



## WHY HOME IMPROVEMENT EXPERT?

An easy way to get a quality job.

Research findings reveal significantly reduced energy savings and potential performance risks where home improvements are not properly installed. To help homeowners address this challenge, the U.S. Department of Energy has compiled world-class expert guidance from industry leaders and national laboratories in factsheets and checklists under the name **Home Improvement Expert**. Homeowners can leverage these expert recommendations to help ensure quality installation by attaching Home Improvement Expert checklists to vendor contracts and ensuring the vendor completes and signs the checklist before accepting the work.

## READY TO DO MORE?

This factsheet and accompanying checklist cover one of more than 20 home improvements covered by the U.S. Department of Energy Home Improvement Expert. Use them to help optimize energy savings and improve performance related to comfort, health, safety, and durability.

To download other checklists: [bascc.pnnl.gov/home-improvement-expert](http://bascc.pnnl.gov/home-improvement-expert)

For more customized home improvement recommendations:

- Get your **Home Energy Score** from a qualified assessor ([www.home-energy-score.gov](http://www.home-energy-score.gov))
- Schedule an expert assessment through **Home Performance with ENERGY STAR®** ([www.energystar.gov/homeperformance](http://www.energystar.gov/homeperformance)).



## BENEFITS

Installed correctly, energy-efficient windows can reduce utility costs while improving comfort and durability.

Old windows represent a substantial source of heat loss in winter and heat gain in summer because they provide 5 to 10 times less thermal protection than an insulated wall. With typical window replacements, the existing frame is left in place to minimize the disruption and cost. However, existing windows were often never air sealed behind the trim at the rough opening around the window frame and the window may also lack pan flashing. Homeowners who are replacing windows must decide whether to address these areas of potential air and water leakage by doing a full-frame window replacement or to minimize costs and leave the existing frame in place.

## RELATED HOME IMPROVEMENT CONSIDERATIONS

Before replacing your home's windows, consider working with a qualified home energy assessor to evaluate other related home performance needs and opportunities. This includes:

- Assessing any indications of air or water leakage and considering a full-frame replacement including air sealing and window flashing where problems are identified. This is especially important where there are plans to add insulation to the walls because they will be more vulnerable to moisture damage from leaking windows.
- Consider using a RESNET or BPI certified home energy assessor.
- Consider consulting an architect and local code officials to assist with meeting historic preservation criteria where required.

For more information on windows, please search the Building America Solution Center, [bascc.pnnl.gov](http://bascc.pnnl.gov).

## TIPS FOR HIRING A CONTRACTOR

- Look for licensed, insured, and certified contractors.
- Check references and reviews on home improvement web sites.
- Get multiple bids in writing.
- Check with your utility and state, local, and federal weatherization programs for rebates and incentives.
- Include the Home Improvement Expert™ checklist in bids and contracts to ensure quality installation.
- Consider using a Residential Energy Services Network (RESNET) certified Home Energy Rating System (HERS) rater, Building Performance Institute (BPI) certified Building Analyst, or other qualified professional (e.g., licensed engineer or architect) to inspect the work.

**ENCLOSURE UPGRADES**

Attic Air Sealing and Insulation

Basement Wall Insulation

Comprehensive Attic Upgrade

Framed Wall Insulation

Masonry Wall Insulation

Home Air Sealing

Vented to Unvented Attic

Vented to Unvented Crawl Space

Window Replacement

**HEATING & COOLING**

Air Conditioner Replacement

Gas Furnace Replacement

Heat Pump Replacement

Duct Sealing and Insulation

Oil or Gas Boiler Replacement

**HOT WATER HEATING**

Gas Tank Water Heater

Gas Tankless Water Heater

Heat Pump Water Heater

**FRESH AIR SYSTEM**

Bathroom Exhaust Fan

Kitchen Exhaust Fan

Balanced HRV/ERV

Balanced Supply plus Exhaust

Supply Integrated with HVAC

**PROPER SEQUENCING OF HOME IMPROVEMENTS**

Through the U.S. Department of Energy's Building America research program, expert guidance has been developed for optimizing whole-house energy-efficiency upgrades. This includes a recommended sequence for home improvements (shown below) to help ensure homeowners get the most out of their upgrade investments while minimizing potential harm from safety, indoor air quality, and moisture issues.

**STEP 1: ENSURE SAFE AND DURABLE**

Have experts assess opportunities to improve energy efficiency and identify comfort, moisture management, health, and safety issues.

**STEP 2: ENSURE FRESH AIR**

Ensure effective ventilation before increasing air tightness.

**STEP 3: ENSURE MOISTURE CONTROL**

Ensure adequate water protection before reducing the ability of walls to dry by adding air sealing and insulation.

**STEP 4: ENSURE DRAFT-FREE**

Capture air sealing opportunities not accessible after insulation is installed.

**STEP 5: ENSURE THERMAL COMFORT**

Insulate at least to the latest national code recommendations for your location after addressing related safety, indoor air quality, and moisture management issues.

**ANYTIME: EQUIPMENT UPGRADES**

Replace heating and cooling equipment, water heaters, windows, appliances, lighting, fans, and electronics when they fail or become out of date with ENERGY STAR® qualified products or better, and improve systems to operate more efficiently.



This U.S. Department of Energy checklist includes important specifications that can contribute to a complete and quality installation. All work shall comply with these specifications, all relevant codes and standards, and all manufacturer installation instructions. The contractor shall check each box on the checklist below and sign and date at the bottom to certify the work is completed.

**PREPARATION**

- An ENERGY STAR certified or better window matched to the climate zone for this specific home shall be selected for all windows to be replaced.
- Egress windows and safety glass shall be specified in accordance with local codes.
- The presence of lead-based paint in pre-1978 homes shall be assumed unless testing confirms otherwise. The work shall comply with EPA's Lead Renovation, Repair and Painting (RRP) Rule (40 CFR Part 745) in pre-1978 homes and proposed changes to this rule (Federal Register/Vol. 75, No. 87/ May 6, 2010).

**INSTALLATION: OPTION 1 - WINDOW REPLACEMENT IN EXISTING FRAME**

- Interior stops, sashes, parting strips, and pulleys shall be removed and the rough opening shall be cleaned and fully sealed.
- Sealants shall be durable, pest resistant, compatible with their intended surfaces, have a weather-appropriate seal, and be applied in accordance with the manufacturer's specifications.
- Indoor sealants shall be low volatile organic compound (VOC) products that meet independent testing and verification protocols, such as Green Seal, GREENGUARD, or comparable certifications.
- Replacement windows shall be installed in accordance with the manufacturer's specifications, ensuring that the exterior stops are caulked and that the new window inserts are sealed at the existing frame.

**COMMISSIONING**

- Occupants shall be notified of changes or repairs made and shall be educated on how to operate and maintain the windows.

I hereby certify that, to the best of my knowledge and ability, all checked items on the above checklist have been accomplished as part of completion of this home upgrade.

Contractor Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Contracting Organization: \_\_\_\_\_

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