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SUCCESS *with* ENERGY STAR

~~For Home Energy Raters~~

For Building Performance Professionals

Creating a Successful Partnership

Agenda

- What is Success?
- History of Success with ENERGY STAR Concept
- The Process
- Where are we doing this?
- How can you succeed with this process?

Success according to Webster

- Success:

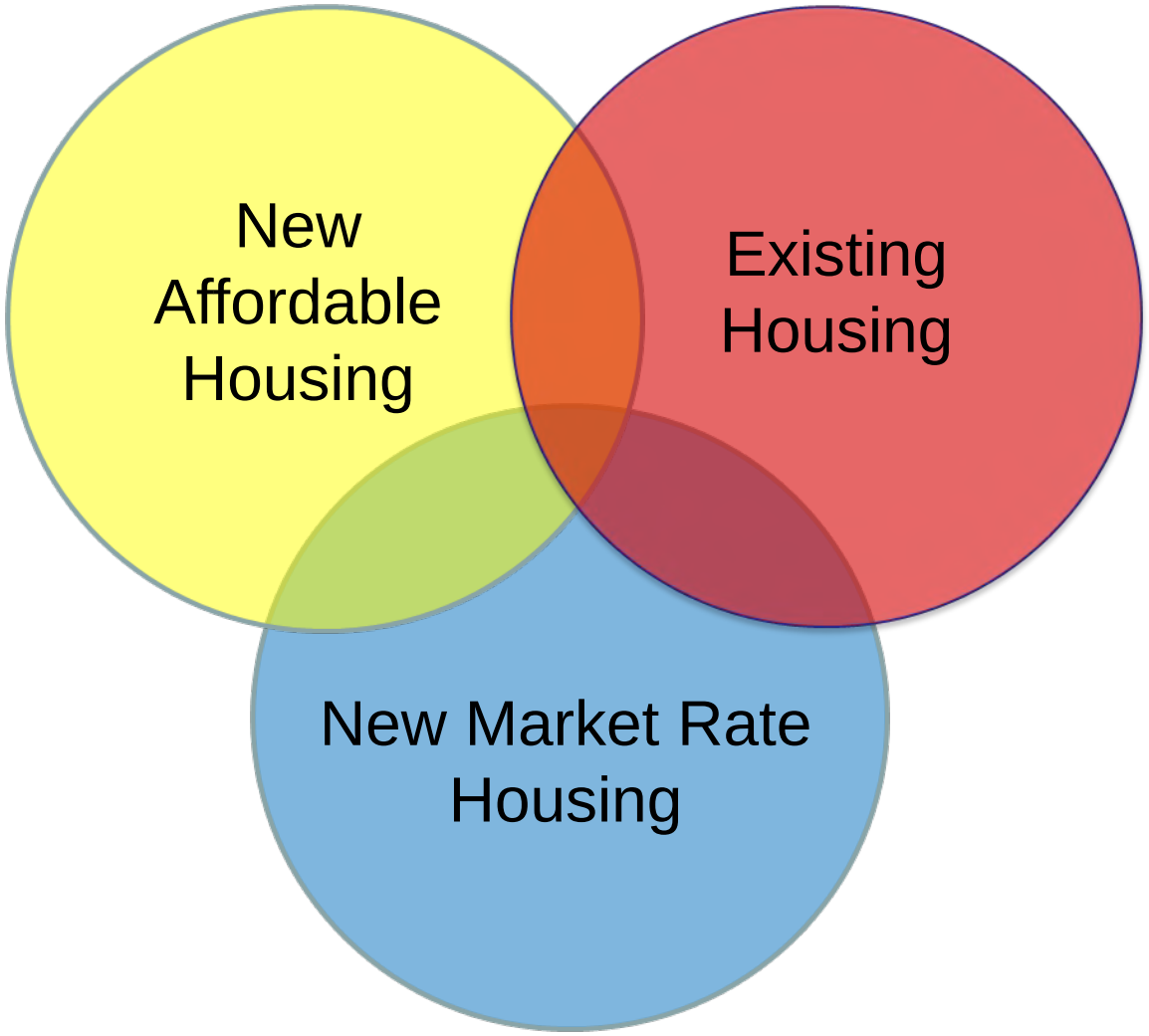
Main Entry: **suc·cess** Pronunciation: \sək-ˈses\

1 *obsolete* **:** outcome, result

2 **a :** degree or measure of succeeding **b :** favorable or desired outcome; *also* **:** the attainment of wealth, favor, or eminence

3 **:** one that succeeds

Applied Building Science Team

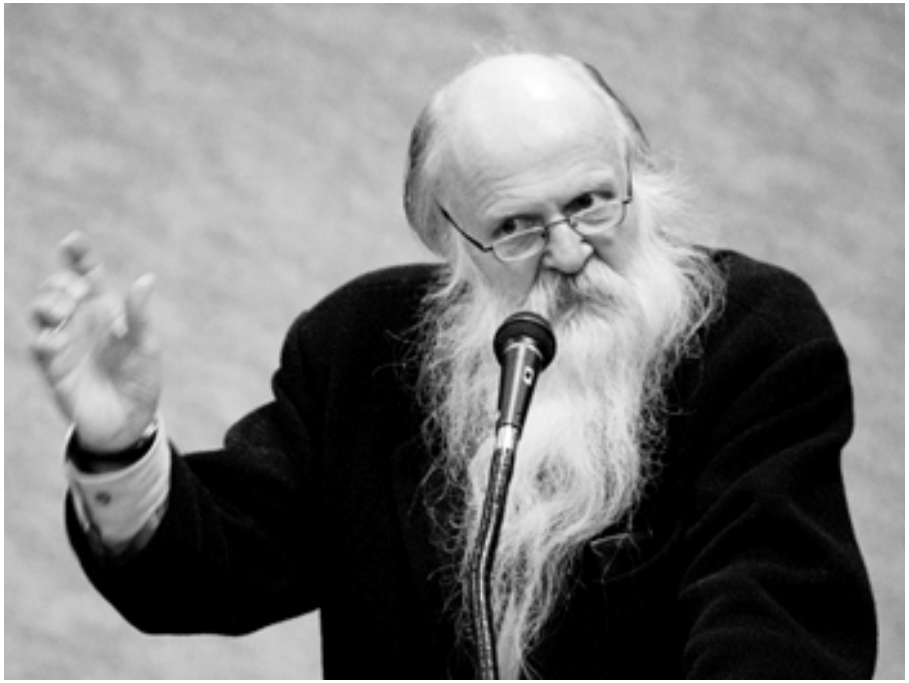


What are we trying to do?

- Convert builders to energy efficiency
- Teach them how to do it the right way every time
- Get results through real performance data
- Massive Impact

How *WERE* we doing it?

- Delivering awareness training to convert
- Awareness training to teach implementation
- Collect data= ☹
- Massive Impact?



Your clients teach you…if you listen

- Large Builder in two major cities
  - > Need: A moisture risk protection program
- Our Response?
  - > Assessment, narrowed to five major risks….then
  - > Teach them how to eliminate five major risks
  - > Awareness training isn't cutting it!
  - > Introducing Job Ready Job Complete idea

Job Ready Job Complete

- There are numerous hands that touch one construction site. (40+?)
- Each group is in narrowed into their zone, creating lots of room for mistakes
- Job Ready Job Complete is a process for each subcontractor to ensure the site is ready for their work.
- Why is this important?

Success with…. Documents are born

- Mistake Proofing Verification Checklists per detail and per subcontractor
- Illustrated (Pictures) that are connected to each line item in the checklist for reference in the field.

What else needs simplification?

- 2006: ENERGY STAR Version 2 (TBC) appeared and builders were surprised….and fell out of the program!!!

Thermal Bypass Checklist

- Simple, right?
- Standards are necessary,

  but how do we do it?

ENERGY STAR Qualified Homes
Thermal Bypass Inspection Checklist

Home Address:_____ City:_____ State:_____

Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	**Requirements:** Insulation shall be installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under item no. 2 *(Walls Adjoining Exterior Walls or Unconditioned Spaces)*				
	All Climate Zones:				
	1.1 Overall Alignment Throughout Home	☐	☐	☐	☐
	1.2 Garage Band Joist Air Barrier (at bays adjoining conditioned space)	☐	☐	☐	☐
	1.3 Attic Eave Baffles Where Vents/Leakage Exist	☐	☐	☐	☐
	Only at Climate Zones 4 and Higher:				
	1.4 Slab-edge insulation (A maximum of 25% of the slab edge may be uninsulated in Climate Zones 4 and 5.)	☐	☐	☐	☐
	Best Practices Encouraged, Not Req'd.:				
	1.5 Air Barrier At All Band Joists (Climate Zones 4 and higher)	☐	☐	☐	☐
	1.6 Minimize Thermal Bridging (e.g., OVE framing, SIPs, ICFs)	☐	☐	☐	☐
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	**Requirements:** • Fully insulated wall aligned with air barrier at both interior and exterior, **OR** • Alternate for **Climate Zones 1 thru 3**, sealed exterior air barrier aligned with RESNET Grade 1 insulation fully supported • Continuous top and bottom plates or sealed blocking				
	2.1 Wall Behind Shower/Tub	☐	☐	☐	☐
	2.2 Wall Behind Fireplace	☐	☐	☐	☐
	2.3 Insulated Attic Slopes/Walls	☐	☐	☐	☐
	2.4 Attic Knee Walls	☐	☐	☐	☐
	2.5 Skylight Shaft Walls	☐	☐	☐	☐
	2.6 Wall Adjoining Porch Roof	☐	☐	☐	☐
	2.7 Staircase Walls	☐	☐	☐	☐
	2.8 Double Walls	☐	☐	☐	☐
3. Floors between Conditioned and Exterior Spaces	**Requirements:** • Air barrier is installed at any exposed fibrous insulation edges • Insulation is installed to maintain permanent contact with sub-floor above including necessary supports (e.g., staves for blankets, netting for blown-in) • Blanket insulation is verified to have no gaps, voids or compression. • Blown-in insulation is verified to have proper density with firm packing				
	3.1 Insulated Floor Above Garage	☐	☐	☐	☐
	3.2 Cantilevered Floor	☐	☐	☐	☐
4. Shafts	**Requirements:** Openings to unconditioned space are fully sealed with solid blocking or flashing and any remaining gaps are sealed with caulk or foam (provide fire-rated collars and caulking where required)				
	4.1 Duct Shaft	☐	☐	☐	☐
	4.2 Piping Shaft/Penetrations	☐	☐	☐	☐
	4.3 Flue Shaft	☐	☐	☐	☐
5. Attic/ Ceiling Interface	**Requirements:** • All attic penetrations and dropped ceilings include a full interior air barrier aligned with insulation with any gaps fully sealed with caulk, foam or tape • Movable insulation fits snugly in opening and air barrier is fully gasketed				
	5.1 Attic Access Panel (fully gasketed and insulated)	☐	☐	☐	☐
	5.2 Attic Drop-down Stair (fully gasketed and insulated)	☐	☐	☐	☐
	5.3 Dropped Ceiling/Soffit (full air barrier aligned with insulation)	☐	☐	☐	☐
	5.4 Recessed Lighting Fixtures (ICAT labeled and sealed to drywall)	☐	☐	☐	☐
	5.5 Whole-house Fan (insulated cover gasketed to the opening)	☐	☐	☐	☐
6. Common Walls Between Dwelling Units	**Requirements:** Gap between drywall shaft wall (i.e., common wall) and the structural framing between units is fully sealed at all exterior boundary conditions				
	6.1 Common Wall Between Dwelling Units	☐	☐	☐	☐

Home Energy Rating Provider: _____ Rater Inspection Date: _____ Builder Inspection Date: _____
Home Energy Rater Company Name: _____ Builder Company Name: _____
Home Energy Rater Signature: _____ Builder Employee Signature: _____

Success with ENERGY STAR Process

- Success with ENERGY STAR
  - > Assessment of Builder's product
  - > Group Training
  - > Provide the Process for Success
    - Mistake Proofing Verification
    - Critical Details / Tech Tips
    - Thermal Bypass Checklist (TBC) Scope of Work

Success with ENERGY STAR Process

- Assessment
  - > Walk Through With The Builder/Developer
    - Assess Strengths/Weaknesses
  - > Scopes Review
  - > Plan Review

Success with ENERGY STAR process

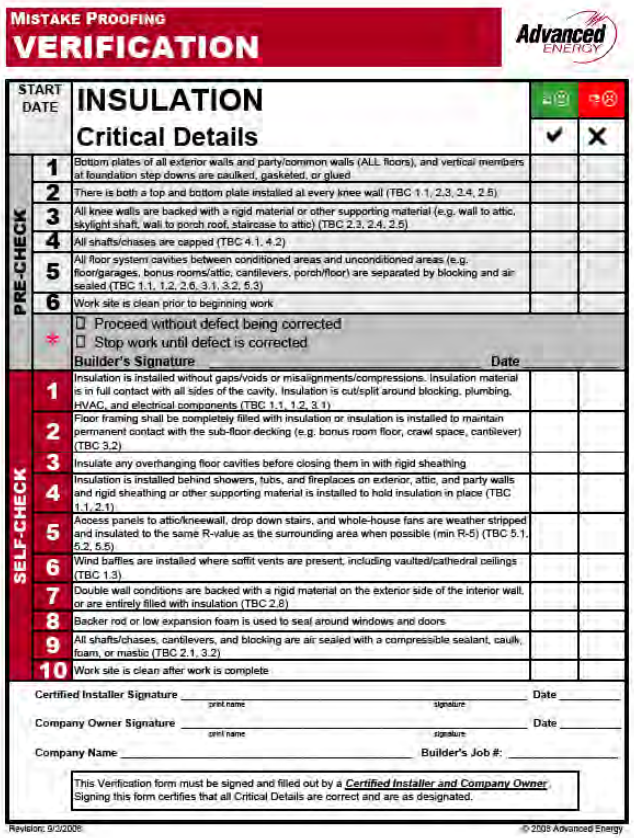
- Group Training
  - > Who?
    - Contractors/Sub-contractors
    - Realtors
    - Raters
  - > What?
    - Quality Process Improvement
    - Building Science
    - Explain requirements
    - Walk through the process with each sub

Success with ENERGY STAR process

- Group Training
  - > Why?
    - Buy-in from management
    - Discuss interconnectedness
    - Improved communication

Success with ENERGY STAR

- Group Training….example



MISTAKE PROOFING
VERIFICATION

START DATE	INSULATION Critical Details	✔	✕
PRE-CHECK 1	Bottom plates of all exterior walls and party/common walls (ALL floors), and vertical members at foundation step downs are caulked, gasketed, or glued		
2	There is both a top and bottom plate installed at every knee wall (TBC 1.1, 2.3, 2.4, 2.5)		
3	All knee walls are backed with a rigid material or other supporting material (e.g. wall to attic, skylight shaft, wall to porch roof, staircase to attic) (TBC 2.3, 2.4, 2.5)		
4	All shafts/chases are capped (TBC 4.1, 4.2)		
5	All floor system cavities between conditioned areas and unconditioned areas (e.g. floor/garages, bonus rooms/attic, cantilevers, porch/floor) are separated by blocking and air sealed (TBC 1.1, 1.2, 2.6, 3.1, 3.2, 5.3)		
6	Work site is clean prior to beginning work		
*	☐ Proceed without defect being corrected ☐ Stop work until defect is corrected Builder's Signature _____ Date _____		
SELF-CHECK 1	Insulation is installed without gaps/voids or misalignments/compressions. Insulation material is in full contact with all sides of the cavity. Insulation is cut/split around blocking, plumbing, HVAC, and electrical components (TBC 1.1, 1.2, 3.1)		
2	Floor framing shall be completely filled with insulation or insulation is installed to maintain permanent contact with the sub-floor decking (e.g. bonus room floor, crawl space, cantilever) (TBC 3.2)		
3	Insulate any overhanging floor cavities before closing them in with rigid sheathing		
4	Insulation is installed behind showers, tubs, and fireplaces on exterior, attic, and party walls and rigid sheathing or other supporting material is installed to hold insulation in place (TBC 1.1, 2.1)		
5	Access panels to attic/kneewall, drop down stairs, and whole-house fans are weather stripped and insulated to the same R-value as the surrounding area when possible (min R-5) (TBC 5.1, 5.2, 5.5)		
6	Wind baffles are installed where soffit vents are present, including vaulted/cathedral ceilings (TBC 1.3)		
7	Double wall conditions are backed with a rigid material on the exterior side of the interior wall, or are entirely filled with insulation (TBC 2.8)		
8	Backer rod or low expansion foam is used to seal around windows and doors		
9	All shafts/chases, cantilevers, and blocking are air sealed with a compressible sealant, caulk, foam, or mastic (TBC 2.1, 3.2)		
10	Work site is clean after work is complete		

Certified Installer Signature _____ Date _____
(print name) (signature)

Company Owner Signature _____ Date _____
(print name) (signature)

Company Name _____ Builder's Job #: _____

This Verification form must be signed and filled out by a ***Certified Installer and Company Owner***.
Signing this form certifies that all Critical Details are correct and are as designated.

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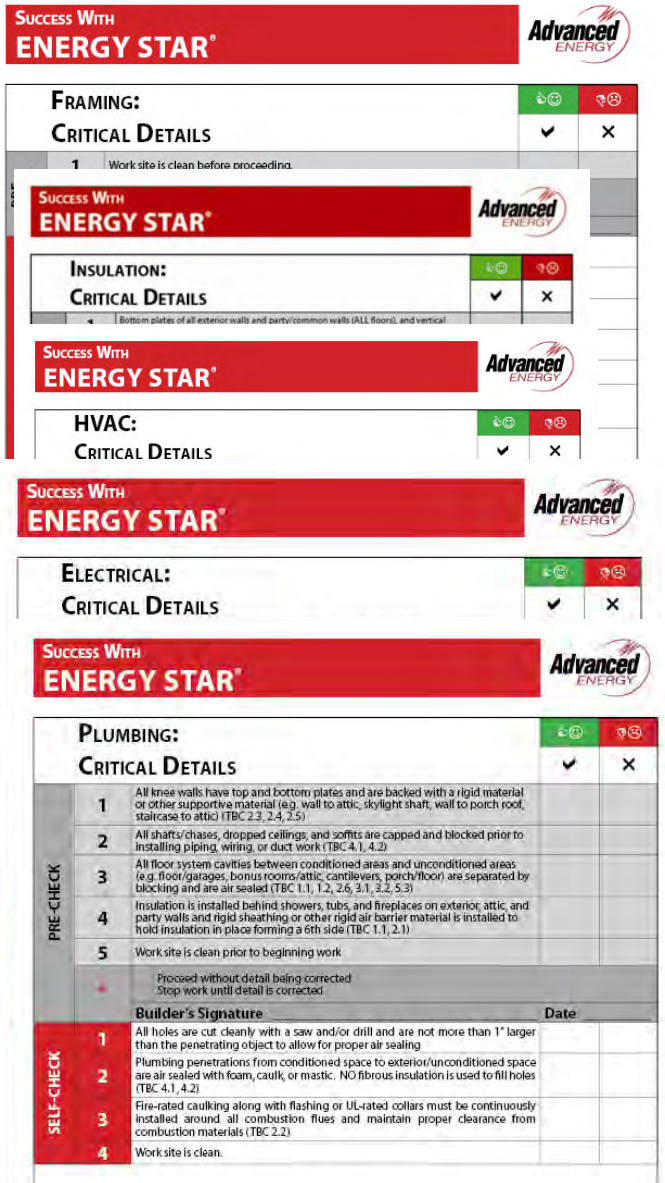
Success with ENERGY STAR

- Sub-contractor JRJC (Framing, Insulation, HVAC, Electrical, and Plumbing)
- Reduces mistakes and reinspections
- Self checks
  - > Reduce cost
  - > Catch problems at the source
- Cost effective



Success With ENERGY STAR®

FRAMING: CRITICAL DETAILS

INSULATION: CRITICAL DETAILS

HVAC: CRITICAL DETAILS

ELECTRICAL: CRITICAL DETAILS

PLUMBING: CRITICAL DETAILS

PRE-CHECK

1 All knee walls have top and bottom plates and are backed with a rigid material or other supportive material (e.g. wall to attic, skylight shaft, wall to porch roof, staircase to attic) (TBC 2.3, 2.4, 2.5)

2 All shafts/chases, dropped ceilings, and soffits are capped and blocked prior to installing piping, wiring, or duct work (TBC 4.1, 4.2)

3 All floor system cavities between conditioned areas and unconditioned areas (e.g. floor/garages, bonus rooms/attic, cantilevers, porch/floor) are separated by blocking and are air sealed (TBC 1.1, 1.2, 2.6, 3.1, 3.2, 5.3)

4 Insulation is installed behind showers, tubs, and fireplaces on exterior, attic, and party walls and rigid sheathing or other rigid air barrier material is installed to hold insulation in place forming a 6th side (TBC 1.1, 2.1)

5 Work site is clean prior to beginning work

Proceed without detail being corrected
Stop work until detail is corrected

Builder's Signature Date

SELF-CHECK

1 All holes are cut cleanly with a saw and/or drill and are not more than 1" larger than the penetrating object to allow for proper air sealing

2 Plumbing penetrations from conditioned space to exterior/unconditioned space are air sealed with foam, caulk, or mastic. NO fibrous insulation is used to fill holes (TBC 4.1, 4.2)

3 Fire-rated caulking along with flashing or UL-rated collars must be continuously installed around all combustion flues and maintain proper clearance from combustion materials (TBC 2.2)

4 Work site is clean.

Critical Detail / Tech Tips

Success With ENERGY STAR®
INSULATION CRITICAL DETAILS

1 **NO GAPS/VOIDS** — Insulation is installed without gaps/voids. Insulation material is in full contact with all sides of the cavity. Insulation is cut/split around blocking, plumbing, HVAC and electrical components (TBC 1.1, 1.2, 3.1)

1 **NO COMPRESSIONS/MISALIGNMENTS** — Insulation is installed without misalignments/compressions. Insulation material is in full contact with all sides of the cavity. Insulation is cut/split around blocking, plumbing, HVAC and electrical components (TBC 1.1, 1.2, 3.1)

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Critical Detail Tips

Success With ENERGY STAR®
INSULATION CRITICAL DETAILS

2 **FLOOR SYSTEMS** — Floor framing shall be completely filled with insulation or insulation is installed to maintain permanent contact with the sub-floor decking (e.g. bonus room floor, crawl space, cantilever) (TBC 3.2)

3 **CANTILEVERS** — Insulate any overhanging floor cavities before closing them in with rigid sheathing

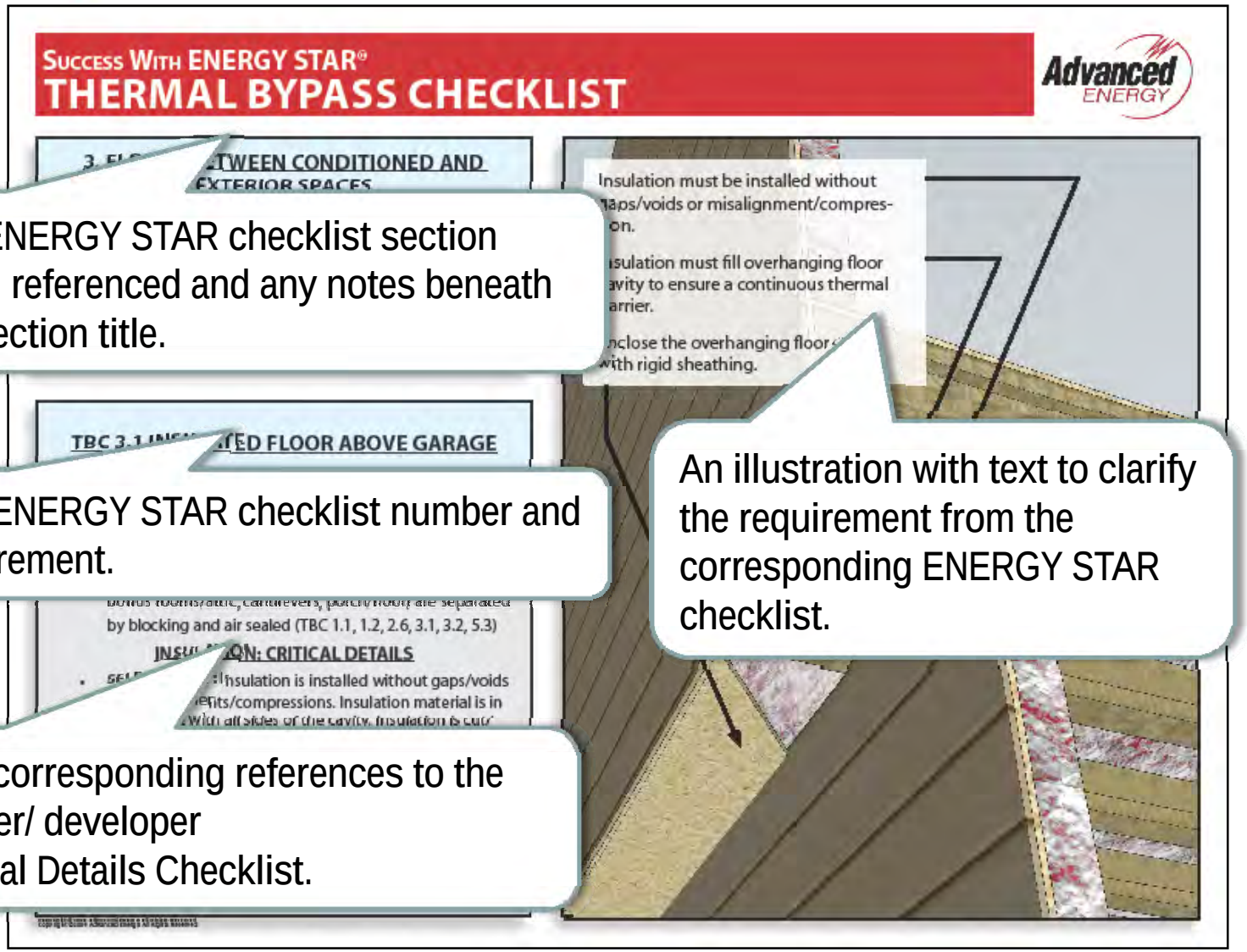
4 **TUBS/SHOWERS/FIREPLACES** — Insulation is installed behind showers, tubs, and fireplaces on exterior, attic, and party walls and rigid sheathing or other supporting material is installed to hold insulation in place (TBC 1.1, 2.1)

4 **TUBS/SHOWERS/FIREPLACES** — Insulation is installed behind showers, tubs, and fireplaces on exterior, attic, and party walls and rigid sheathing or other supporting material is installed to hold insulation in place (TBC 1.1, 2.1)

What about scopes?

- Purchasing Managers and Architects…who else?
- Streamlines the bidding process for different subs

TBC Scope of Work



TBC Scope of Work

SUCCESS WITH ENERGY STAR®

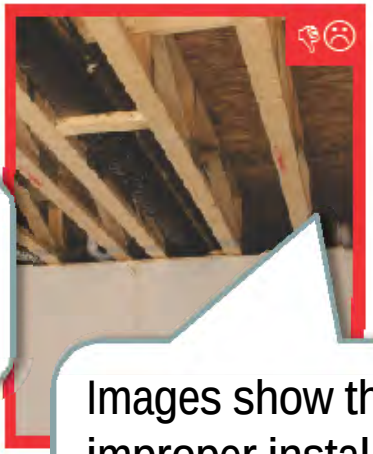
THERMAL BYPASS CHECKLIST

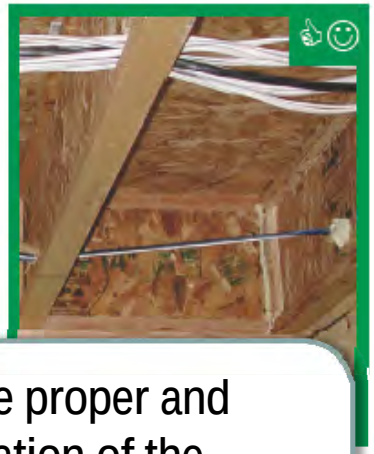
APPLICABLE TRADES:

FRAMER

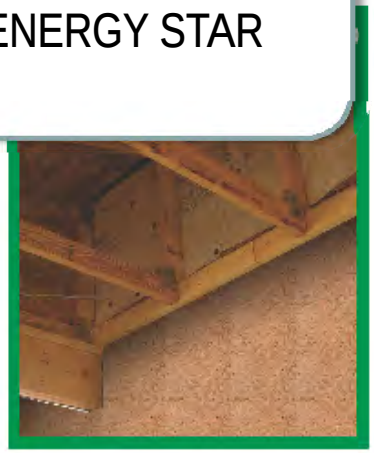
INSULATOR

This informs the Rater which sub-contractors are most likely to perform the corresponding detail.



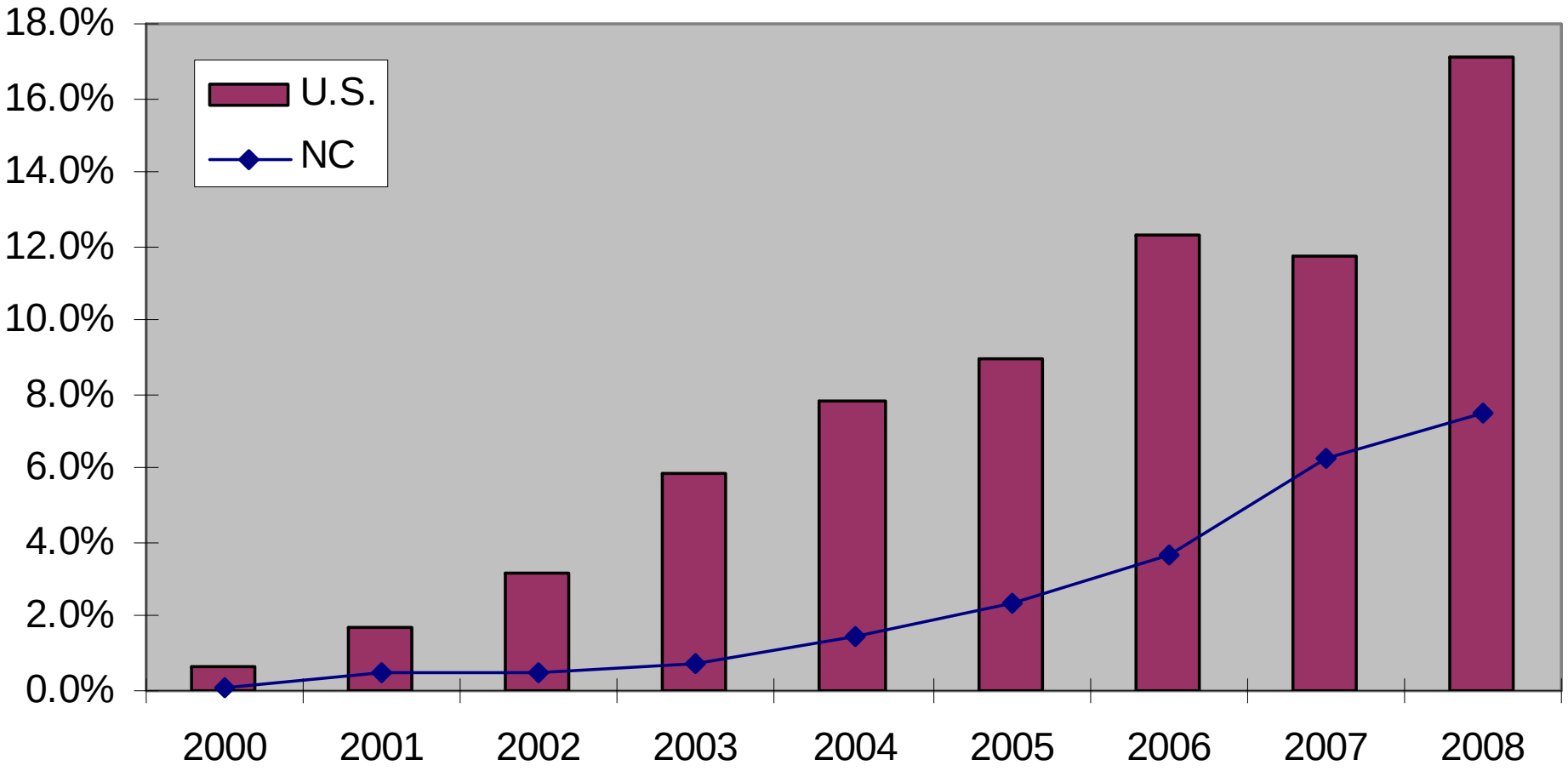


Images show the proper and improper installation of the corresponding ENERGY STAR requirement.



Pertinent tips and tricks are provided here and space is provided for additional notes.

- 2009 ENERGY STAR market penetration: ~20%



Success with ENERGY STAR – Where is it today?

- APS ENERGY STAR Homes Program (Arizona)
- Duke Energy ENERGY STAR Program (South Carolina)
- Georgia Power ENERGY STAR Program (Georgia)
- Progress Energy Home Advantage Program (Carolinas)
- Gulf Power EnergyCents Program (Florida)

Arizona Public Service

- Builder and contractor participants are uniformly EXTREMELY satisfied with the training. All indicate how this course makes it so much easier to understand and meet the critical details to meet E Star requirements and improve performance. That is what lead APS to make this a mandatory program requirement when a builder joins the program - we feel this training is essential to get all construction team together with a streamlined process to achieve success.

  - Tom Hines, APS

What does this have to do with You?

- What kind of Home Energy Rater are you?

Partner or Policeman

Partnerships win

- Develop a way to help your builders meet the requirements of ENERGY STAR or other HPH Programs
- Communication
- Provide them with a process
- Get everyone together
- Get top management buy in
- Commit yourself, guarantee results, quality service

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