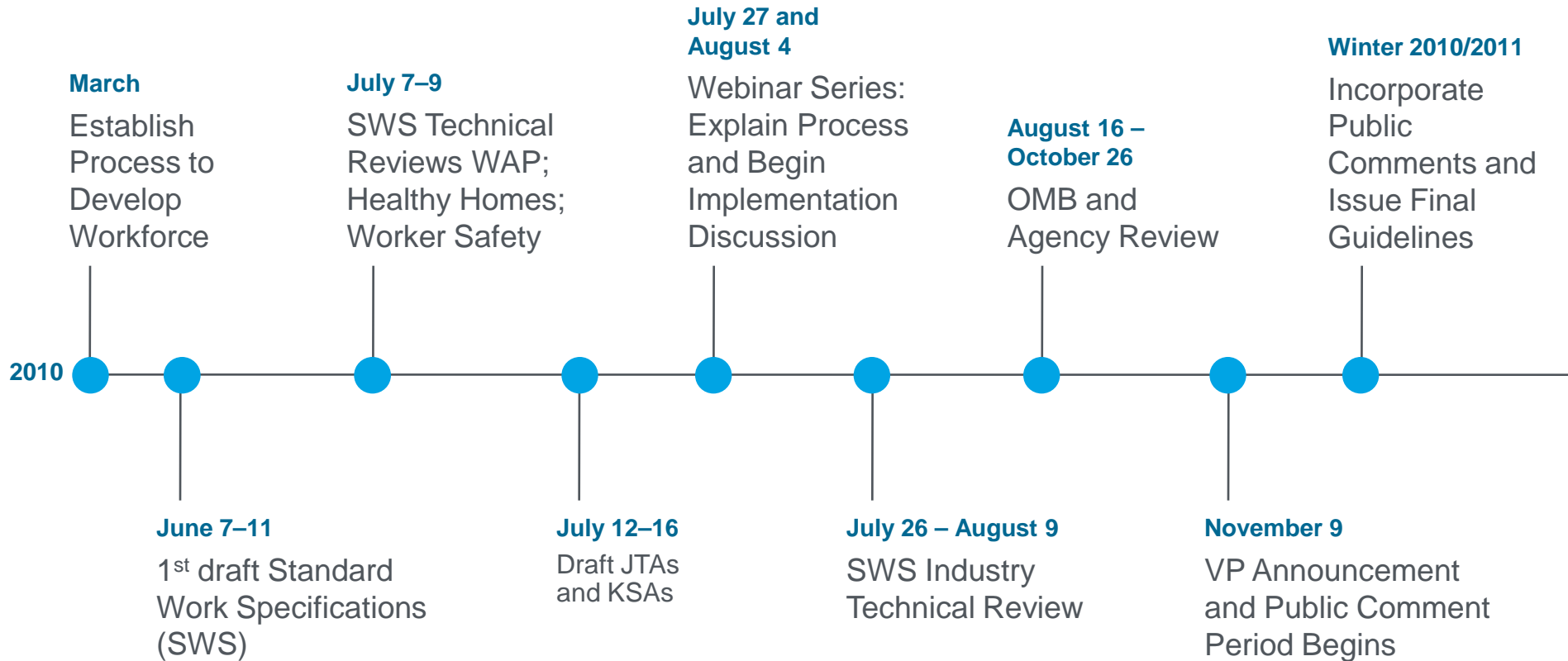
1	Place bread flour in bowl.
2	Place 2 heaping tablespoons salt in bowl.
3	Place 2/3 cup canola oil in bowl.
4	Place ½ quart warm clover honey in bowl.
5	Place 4 tablespoons of yeast in mason jar with a lid that seals tightly.
6	Place 1½ tablespoons sugar in mason jar with yeast.
7	Place ½ cup warm water in mason jar.
8	Shake vigorously.

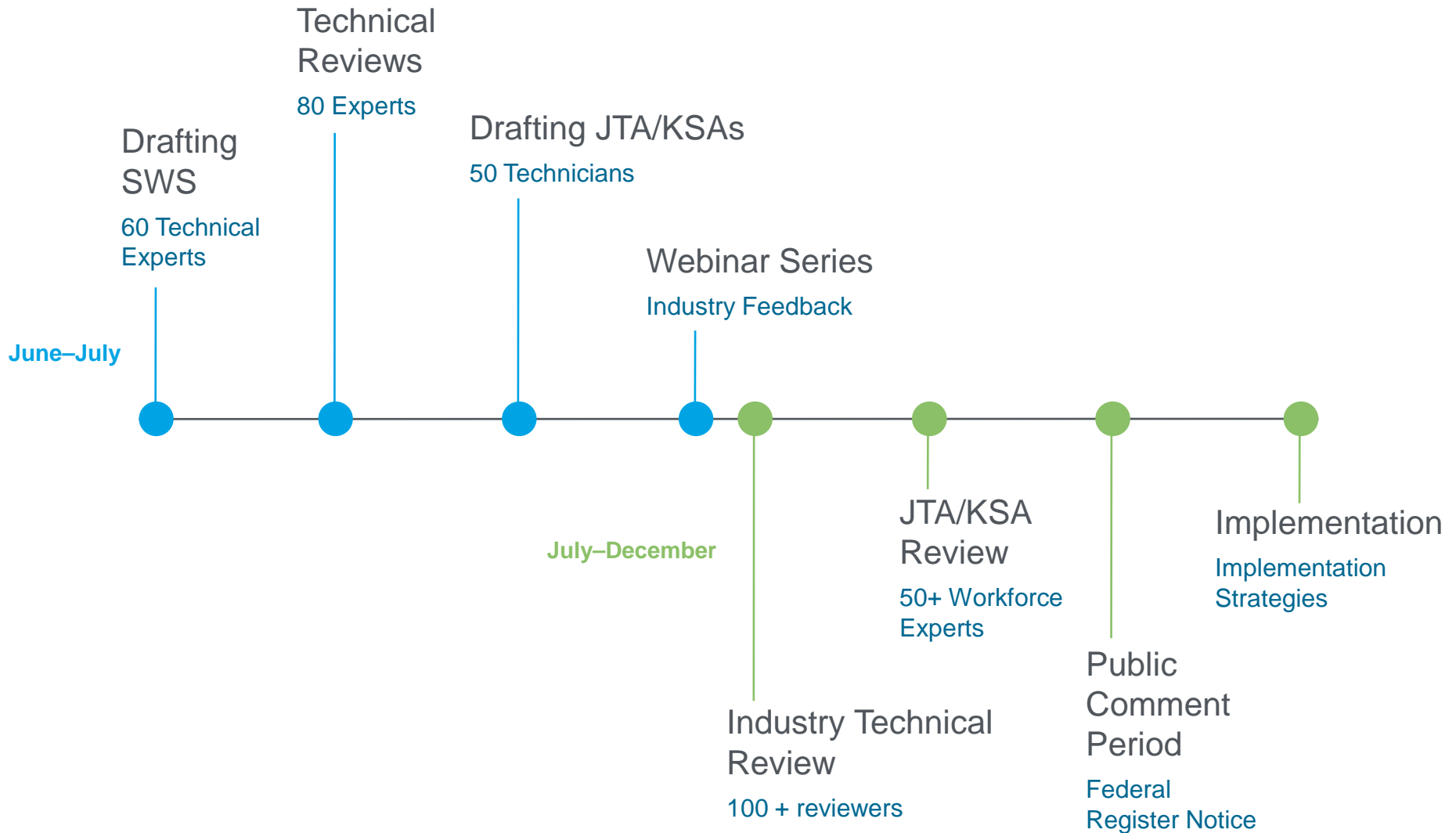
Bread Baking Best Practices (Mom's interpretation)

1	Large wooden bowl works best to minimize spills.
2	Use kosher, non-iodized salt, not sea salt.
3	Pour the canola oil in a circular pattern to evenly distribute over the flour.
4	Microwave the honey in a glass measuring cup.
5	Use a mason jar that you've already checked for tightness in the seal.
6	Place 1½ tablespoons sugar in mason jar with yeast.
7	Use the same glass measuring cup as was used for the honey.
8	Put on some music; it helps with the shaking.

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

Progress to Date



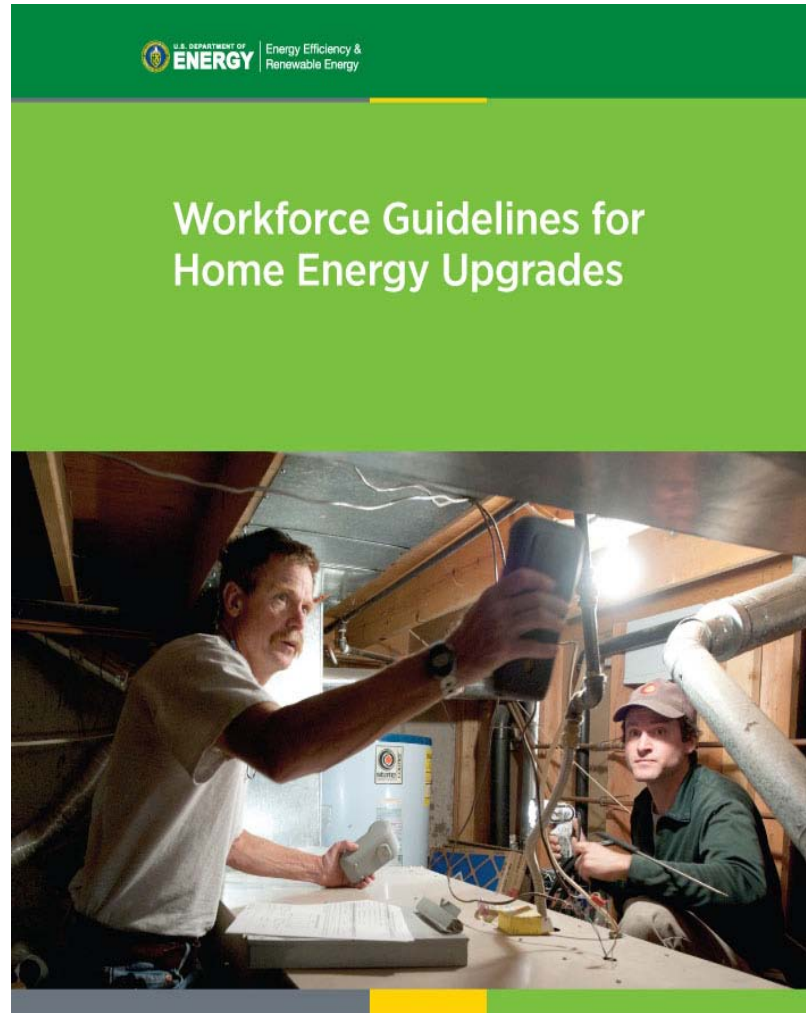


3 Calling All Public Comments



Comments on:

- JTA/KSAs and SWS
- General formatting, use, any additional thoughts



www.eere.energy.gov/wip/retrofits

Public Comment on Workforce Guidelines for Home Energy Upgrades

[EERE](#) » [Weatherization & Intergovernmental Program](#) » Public Comment on Workforce Guidelines for Home Energy Upgrades


Here you can make comments about the draft *Workforce Guidelines for Home Energy Upgrades*. The public comment period closes January 7, 2011. There are three steps to making comments.

1. Review the documents.
2. Register to provide comments.
3. Submit your comments.

Step 1: Review the documents

To start, please read the guidelines at your leisure. When you are ready, go to the next step to register and submit comments. You may return here as many times as necessary and submit as many times as you like.



[Part 1: Standard Work Specifications for Energy Efficiency Residential Retrofits](#) 



[Part 2: Job Task Analysis Outlines](#) 

Next: Register to provide comments ▶

4 From Guidelines to Training and Certification



National Residential Retrofit Guidelines



Training Program Accreditation

Worker Certification Architecture

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

– industry, labor, government, educational institutions, NGOs

1. Major infusion of DOE and DOL 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 providers for the Weatherization Assistance Program and home energy retrofit industry.
- Interstate Renewable Energy Council (IREC)
 - Currently accredits solar training programs with DOE support
- ISPQ International Standard 01022; JTA/KSAs from workforce guidelines
- Available March 2011; documents on IREC website

- Application for ISPQ Training Program Accreditation
- ISPQ Candidate Handbook for Standard 01022
- ISPQ International Standard 01022
- Available on March 2011
- <http://irecusa.org/irec-programs/ispq-training-accreditation/>

Workforce Guidelines for Home Energy Upgrades

Worker Certification Framework

- Unlike accreditation, there are already certifications available for retrofit workers.
- This process is complicated.

Why Certification?

For employers, certification means:

- Skilled workforce
- Increased productivity
- Employee retention
- A higher return on investment from improvements in
 - work quality
 - workplace safety
 - customer service
 - employee training

For workers, certification means

- A more secure job with higher wages
- Transferrable credentials
- Clear career pathways; greater job security
- More mobility
- When 2009 Recovery Act money is spent, WAP workers have options in the home performance industry

For consumers and lenders, certification means

- Increased confidence
- Higher quality
- Greater energy savings
- Health benefits (or no harm done)
- Satisfaction and referrals

1. Too many different credentials
 - Certifications and certificates galore
 - Credentials are not always transferable across programs and geographies (impedes mobility)
2. “Standards” (Job Tasks and KSAs) upon which certifications are built are all different and in need of strengthening
3. Assessments/tests need to better assess field capabilities
4. Many credentials are too expensive and are not always available in all locations

5. Federal investment in training programs with no clear credential on the other side

Conclusion:

Disaggregated, heterogeneous workforce certification system is not working

- WAP, workers, employers, industry all suffer
- Consumers want consistent, dependable service

Something needs to be done...



- Support a life after Recovery Act for the retrofit workforce
 - Certifications should be based on national, industry-recognized workforce guidelines (Job Task Analysis and Knowledge, Skills, and Abilities)
- Bring coherence to residential workforce certification landscape
- Ensure sustainability over time
- No new DOE certification
- Federal coordination
 - DOL, HUD, Dept of Ed. investments in worker training

1. Government and industry *cannot* keep putting money into retrofit programs and workforce training without:
 - ☒ Work quality guidelines (Standard Work Specifications)
 - ☒ Workforce competency guidelines (JTA/KSAs)
 - ☒ Training program accreditation
 - ☐ A high-quality, transferrable, and recognized certification toward which to direct workers...
2. This won't happen without government-industry partnership.
3. This is a legacy opportunity.

The *Workforce Guidelines for Home Energy Upgrades* will:

- 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 amongst consumers and the energy efficiency finance community
- Lay the foundation for a more robust worker certification and training program accreditation architecture.

1. Help spread the word!

[**weatherization.energy.gov/retrofit_guidelines/**](http://weatherization.energy.gov/retrofit_guidelines/)

2. Review and contribute

- Public comment period open until January 7, 2011

3. Start thinking about implementation opportunities for the Workforce Guidelines for Home Energy Upgrades

- Standard Work Specifications
- Job Tasks and KSAs

4. Prepare for IREC accreditation.

America Has Been Here Before...

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Prepare for **WINTER** Now!



Take dealer's advice—

on amount and kind of fuel
to buy and when to accept
delivery.



Check your heating plant

Clean and repair equipment—
install controls and other
fuel-saving devices.



"Winterize" your home

Insulate walls and ceilings,
install storm sash, weather-
strips. Caulk cracks.

FUEL IS SCARCE...CONSERVE IT!

SOLID FUELS ADMINISTRATION FOR WAR
WASHINGTON, D. C.



HOW TO KEEP WARM WITH LESS FUEL THIS WINTER

"Winterproof" your home now to prevent heat loss...

1. Insulate walls and ceilings
2. Weatherstrip windows...caulk cracks
3. Order storm sash early
4. Have your furnace and controls checked
for burning efficiency

**ACT NOW...WHILE MEN AND
MATERIALS ARE AVAILABLE**

A U.S. Government Message from the Office of War Information

When you ride **ALONE**
you ride with Hitler!



Join a
Car-Sharing Club
TODAY!

POST IN LATRINES ONLY



NOBODY LOVES A

HOT WATER HOG



SAVE

Benjamin Goldstein
Project Lead

Workforce Guidelines for Home Energy Upgrades

weatherization.energy.gov/retrofit_guidelines/