

Proposed Merged Low-Rise/High-Rise Multifamily Framework and Technical Requirements, Part 1

November 13, 2017





Agenda – Webinar Part 1

- Background
- Specification Timeline
- Overview the 'One Multifamily' framework
 - Goals and concept
- 2017 Changes and Updates
- Proposed Technical Requirements
 - Performance Target
 - Mandatory Measures
 - Envelope
- Summary and Next Steps



Agenda – Webinar Part 2

- Day 1 Review
- Proposed Technical Requirements
 - Mandatory Measures
 - Heating and Cooling
 - Distribution
 - Domestic Hot Water
 - Ventilation and Filtration
 - Lighting and Appliances
 - Water Management
 - Verification and Oversight
- Summary and Next Steps



Timeline

First Comment Period

- Comments through December 15 to mfhr@energystar.gov

Second Comment Period

- Webinar and comments late Q1

Goal

- Final specification available January 2019
- Transition to new specification January 2020



Background

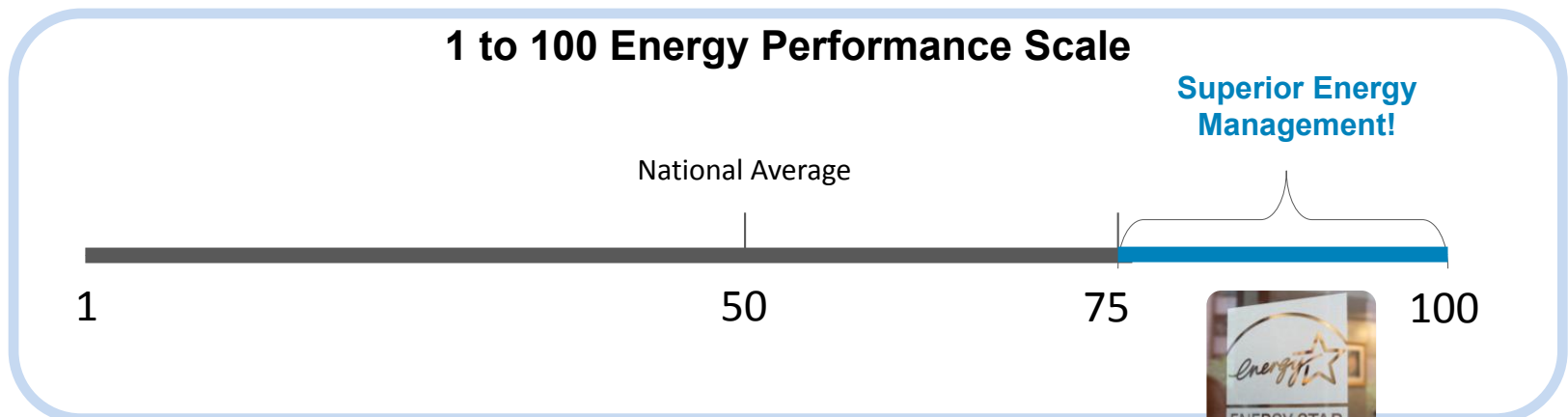


ENERGY STAR Multifamily Programs

Commercial: Has guidelines that apply to existing buildings:

- Recognition for superior energy performers – score 75 or above – and provided they meet industry standards for indoor environmental quality.
- Awarded based on the calendar year.
- Properties must have at least 20 units.
- Score available since Sept 2014

www.energystar.gov/multifamilyhousing





ENERGY STAR Multifamily Programs

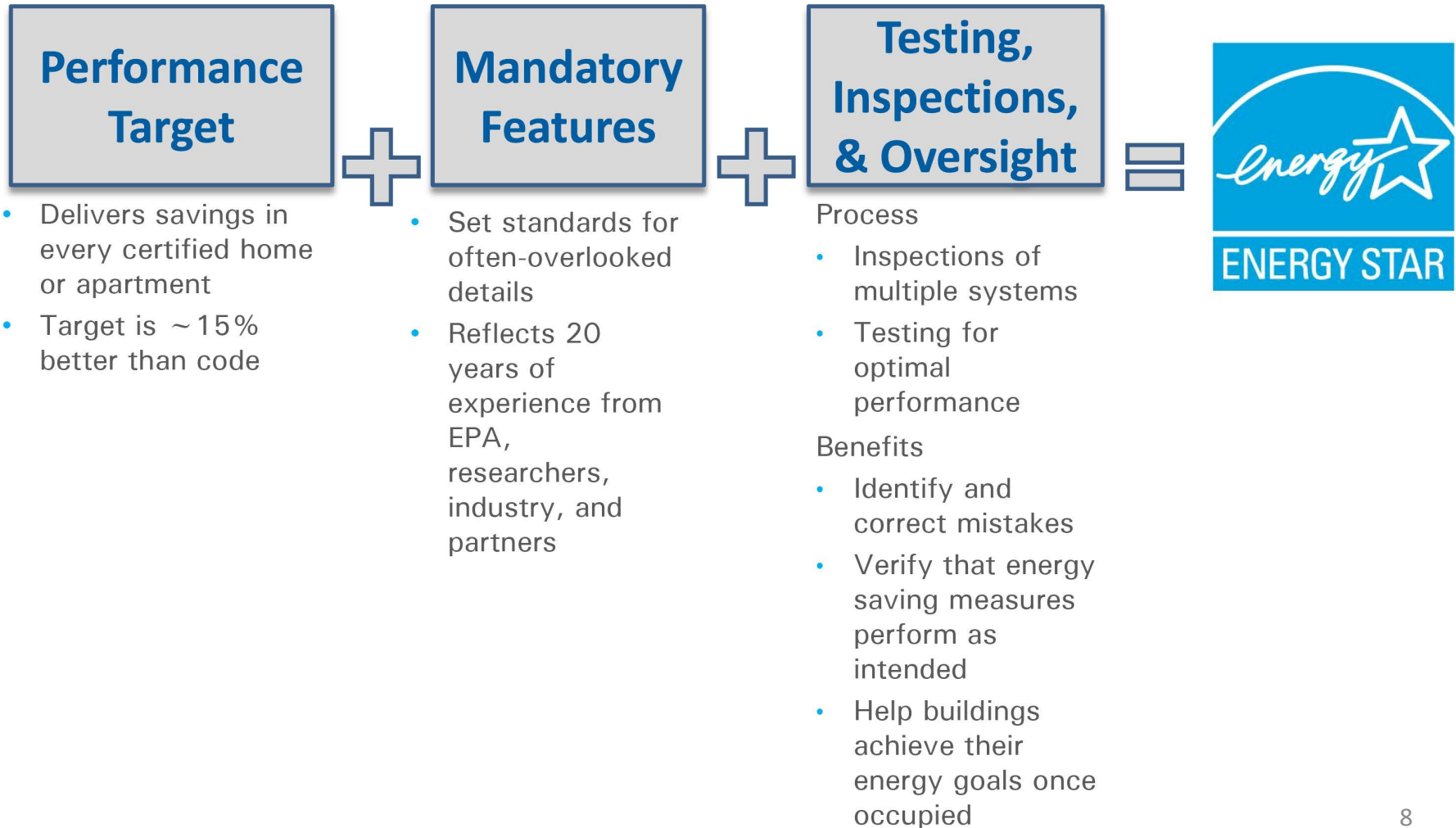
Residential: Has guidelines that apply to new or gut rehab:

Current Framework

- Single Family Homes (detached and attached)
 - Factory Built Homes (manufactured and modular)
 - Low Rise Multifamily Residential Buildings
 - Mid and High Rise Multifamily Residential Buildings
 - Covers buildings previously ineligible for ESCH
 - Launched in June 2011
- } Certified Homes
- } MFHR

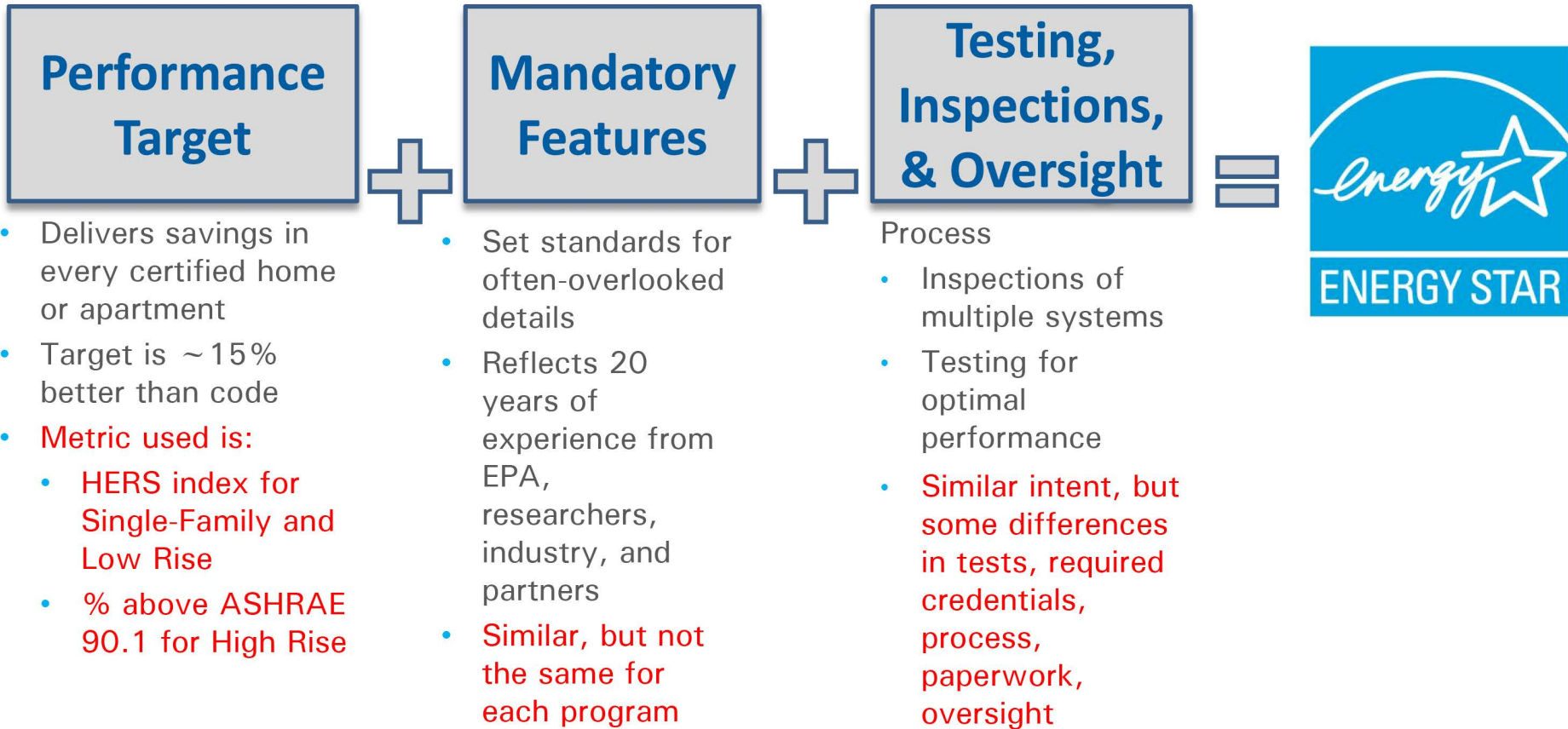


Key Components Common to Both Programs





Key Components Common to Both Programs

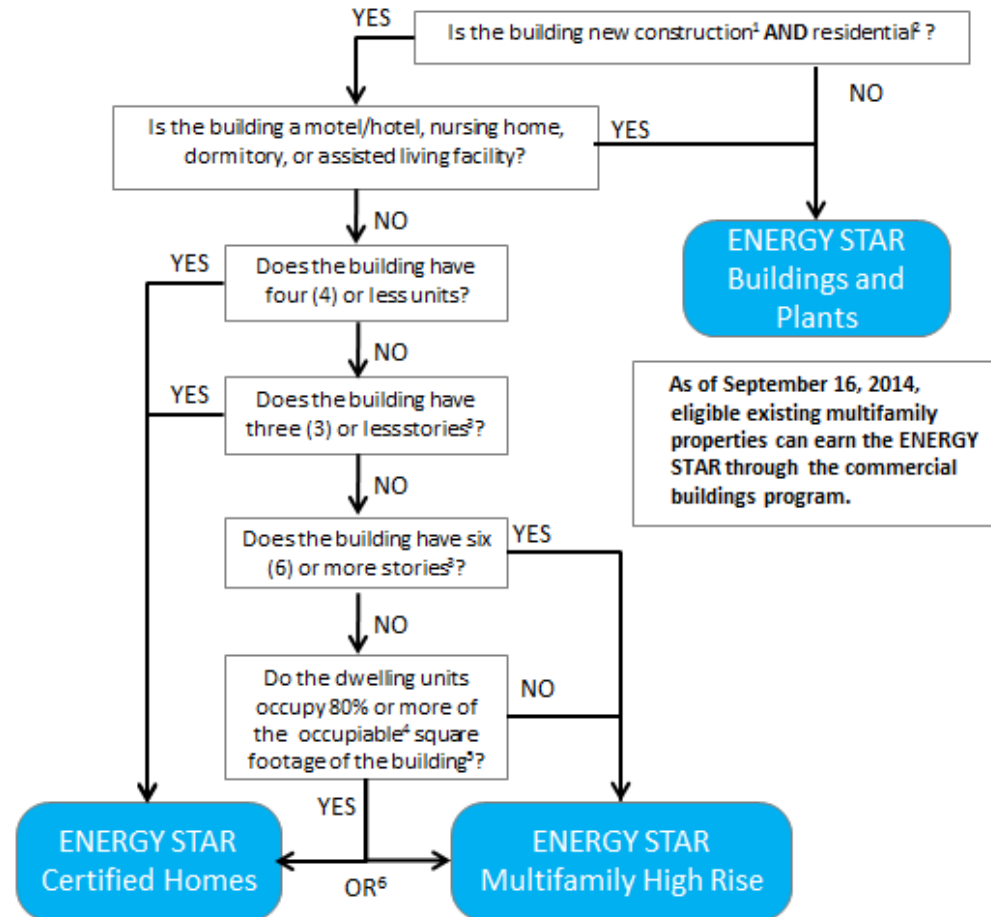




Current Eligibility

Complex dividing line with significant programmatic differences causes:

- Confusion/Frustration
- Inconsistency with code/incentive program eligibilities
- Designing to program, instead of what's best for the building
- Requirements not optimized for project







Goals for the New Concept

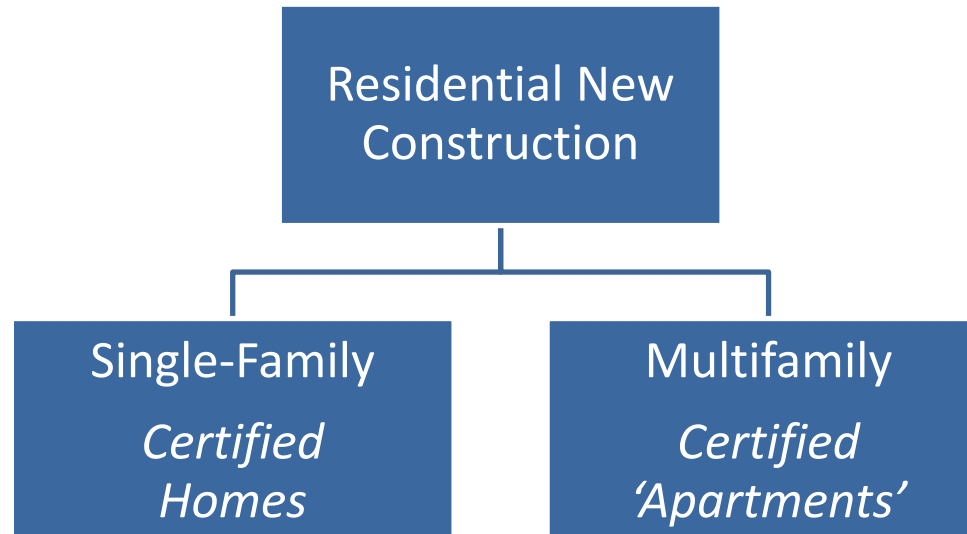
- Appropriate eligibility
- Technical requirements are governed by building features
 - Optimized for multifamily
 - Appropriate for variety of building types
- Common areas addressed
- Flexibility for participants and program administrators
- Well-defined verifier requirements
 - Including multifamily training
- Market-based oversight



One Multifamily Framework



New Framework



- Delineation between SF and MF
 - Single-Family: Detached housing, duplexes, townhomes
 - Multifamily: All other attached housing
- Consistent specification for multifamily (any height)

New Framework

- Townhouses: A single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides (2015 IBC)
 - Q: What about a configuration where townhouses are adjacent to a vertical structure that contains more than one dwelling unit (“stacked flat”)?
 - A: Under Review





Key Components of the Multifamily Program





New Performance Target Options

ASHRAE

- Model residential space (including common areas) to 90.1 using Appendix G and Simulation Guidelines
- MFHR business as usual
- Low-rise also models to 90.1 Appendix G

HERS

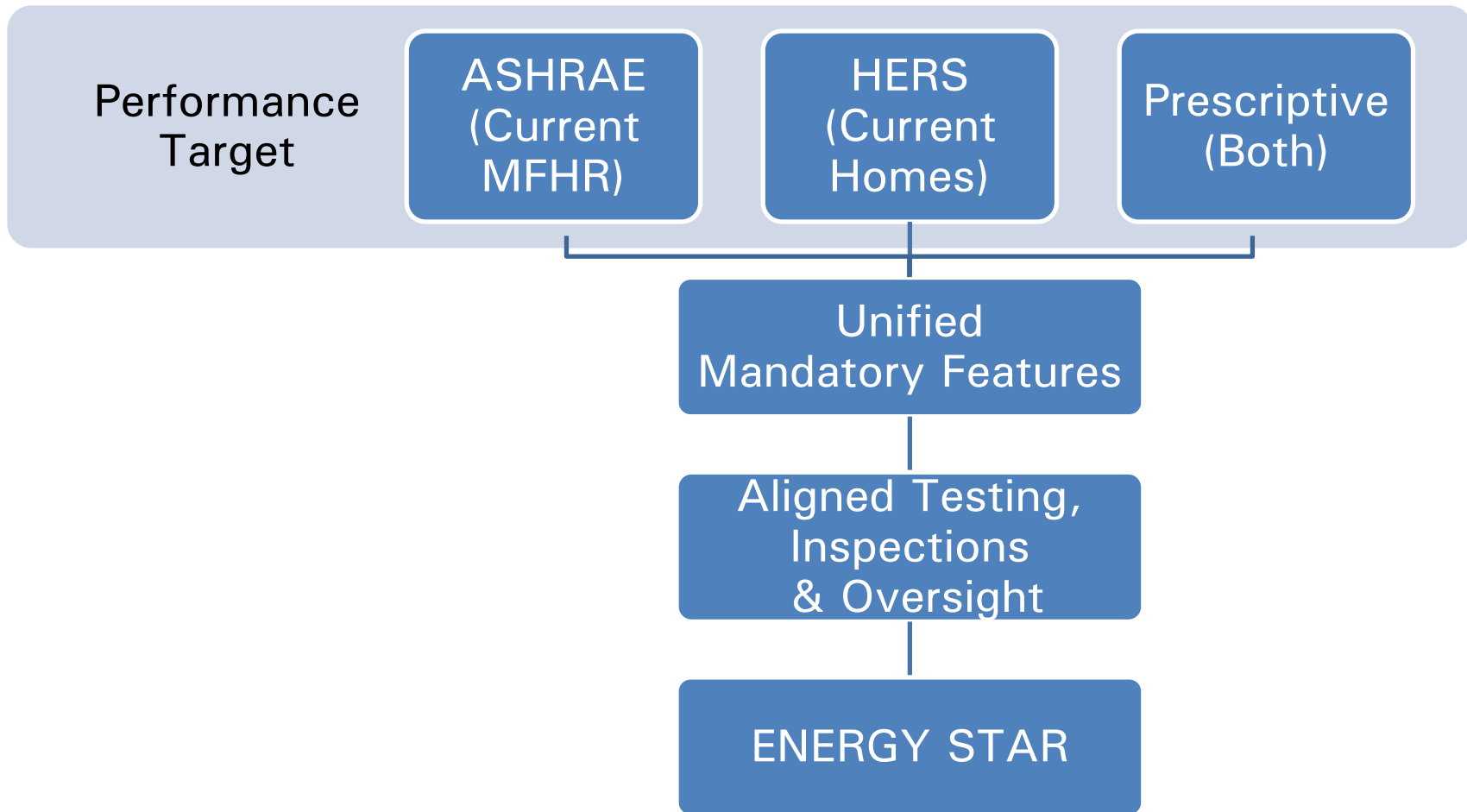
- Model units in any height building using HERS
 - Modified ES Reference Design 'Apartment'
 - ANSI 301 for MF calcs in HERS software
- Common space prescriptive requirements

Prescriptive

- In-unit prescriptive requirements (match modified ES Reference Design 'Apartment')
- Common space prescriptive requirements



New Merged Multifamily Requirements Overview



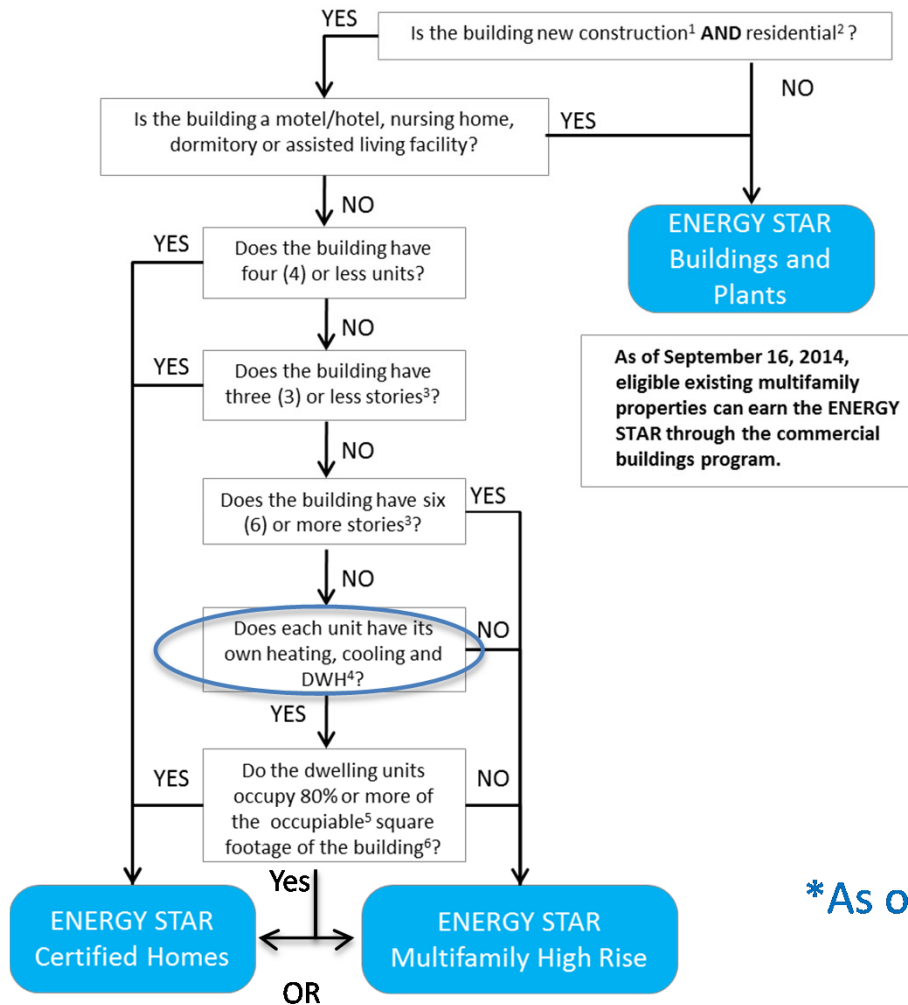


Multifamily 2017 Updates

- Eligibility Update



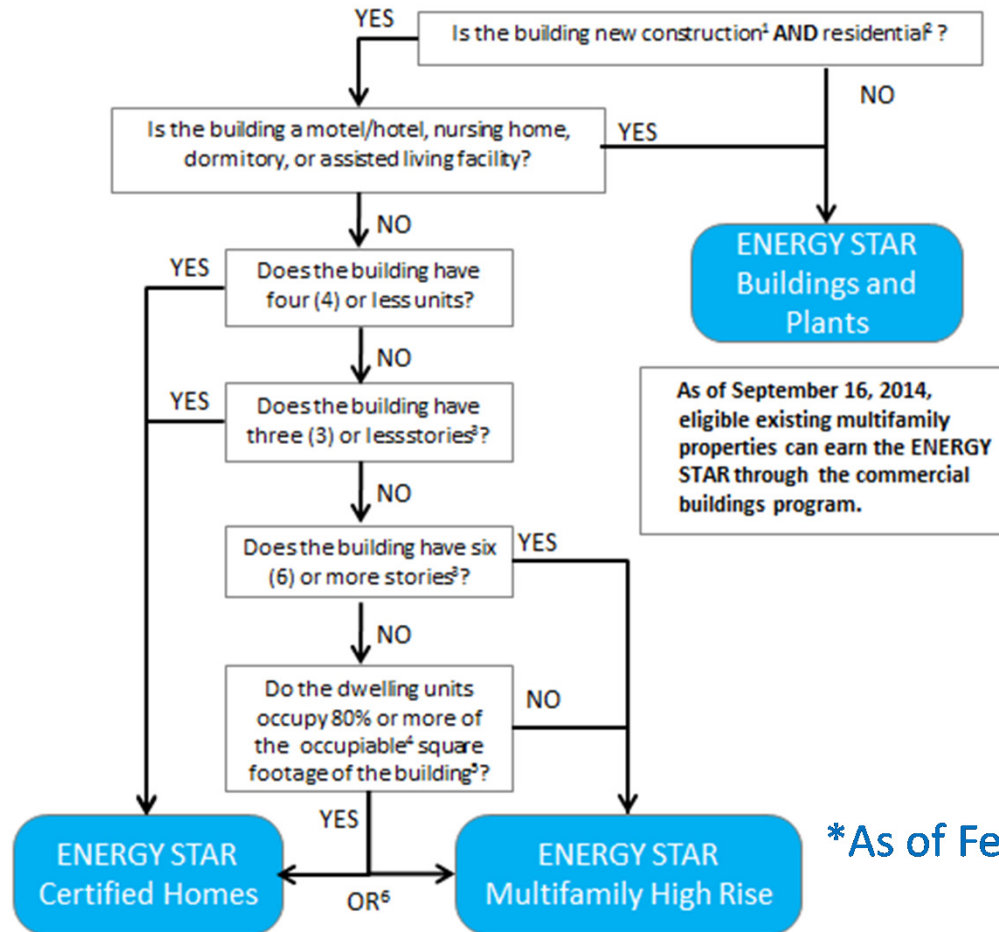
ENERGY STAR Multifamily Program Decision Tree*



*As of January 2017



ENERGY STAR Multifamily Program Decision Tree*



*As of February 2017



Multifamily 2017 Updates

- Eligibility Update – Current Framework
- RESNET Multifamily Sub-Committee
 - Goal: HERS ratings for all multifamily
 - Updated ANSI/RESNET/ICC 301 to apply to all dwelling units (and sleeping units) in any height building and to accommodate MF units/systems better
 - Currently under internal review by RESNET’s SDC300
 - Out for public comment in January and will also be presented at RESNET Conference in February
 - Target: publication by January 2019
 - ANSI 380 will soon have a specific BD test section for attached units



Market-based MFHR review process

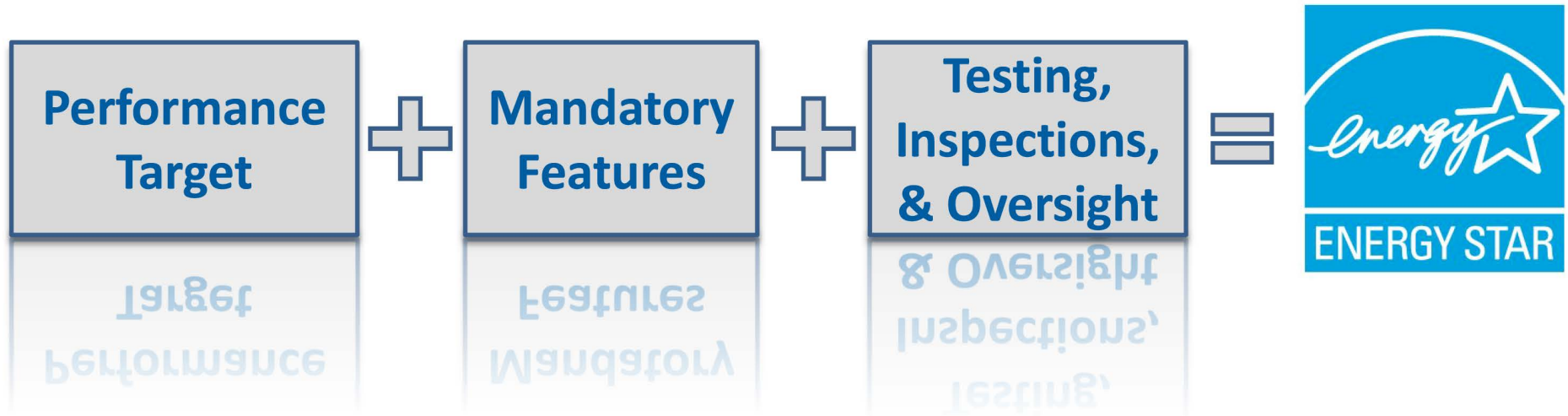
- Update for current MFHR program
- Multifamily High Rise Review Organizations (MROs) will review all documentation for MFHR projects
- Once MRO(s) established
 - All new projects will submit documentation to an MRO
 - Current projects
 - EPA will review the next submittal from buildings with Project Applications submitted after August 1, 2017
 - EPA will review all documentation for buildings with Project Applications prior to August 1, 2017
- MRO Application released August 1
 - Rolling application process
- New 'MRO' Application for new specification



Proposed Updates



Key Components of the Multifamily Program





Updates for ASHRAE Target

**Performance
Target**

Target
Performance

Target

- 15% above ASHRAE 90.1 (the year is based on the state code)
- 10% above Title 24-2016 in California

Modeling methodology

- 90.1-2013 will be based on Appendix G from ASHRAE 90.1-2016
 - New simulation guidelines are coming soon
- 90.1-2007 and 90.1-2010 use of Appendix G from ASHRAE 90.1-2016 still under review

Documentation

- Updated excel spreadsheet for all projects using Appendix G from ASHRAE 90.1-2016



Updates to HERS Target



ENERGY STAR Reference Design

- Based on Certified Home Version 3.1
- Current modeling is similar or slightly more stringent than 3.1, but multifamily modeling changes may alter score
 - Relax infiltration level
 - Focus on hot water energy
- Prescriptive common area measures

Exhibit 1 – Reference Design ‘Apartment’

Hot Climates (2009 IECC Zones 1,2,3)

Mixed and Cold Climates (2009 IECC Zones 4,5,6,7,8)

Cooling Equipment (Where Provided)

- | | |
|---|--|
| <ul style="list-style-type: none"> • Cooling equipment modeled at the applicable efficiency levels below: • 15 SEER / 12 EER AC, • Heat pump (See Heating Equipment) | <ul style="list-style-type: none"> • CZ 4: 15 SEER / 12 EER AC • CZ 5: 14 SEER AC • CZ 6-8: 13 SEER AC • Heat pump (See Heating Equipment) |
|---|--|

Heating Equipment

- | | |
|--|---|
| <ul style="list-style-type: none"> • Heating equipment modeled at the applicable efficiency levels below, dependent on fuel and system type: | |
| <ul style="list-style-type: none"> • Gas furnace, efficiency as follows: • CZ 1-3: 80 AFUE, • 80 AFUE oil furnace, • 80 AFUE boiler, • 8.2 HSPF / 15 SEER / 12 EER air-source heat pump with electric or dual-fuel backup | <ul style="list-style-type: none"> • CZ 4-5: 90 AFUE gas furnace • CZ 6-8: 95 AFUE ENERGY STAR gas furnace, • 85 AFUE ENERGY STAR oil furnace, • 90 AFUE ENERGY STAR gas boiler, • 86 AFUE ENERGY STAR oil boiler, • Heat pump, with efficiency as follows: <ul style="list-style-type: none"> • CZ 4: 8.5 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup, • CZ 5: 9.25 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup, • CZ 6: 9.5 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup, • CZ 7-8: 3.6 COP / 17.1 EER ground-source w/ electric or dual-fuel backup |

Exhibit 1 – Reference Design ‘Apartment’

Envelope, Windows, & Doors

- Insulation levels modeled to 2012 IECC levels (Commercial-wood frame) and Grade I installation per RESNET standards.
- Infiltration rates modeled as follows: ≤ 0.30 CFM50/ft² of enclosure
- ENERGY STAR windows and doors modeled, as illustrated below:

Window U-Value:	0.40 in CZs 1,2	0.30 in CZ 3	0.30 in CZ 4	0.27 in CZs 5,6,7,8
Window SHGC:	0.25 in CZs 1,2	0.25 in CZ 3	0.40 in CZ 4	Any in CZs 5,6,7,8
Door U-Value:	Opaque: 0.17	$\leq \frac{1}{2}$ lite: 0.25	$> \frac{1}{2}$ lite: 0.30	
Door SHGC:	Opaque: Any	$\leq \frac{1}{2}$ lite: 0.25	$> \frac{1}{2}$ lite: 0.25 in CZs 1,2,3; 0.40 in CZs 4,5,6,7,8	

Exception: Class AW windows meet 2015 IgCC commercial window U-Value requirements

Water Heater

- DHW equipment modeled with the following efficiency levels as applicable:

Gas:	30 Gal = 0.67 EF	40 Gal = 0.67 EF	50 Gal = 0.67 EF	60 Gal = 0.67 EF	70 Gal = 0.67 EF	80 Gal = 0.67 EF
Electric:	30 Gal = 0.95 EF	40 Gal = 0.95 EF	50 Gal = 0.95 EF	60 Gal = 0.95 EF	70 Gal = 0.95 EF	80 Gal = 0.95 EF
Oil:	30 Gal = 0.55 EF	40 Gal = 0.53 EF	50 Gal = 0.51 EF	60 Gal = 0.49 EF	70 Gal = 0.47 EF	80 Gal = 0.45 EF

Thermostat & Ductwork

- Programmable thermostat modeled.
- All ducts and air handlers modeled within conditioned space.

Lighting, Appliances & Water Fixtures

- ENERGY STAR refrigerators, dishwashers, clothes washers, dryers, and ceiling fans modeled.
- ENERGY STAR light bulbs modeled in 90% of RESNET-defined Qualifying Light Fixture Locations.
- WaterSense bathroom faucet aerators and showerheads



Feedback on Reference Design

- Is there a specific item that you think should be more/less efficient?
- Do you have specific challenges meeting the current HERS index target due to the ENERGY STAR Reference Design Home?



Updates for Prescriptive Path



- Available for all projects
- ENERGY STAR Reference Design specifications (in-unit and common areas)
- Additional req'ts beyond ENERGY STAR Reference Design (e.g. in-unit LPD, building level window-to-wall ratio, ventilation cap)



Prescriptive Path Only – In-unit Lighting

- Lighting maximum: Overall in-unit lighting power density may not exceed 0.75 W/ft².
- When calculating overall lighting power density use 1.1 W/ft² where lighting is not installed.



Prescriptive Path and HERS – Common Area Lighting

- Bi-level controls or occupancy sensors in all common areas
- At least 90% high-efficacy lighting in all common areas and exteriors
- Do not exceed 1 W/sf for all common area combined (excluding parking) OR do not exceed ASHRAE 90.1-2007

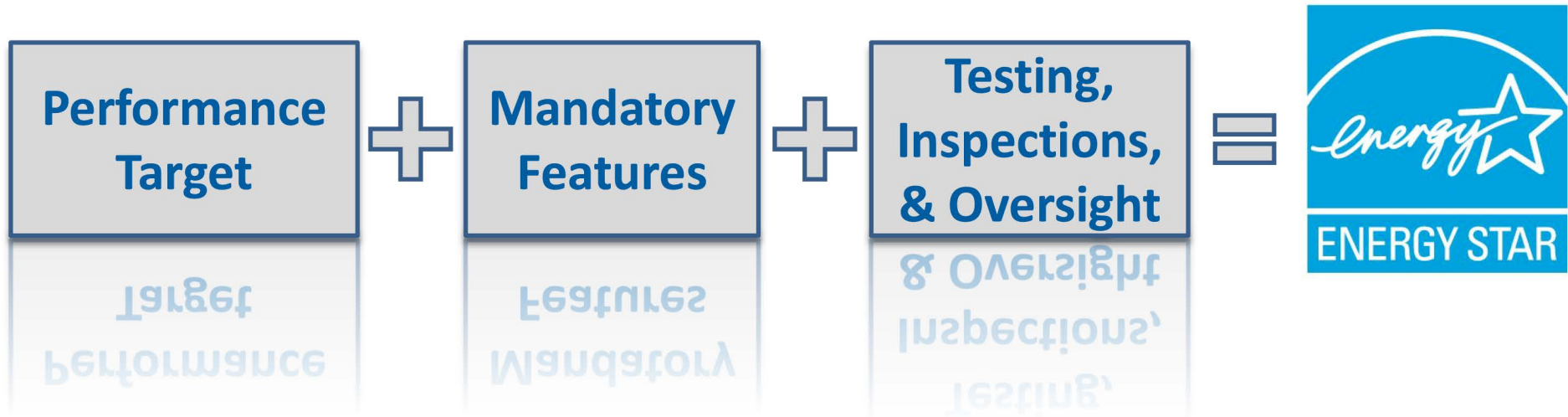


Other Prescriptive Measures

- Building window-to-wall ratio capped at 30% (Prescriptive Path Only)
- Ventilation cap: Do not exceed ASHRAE 2013 rate by more than 50%
 - In-unit cap (Prescriptive Path Only)
 - Common area cap (HERS and Prescriptive Path)



Key Components of the Multifamily Program





Checklist Item/Prerequisite Update Summary

Mandatory Features

Features
Mandatory

- Developed by evaluating requirements from ESCH and ESMFHR and combining/adjusting as appropriate (both more and less stringent)
- Include requirements related to central heating, cooling, ventilation, and hot water systems
- Include requirements from MFHR that focus on reducing hot water energy use
- Include requirements in common areas



Envelope

Certified Homes

1. Change minimum insulation levels to Commercial table
2. Adjust air sealing details
 - Optional on design review checklist
 - Remove some less-relevant details from field checklist
3. Add compartmentalization metric
4. Adjust Reduced Thermal Bridging req't: no advanced framing option; exempt CZ 1&2; CZ 3-8, R-3 cont. ext. insulation or SIP/ICF
5. Update slab edge requirements/exemptions for MF; specify garage podium insulation requirement
6. Allow Class AW performance windows to meet commercial code U-value
7. Requirements apply to common areas

MFHR

1. Add minimum insulation level requirements (2009 IECC Commercial)
2. Adjust air-sealing and air-barrier design review and field inspection requirements to align with ESCH checklist items
3. Keep compartmentalization metric
4. Adjust continuous insulation req't; exempt CZ1&2, but in CZ 3-8, exterior R-3, including wood-frame, or SIP/ICF
5. Add slab edge requirements/ exemptions including garage podium insulation requirement
6. Adjust minimum window requirement to meet 2009 IECC U-value and SHGC
7. Requirements continue to apply to common areas



Envelope

- Insulation: Reference 2009 IECC Commercial
- Air Sealing/Air Barrier
 - Require in-unit compartmentalization: ≤ 0.30 CFM50/ft² of enclosure
 - Specific air sealing details for in-field verification
 - Complete, fully aligned air barrier
- Reduced Thermal Bridging (all framing):
 - CZ 3-8:
 - R-3 continuous exterior insulation OR
 - SIPs, ICFs, or Double-wall framing
 - CZ 1-2: not required
- Slab-On-Grade and Elevated Slab insulation requirements
- Windows: Reference 2009 IECC Residential
- Measures required for common areas



Minimum Insulation Levels

Specified ceiling, wall, floor, and slab insulation levels meets or exceeds 2009 IECC Commercial levels for apartments and common areas

- Meet Table 502.1.2 (U-Value); OR
- Total UA alternative



Air Sealing / Air Barrier / Compartmentalization

- Design Review:
 - Applies to apartments and common spaces
 - Check if field items are noted in construction docs
 - Recommended, not required
- Field Verification:
 - Check exterior air barriers align with insulation
 - Air-Sealing:
 - Apartments: 5 items to visually check & mandatory blower door test ($\leq 0.30\text{cfm}50/\text{ft}^2$)
 - Common area: same 5 items to visually check, but no test



Air Sealing Field Inspection Items

1. Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned spaces sealed, with blocking / flashing as needed.
2. Recessed lighting fixtures, ICAT labeled and gasketed.
3. Drywall sealed to top plate at all unconditioned attic/wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material.
4. Rough opening around windows & exterior doors sealed.
5. Apartment or common area doors adjacent to unconditioned space & apartment doors to corridors or ambient conditions must be made substantially air-tight with weatherstripping or equivalent gasket .

Reduced Thermal Bridging

At apartment and common area above-grade walls separating conditioned from unconditioned space, one of the following options used for CZ 3-8:

1. Continuous insulation, insulated siding, or combination of the two is $\geq R-3$

OR

2. Select an advanced assembly option:

- Structural Insulated Panels;
- Insulated Concrete Forms;
- Double-wall framing



Example: Continuous rigid foam insulation installed



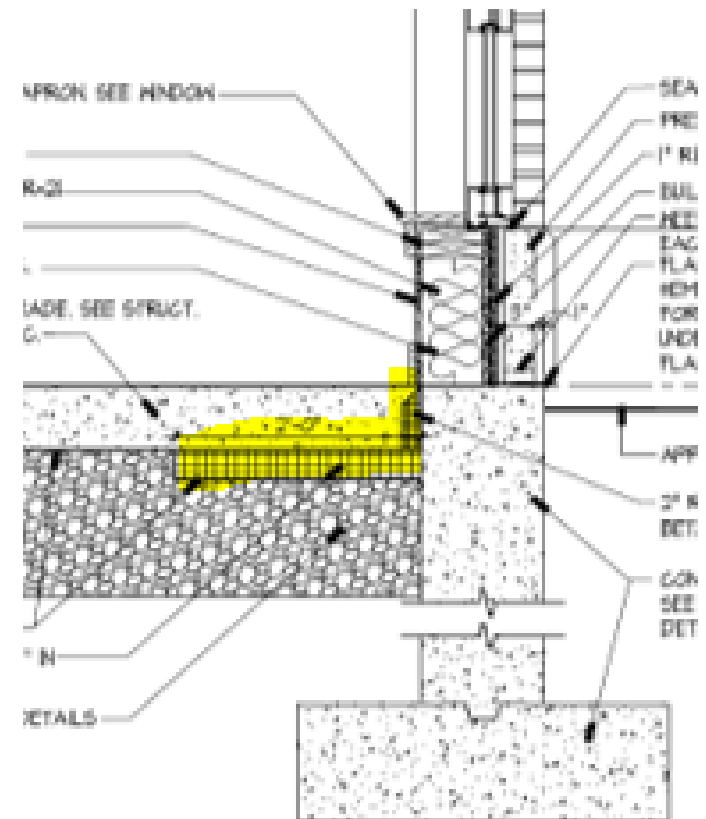
Slab Edge Insulation

- Slab-on-Grade
 - R-5 required for CZ4-8, whether slab is under apartment or common area.
 - Thermal break is required where slab-on-grade extends from conditioned to unconditioned space (e.g., courtyard, patio)
- Elevated Slabs
 - Floor insulation must be installed above garage podiums
- Slab “edge” exemptions
 - Projected balconies will be exempt from continuous insulation requirement

Slab-on-Grade Insulation

For slabs on grade in CZ 4-8, 100% of slab edge insulation to $\geq R-5$ at the depth specified by the 2009 IECC and aligned with the thermal boundary of the walls

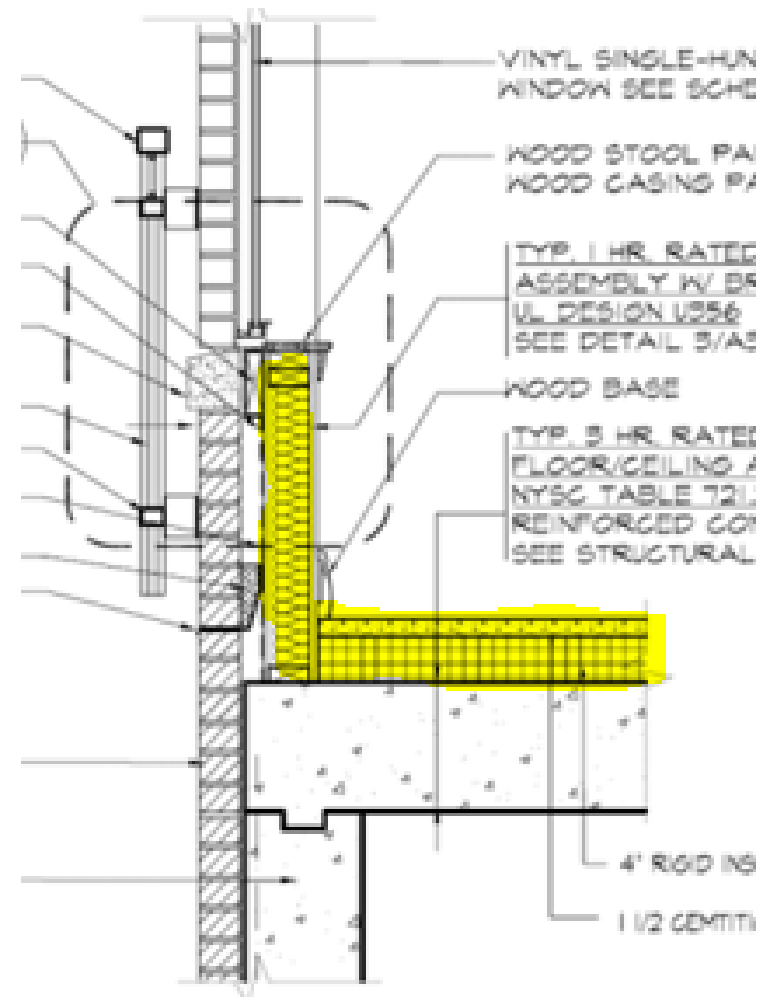
- Required for apartments & common areas
- Required when floor surface less than 24" below grade; and must extend to top of slab
- Required where slab-on-grade transitions from conditioned to unconditioned space (ie. patio, but not balcony)



Elevated Slab Edge Insulation

For elevated slabs in CZ4 -8 with apartments or common areas above (such as garage podiums),

- Floor insulation installed on top of the slab; OR
- If installed below the slab:
 - The elevated slab edge must be insulated to the R-value specified for above-grade walls; AND
 - Where insulation below the slab is interrupted by walls or columns, insulation must be installed vertically to maintain a continuous thermal boundary.





Windows / Skylights / Doors

- Windows/Skylights/Doors:
 - Meet 2009 IECC Residential U-Value and SHGC
Exception: Performance windows (Class AW) and windows in the common areas meet 2009 IECC Commercial U-Value
- Exemptions:
 - Up to 5% or 50 sq ft (whichever is larger) of combined window and door area from the entire building is exempted



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Webinar Part 2- Wednesday, November 15, 1-2pm ET

- Day 1 Review
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 - Distribution
 - Ventilation and Filtration
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Comment Process and Timeline

Email feedback to mfhr@energystar.gov by December 15th

- Feedback on proposed changes:
 - What you like and why
 - What you do not like, why, and suggestions for changes

EPA is planning to revise and present the next version of the specification in March for additional feedback



Q&A

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Proposed Merged Low-Rise/High-Rise Multifamily Framework and Technical Requirements, Part 2

November 15, 2017





Recap – Webinar Part 1 (Monday)

- ✓ Background
- ✓ Specification Timeline
- ✓ Overview the 'One Multifamily' framework
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ES Reference Design: Benchmark for HERS path (in-unit)

Mandatory for Prescriptive Path in-unit and common areas

Hot Climates (2009 IECC Zones 1,2,3)

Mixed and Cold Climates (2009 IECC Zones 4,5,6,7,8)

Cooling Equipment (Where Provided)

- Cooling equipment modeled at the applicable efficiency levels below:
- 15 SEER / 12 EER AC,
- Heat pump (See Heating Equipment)
- CZ 4: 15 SEER / 12 EER AC
- CZ 5: 14 SEER AC
- CZ 6-8: 13 SEER AC
- Heat pump (See Heating Equipment)

Heating Equipment

- Heating equipment modeled at the applicable efficiency levels below, dependent on fuel and system type:
- Gas furnace, efficiency as follows:
 - CZ 1-3: 80 AFUE,
 - 80 AFUE oil furnace,
 - 80 AFUE boiler,
 - 8.2 HSPF / 15 SEER / 12 EER air-source heat pump with electric or dual-fuel backup
 - CZ 4-5: 90 AFUE gas furnace
 - CZ 6-8: 95 AFUE ENERGY STAR gas furnace,
 - 85 AFUE ENERGY STAR oil furnace,
 - 90 AFUE ENERGY STAR gas boiler,
 - 86 AFUE ENERGY STAR oil boiler,
 - Heat pump, with efficiency as follows:
 - CZ 4: 8.5 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup,
 - CZ 5: 9.25 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup,
 - CZ 6: 9.5 HSPF / 15 SEER / 12 EER air-source w/ electric or dual-fuel backup,
 - CZ 7-8: 3.6 COP / 17.1 EER ground-source w/ electric or dual-fuel backup



Agenda – Webinar Part 2

- ✓ Day 1 Review
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Heating, Cooling, and Hot Water

Certified Homes

- Unit-level HVAC load calcs allowed instead of room-by-room
- Manual D recommended but not required
- HVAC Commissioning Checklist required for more systems
- Licensed professionals also allowed to fill out HVAC-C checklist, but then checklist must be collected
- Naturally drafted equipment no longer allowed inside pressure boundary in CZ 1-3
- Add DHW req'ts & include on commissioning checklist
 - Pipe insulation to R-3 at 5 code locations
 - Test delivery temperature of faucets and showerheads

MFHR

- HVAC design documented and reviewed
 - Unit-by-unit load calcs allowed
- Manual D recommended but not required
- HVAC Commissioning to be more formally documented
- Naturally drafted equipment allowed if outside pressure boundary
- Reduce DHW pipe insulation to R-3
- Keep temp measurement at faucet/showerhead
- Remove:
 - Central DHW mixing valve requirement
 - DHW storage temperature requirement
 - Calculating DHW storage tank capacity based on occupancy
 - Calculating circulating pump size for hydronic distribution
 - Insulated AC covers for through wall AC
 - Some requirements specified from ASHRAE 90.1



Hydronic and Air Distribution

Certified Homes

- Add hydronic distribution req'ts & visual inspection
 - Pipe insulation to code
 - NEMA premium motors
 - Balancing & control valves required
- Remove duct leakage to outdoors test; add central exhaust riser test
- Reduce duct leakage threshold for non-ducted returns
- Undercut doors cannot be the only method used for room pressure balancing, but allowance increased to 5 Pa

MFHR

- Reduce hydronic pipe insulation levels to code
- Adjust NEMA premium req't to ONLY apply to hydronic pumps for heating/cooling
- Replace reverse return req't with req't for pressure independent balancing valves
- Keep total duct leakage test for in-unit and central exhaust riser test
- Reduce duct leakage threshold for non-ducted returns, but test at air handler
- Add bedroom pressure-balancing testing



Heating, Cooling, Hot Water, Distribution

- HVAC documented design reports for all systems (unit-by-unit load calcs)
 - 3rd party review: specific elements from design report
- HVAC/DHW Equipment Req'ts & 'Rater' Inspections
 - Equipment mfr/model, t'stat, hydronic distribution req'ts, limits on combustion appliances, hot water pipe insulation
- HVAC/DHW Commissioning
 - All systems (including central) and hot water
 - 3rd party review: static pressure test, temperature at faucet
- Total duct leakage performance threshold (in-unit)
 - (lower threshold for non-ducted returns)
- Central exhaust duct leakage performance threshold
- Ducts installed well and insulated in unconditioned space
- Bedrooms pressure-balanced (measured)



HVAC – Design Report and Review by ‘Rater’

- HVAC Designer to provide report that documents HVAC design, from the inputs used to calculate loads to the system selection, for all systems (central, common area & in-unit)
 - Lighting and internal gains included
- Rater reviews items that drive load calcs/sizing, such as:
 - Design temperatures, # occupants, areas, SHGC
- Compares ventilation design rates to ASHRAE 62
- Unit-level load calculations allowed
 - Manual D a recommendation not requirement



Rater Design Review Checklist

ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 08)

4. Review of HVAC Design Report ⁷		
4.1 HVAC Design Report collected for records, with no Items left blank	<input type="checkbox"/>	<input type="checkbox"/>
4.2 HVAC Design Report reviewed by Rater for the following parameters (HVAC Design Report Item # indicated in parenthesis):		
4.2.1 Cooling season and heating season outdoor design temperatures used in loads (3.3) are within the limits defined at energystar.gov/hvacdesigntemps for the State and County where the home will be built, or the designer has provided an allowance from EPA to use alternative values ⁸	<input type="checkbox"/>	<input type="checkbox"/>
4.2.2 Number of occupants used in loads (3.4) is within ± 2 of the home to be certified ⁹	<input type="checkbox"/>	<input type="checkbox"/>
4.2.3 Conditioned floor area used in loads (3.5) is between zero and 300 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
4.2.4 Window area used in loads (3.6) is between zero and 60 sq. ft. larger than the home to be certified	<input type="checkbox"/>	<input type="checkbox"/>
4.2.5 Predominant window SHGC used in loads (3.7) is within 0.1 of predominant value in the home to be certified ¹⁰	<input type="checkbox"/>	<input type="checkbox"/>
4.2.6 Sensible, latent, & total heat gain are documented (3.10 - 3.12) for the orientation of the home to be certified ¹¹	<input type="checkbox"/>	<input type="checkbox"/>
4.2.7 The variation in total heat gain across orientations (3.13) is ≤ 6 kBtuh ¹¹	<input type="checkbox"/>	<input type="checkbox"/>
4.2.8 Cooling sizing % (4.13) is within the cooling sizing limit (4.15) selected by the HVAC designer	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name: _____ Date of Review: _____		
Rater Signature: _____ Rater Company Name: _____		



HVAC Equipment

- Rater must compare installed equipment (manufacturer and model) to Design Report, for in-unit, common and central systems
- All apartments must have a thermostat
- Central Hydronic distribution requirements:
 - Control valve installed
 - Pressure independent balancing valve installed
 - Pump motors NEMA Premium
 - Pipe insulation meets code level
- Stair and elevator shaft vents need motorized dampers
- Freeze protection & ice/snow-melt systems require temperature-based controls to limit use



Combustion Appliances

- Furnaces, boilers, and water heaters located within the building's thermal boundary are mechanically drafted or direct-vented.
 - Does not apply to rooftop make-up air units
 - Does apply to systems in closets in the corridor
 - May not apply to mechanical closets on balconies
- Fireplaces located within the building's thermal boundary are direct vented.
- No unvented combustion appliances other than cooking ranges or ovens are permitted inside the building's thermal boundary.

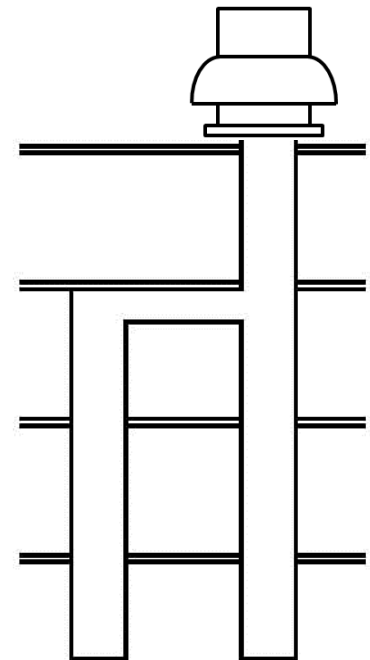


Ducts

- Quality Installation: no bends/compression, etc
- R-6 insulation for ducts in unconditioned spaces
- Total Duct Leakage Test for Apartment systems:
 - Either 80 CFM25 or up to 8 CFM25/100 ft²
 - Non-ducted returns: < 5 Pa between closet and living space; 60 CFM25 or up to 6 CFM25/100 ft²
- NO Duct Leakage to “Outside” test!
- NO Duct Leakage test if < 10ft supply; common area forced air systems (no test, just inspection)
- Test bedrooms for pressure-balancing (< 5 Pa)

Ducts (cont'd)

- Central exhaust duct leakage test
 - Prior to drywall, inspect sealing
 - Prior to drywall, test for leakage
 - Allowed 25% of total exhaust CFM





HVAC/DHW Commissioning

- Verified by HVAC Credentialed Contractor, Licensed Professional, other option TBD
- All systems (boilers, chillers, cooling towers, PTAC/PTHPs, furnaces, mini-split heat pumps, etc) will require some level of commissioning whether in-unit, common, or central, such as:
 - Functional testing of systems, controls, sensors, t'stats
 - Testing for proper refrigerant charge, fan flow & power, static pressure
 - Verifying temperatures on central hydronic systems
- Domestic Hot Water Cx can be rater or contractor verified:
 - Delivery temperature measured at faucet
 - R-3 pipe insulation installed (in 5 specific locations)



Ventilation and Filtration

Certified Homes

- Keep ASHRAE 62.2 in-unit
- **Add ASHRAE 62.1 for common areas;** measured within 15%
- **Drop the sone requirement?**
- **Add efficiency req'ts to central exhaust fans**
- Keep ECM req't for HVAC if part of 62.2 whole-house
- Keep inlet location criteria
- Keep MERV filter requirement (no system expansion)

MFHR

- Keep ASHRAE 62.2 in-unit
- Keep ASHRAE 62.1 for common areas; **measured within 15% of design**
- **Add efficiency req'ts to central exhaust fans**
- **Add ECM req't for HVAC if part of 62.2 whole-house**
- **Add inlet location criteria**
- **Add MERV 6 filter requirement for in-unit ducted space conditioning systems**



Apartment Ventilation Rates

- Dwelling-Unit Mechanical Ventilation rate (Meet 62.2-2010)
 - Measure within 15% of designed rate
- Local Mechanical Exhaust (Meet 62.2-2010)
 - 20 CFM continuous/50 CFM intermittent in bathrooms
 - 5 ACH/100 CFM in kitchens (vented to exterior)



Apartment Ventilation Fans

- In-unit continuous exhaust fans must be ENERGY STAR, but no additional sone requirement
- If HVAC fan part of dwelling-unit ventilation, must have ECM and motorized dampers on OA intakes
- Central exhaust fans 1/12 HP up to 1 HP must be direct-drive with ECM motors and variable speed controllers
- Central exhaust fans 1 HP and larger must have NEMA Premium efficient motors



Common Area Ventilation Rates & Fans

- Minimum outdoor air rate (Meet 62.1-2010)
 - Measure within 15% of designed rate
 - OA dampers must be motorized if not 24/7
- Minimum Exhaust rates (Meet 62.1-2010)
 - E.g., trash rooms, janitor closets, public restrooms, community room kitchens, garages
- Garage Exhaust Fans must have CO/NO2 sensors



Air Inlet Location/Requirements

- Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit
- Inlet is ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and ≥ 3 ft. distance from sources exiting the roof
- Inlet is provided with rodent / insect screen with ≤ 0.5 inch mesh



Filtration

- Only required for in-unit forced air ducted systems
 - i.e., not for mini-splits, common area systems or systems serving more than one unit
- MERV 6 or higher filter
- Must be accessible to either the tenant or building owner
- Filter access panel includes gasket or comparable sealing mechanism to prevent bypass
- All return air and mechanically supplied outdoor air passes through the filter PRIOR conditioning.



Lighting and Appliances

Certified Homes

- No in-unit lighting requirements
- **Add common area occupancy sensors or bi-level controls (except 24-hour spaces)**
- **Add limit for lighting power density in common areas**

MFHR

- **Remove in-unit requirements**
- **Remove common area efficiency requirements**
- Keep occupancy sensors / bi-level controls in common area
- Keep photo sensors for exterior lighting controls
- **Remove ENERGY STAR requirement for all appliances**



Lighting – Common Area

- Bi-level controls or occupancy sensors except for 24-hour spaces / Photo sensors controls on exterior
- Do not exceed 20% above ASHRAE 90.1-2007 space by space lighting power density OR do not exceed 1 W/ft² for all common area overall



Water Management

- Keep the intent of the Water Management System Builder Requirements and adjust the language for multifamily
 - Water is directed off the roof, down the walls, and away from the foundation.
 - Building is built with moisture-resistant barriers to prevent water damage.
 - Building materials are protected during construction to minimize the possibility of mold and rotting.
- Required for apartment and common area spaces



Key Components of the Multifamily Program





Testing/Inspections - Common Area Summary

- Visual Inspections - Pre-drywall
 - Same inspections as unit
- Visual Inspections - Final
 - Same inspections as unit
 - Lighting controls and lighting power density calc.
 - Freeze protection and snow-melt temp controls
- Performance Tests/Commissioning
 - Mostly same as unit, but blower door and duct leakage tests not req'd



Verifiers and Oversight Organizations

Testing & Verification and Oversight

- Different “oversight organizations” for different pathways
- Verifier requirements and oversight will be specified
 - Performance Testing
 - Visual Inspections
 - Modeling
 - HVAC commissioning



HERS Path Verifier

- Modeling performed by certified HERS Rater
 - ENERGY STAR Rater Training
- Verification performed by certified HERS Rater or RFI
- Provider performs QA on Rater according to RESNET Standards
- RESNET performs oversight on Provider



ASHRAE/T-24 and Prescriptive Path Verifier

- New Oversight Organization(s) similar to MRO
- ASHRAE/T-24 and Prescriptive Path
 - Model (ASHRAE/T-24 only)
 - ENERGY STAR Training required for modeler
 - QA required for model (i.e. model review)
 - Inspections/Tests
 - ENERGY STAR Training required for verifier
 - Oversight and QA required for verifier



Policy Issues Under Review

- Process
 - Documentation
 - Design Review
 - Reporting
 - Labeling
 - Basis for Project Transition Date
 - Partnership
- Verification/Oversight
 - ASHRAE and Prescriptive Paths
- Program Alignment
 - ENERGY STAR Existing Buildings
 - Green Building Programs
- Designed to Earn the ENERGY STAR
- Garage Heating



Agenda – Webinar Part 2

- ✓ Day 1 Review
- ✓ Proposed Technical Requirements
 - ✓ Mandatory Measures
 - ✓ Heating, Cooling and Hot Water
 - ✓ Distribution
 - ✓ Ventilation and Filtration
 - ✓ Lighting and Appliances
 - ✓ Water Management
 - ✓ Verification and Oversight
- Summary and Next Steps



Comment Process and Timeline

Email feedback to mfhr@energystar.gov by December 15th

- Feedback on proposed changes:
 - What you like and why
 - What you do not like, why, and suggestions for changes

EPA is planning to revise and present the next version of the specification in March for additional feedback



Q&A

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