

October 4, 2024



CTAC Residential Redesign Topics

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Agenda

I. HES & HES-IE Redesign Explanation



**II. Draft IMPLEMENTATION MANUAL with
Thermal Boundary Updates**

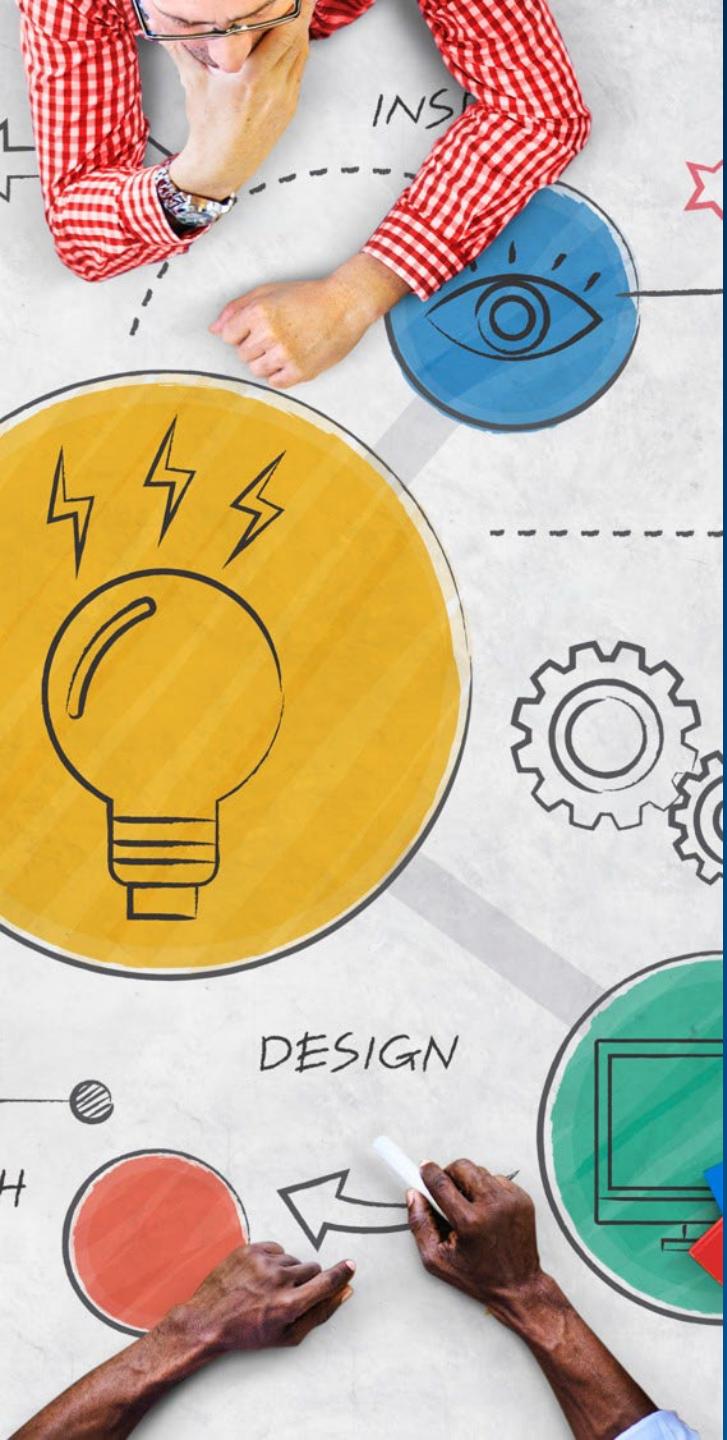


III. Proposed Timeline & PRICING RFI



IV. Pricing Process





I. HES & HES-IE Redesign Delivery Explanation

HES and HES-IE Programs – Current Design

Air sealing and duct sealing
completed at the first visit

HES and HES-IE includes all diagnostic testing with air sealing and duct sealing at first visit

1. Market rate projects qualify for rebates
2. Low-income projects qualify for upgrades

Current challenges –

- **High % of homes with health & safety barriers (HES 25%, HES-IE 36%)**
- **Not enough time to complete service work and engage customers (R1983)**
- **Low adoption % for insulation (R1983)**
- **Difficulty with QA/QC since work is completed before submission for approval**

R1983 Key Findings

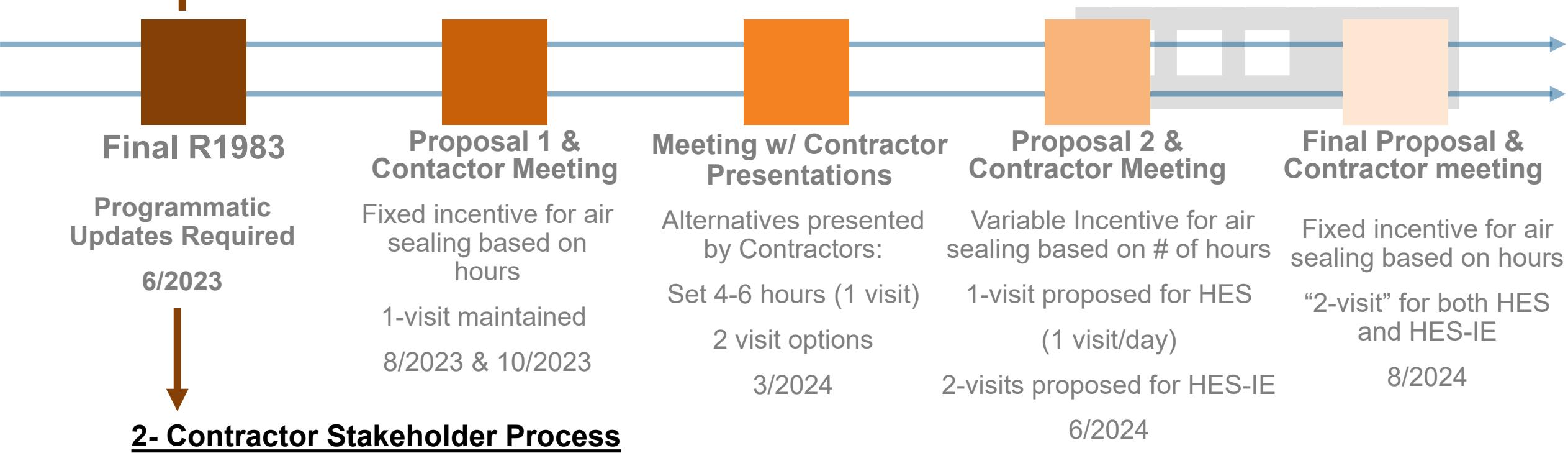
| | | | |
|---|--|----|--|
| 1 | Air Sealing and Insulation Savings are much lower than previous evaluations | 7 | Overall satisfaction among vendors and HES participants is high, improve program communication and messaging |
| 2 | HES participants install insulation less often than participants in similar regional programs | 8 | Virtual audits offered during pandemic had limited uptake and 25% lower ex-ante savings |
| 3 | Current Delivery Model: What's better - less savings at more homes or more savings at fewer homes? | 9 | Collectively, SF and MF income eligible programs are effectively reaching disadvantaged households |
| 4 | Unlike air sealing and insulation, generally, high gross savings and NTG for most other measures | 10 | Residential programs reaching disadvantaged areas through income eligible programs and locations with high savings |
| 5 | Financial and logistical barriers impede weatherization goals | 11 | Rural areas are underrepresented |
| 6 | Certain customer segments face additional barriers to participation | 12 | Delays in data requests adversely impacted the timeliness of the study and ability to inform planning process |

Timeline After R-1983 Study

1-Company Analysis & QA Improvements

Analysis on air sealing CFMs points to overreporting
 CFM is significantly lower when inspector is present
 → **An hourly approach will reduce risk with paying per CFM**

Heightened QA desk reviews shows inconsistent work quality and adherence to BPI and program qualifications
 → **SOW review step is important for a new design**

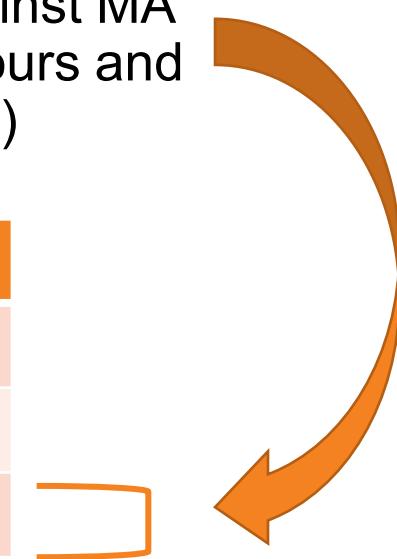
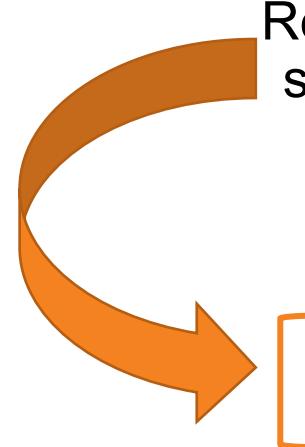




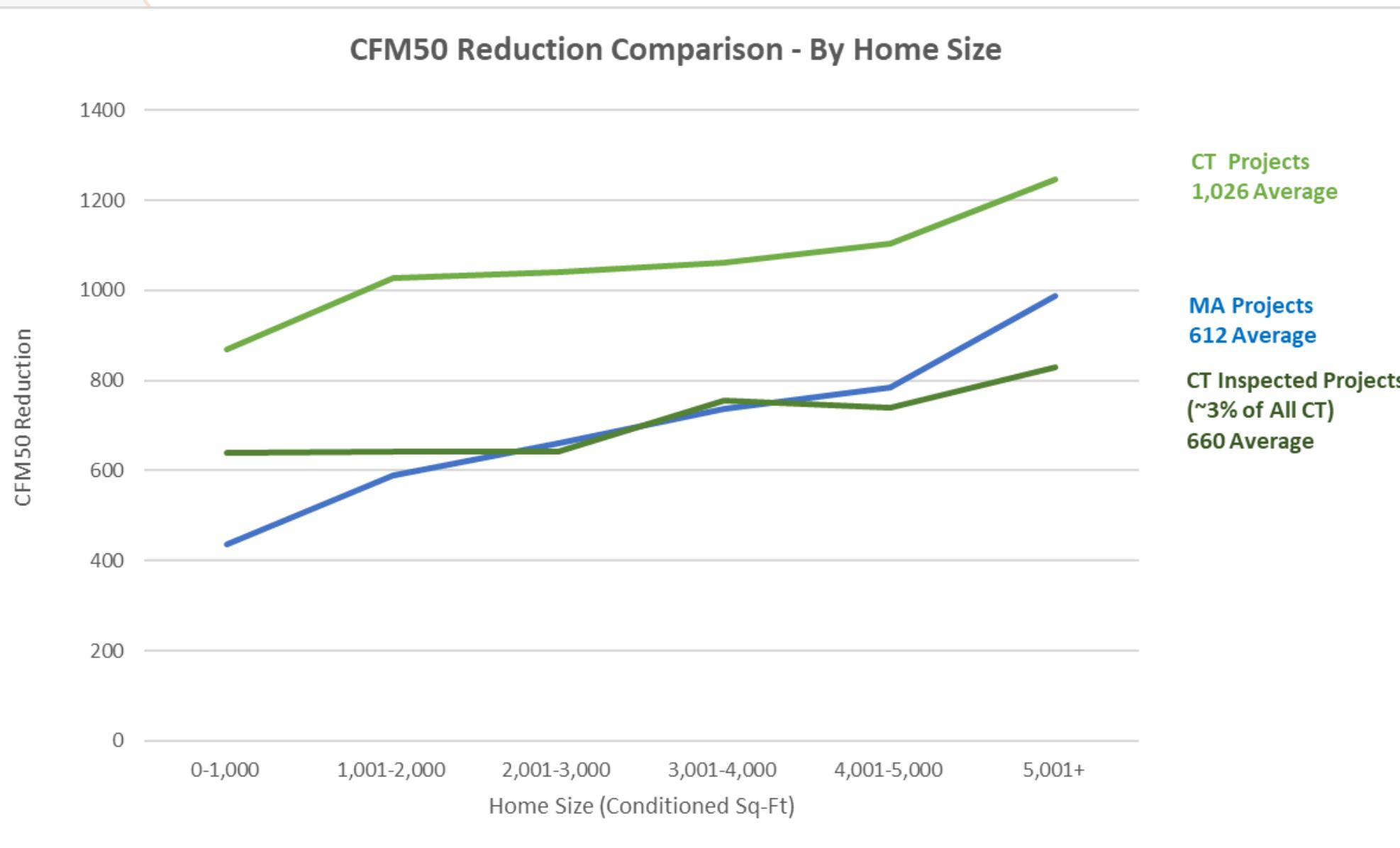
Reviewed Connecticut air sealing CFM reductions (2021-23)



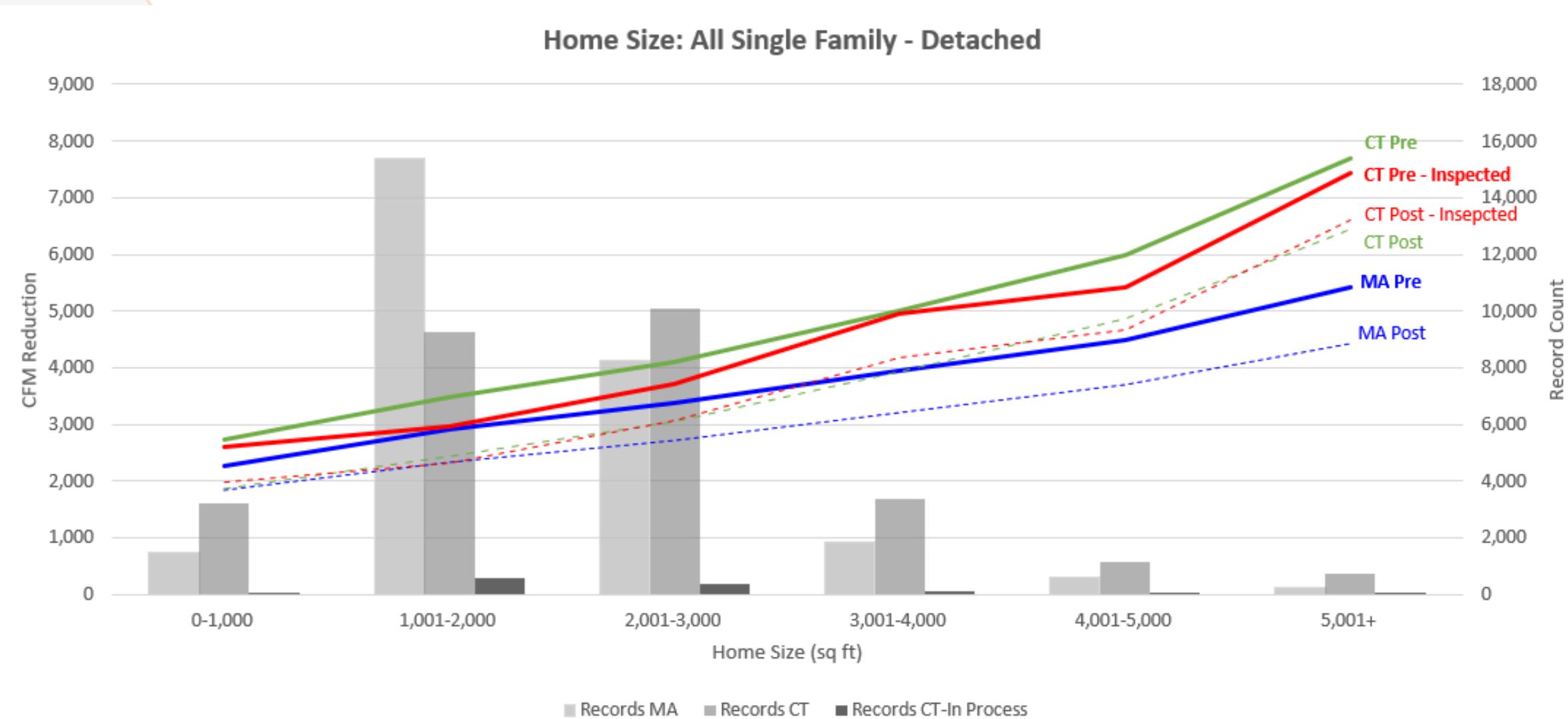
Benchmarked CT against MA projects (air sealing hours and CFM reductions)



| Data Set | # of Records | Ave CFM Reductions |
|----------------------------|--------------|--------------------|
| CT HES/HES-IE | 38,000 | 1,027 |
| CT HES/HES-IE w/ Inspector | 1,200 | 660 |
| MA RCD | 28,000 | 619 |



CT's inspected projects better align with MA results



CT's Inspected Pre-CFMs are consistently lower than projects without inspector – Plus, MA post CFMs are significantly lower for larger homes

Primary Considerations for Air Sealing Measure Update



Ensure **air sealing energy savings** are realized and maximized in customer homes,
Strengthen QA/QC



Continue to deliver **safe, high-quality services** with high customer satisfaction

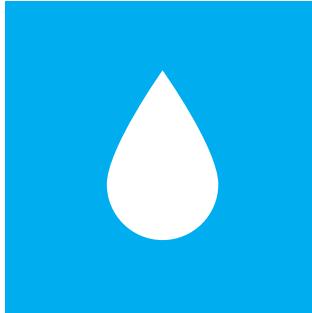


Develop a plan for transitioning how we pay for air sealing in CT **that will not disrupt the CT weatherization industry**



Consider if air sealing can continue to be offered on first visit, or **if it should move to a second visit**

Additional Considerations for Program Improvement Updates



High incidence of **health & safety barriers to running a blower door** impedes service work in the current delivery model



Improved customer engagement and education is critical to customer satisfaction and upgrade adoption

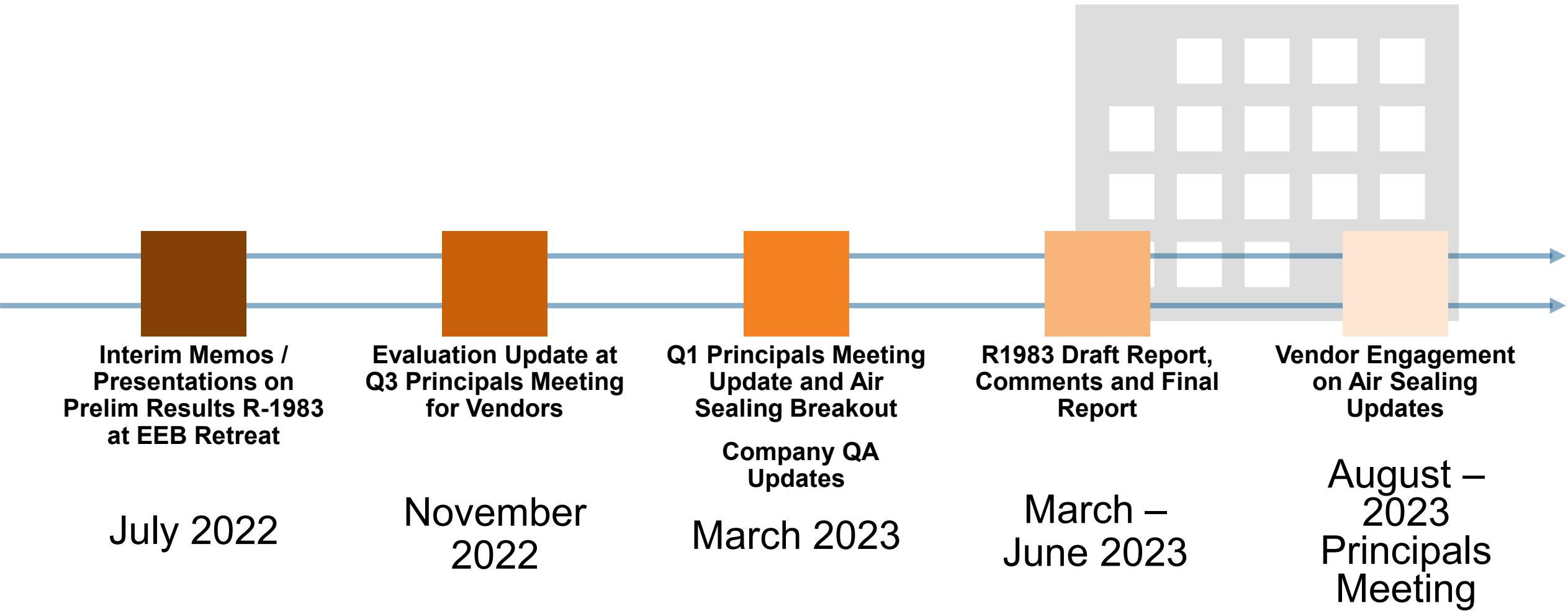


Improved quality control of work plan helps **deliver more energy savings to the customer**

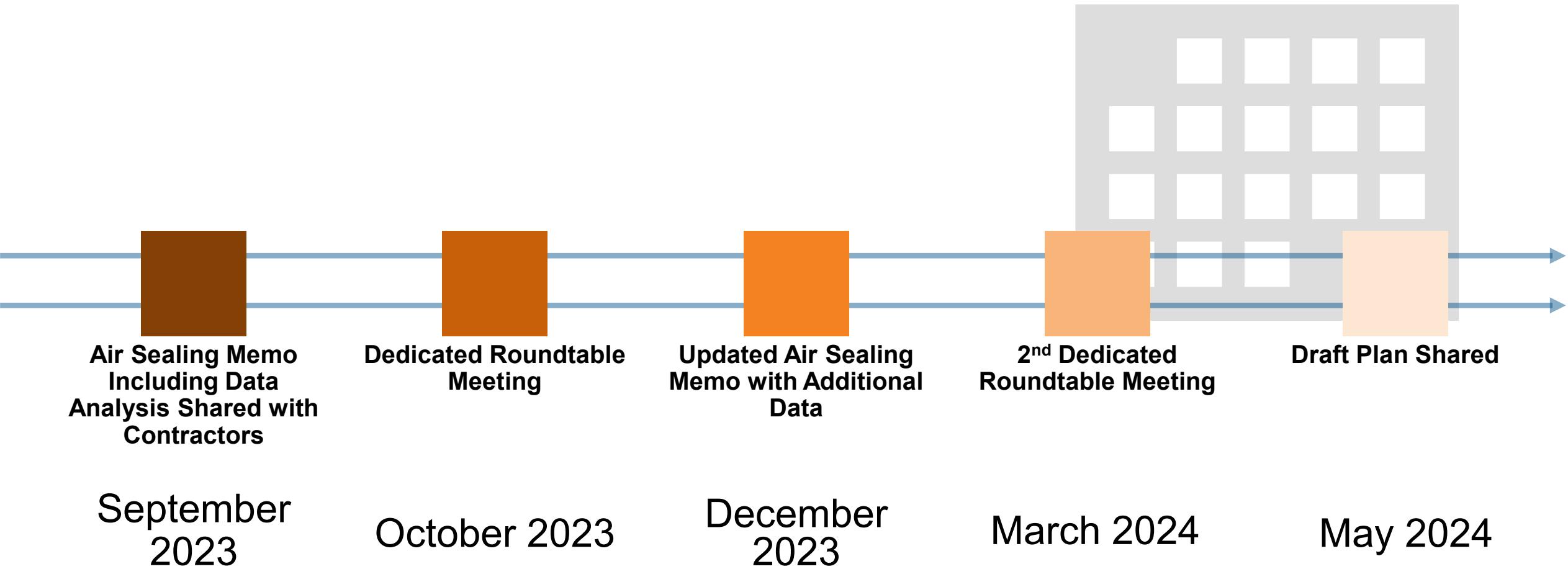


Insulation adoption needs to be a primary goal consideration for overall success of the programs

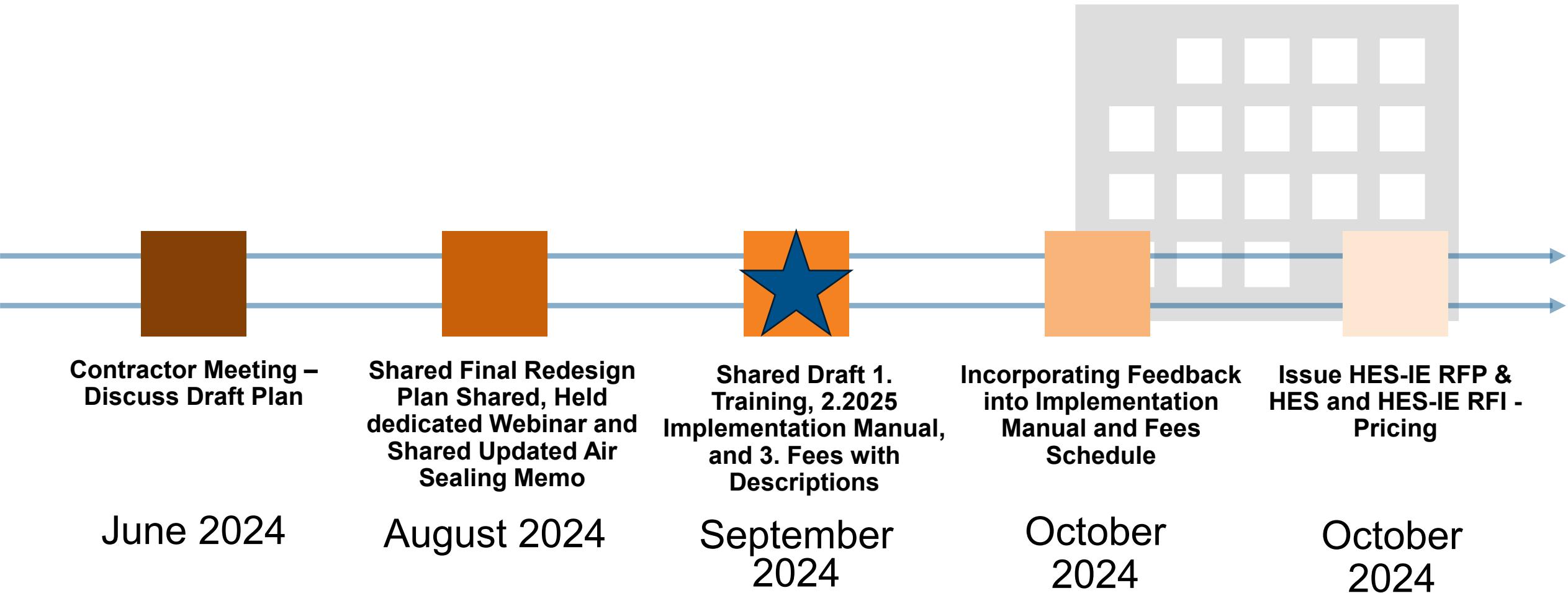
Air Sealing and Redesign Discussions



Air Sealing and Redesign Discussions (Continued)



Air Sealing and Redesign Discussions (Continued)



Deeper Dive -- Proposals, Contractor Feedback, and How this Feedback was Used

Scope

What was proposed?

Comments Heard

What were the key themes of feedback we received?

Rationale

Why was it proposed?

Takeaways & Next Steps

What did the Companies reconsider and update based on feedback?

1st Company Proposal

September 2023

Scope

- More time for air sealing hours is expected, based on home size
- 1-visit maintained
- Hourly Air Sealing proposed - fixed incentive or variable incentive?
- Request for feedback on a number of topics

Comments Heard

New hours of expected air sealing too high

Pre-visits are already being used to help with health and safety barriers

Simpler approach with 4-6 hours of air sealing is preferred (variable payment)

Concerns that variable payment (per hour) encourages inefficiency

Proposal Rationale

Need to ensure adequate time is spent air sealing
Important to decouple air sealing payments from CFM savings

Takeaways & Next Steps

1. Two visits has benefits given growing health and safety barriers; worth exploring
2. Where can we simplify to make this more workable for contractors?
3. **Contractor presentations** were planned to hear new ideas directly from Contractors

Contractor Presentations

March 2024

Scope – Presentations focused on

- Simpler approach “Core Services Transformation” w/ 4-6 hours of sealing
- In Progress Air Sealing Measurements
- Two-visit options explored – Ideas for CT, Current RI and NY models

Comments Heard

Active participation/discussion

Greater interest seen with 2 visits

Meeting Rationale

Understand what re-design approaches contractors would find most useful to support successful delivery

Hear directly contractors’ experience with 2-visits

Introduce company thoughts on a 2-visit approach

Takeaways & Next Steps

1. Two visits needs serious consideration– both to address prevalence of H&S barriers and to improve emerging QA concerns seen in project desk reviews
2. A simpler 4-6 hours of air sealing approach could be used; but we need to ensure contractors still spend adequate time in the home air sealing

2nd Company Proposal

May 2024

Scope

- Simplified hourly incentive (4-6 hr) for HES plus one HES assessment per day rule
- Pilot a 2-step model for HES-IE

Comments Heard:

Two program models is too hard

Did not want to be required to only do one HES project a day

Additional fees recommended to compensate contractors

Assessments should include diagnostics

Variable incentive payment (per hour) encourages inefficiency

Proposal Rationale

Simplify HES based on contractor feedback; require only 1 visit per day to ensure adequate air sealing is done

Pilot 2-step approach (2-visits) with HES-IE to address higher incidence of H&S barriers

Takeaways & Next Steps:

1. Consolidate plan to **one model** – two-step approach chosen to improve QA, better support contractors in the field, and ensure customer education and comprehensive work are a primary focus
2. Use air sealing **fixed incentive** to support greater efficiency in the field. Incorporated contractors recommended 4-6 hours in air sealing table
3. Field feedback **continues to refine plan**: Additional diagnostics added to assessment, more hours added for rim joist sealing

HES and HES-IE Program – Final Plans

August 2024

HES and HES-IE will both use a two-step approach

1. Home Energy Assessment followed by
2. Services

Goal to improve weatherization delivery considering the low realization rates (R-1983), especially for air sealing

Statement of Work (SOW) Work Plan created with Assessment and prior to the Services helps define the home's needs

1. Ensures air sealing and insulation are fully aligned;
2. Allows more time for air sealing; and
3. Builds in more QA/QC with a SOW review and approval before any work is completed

Assessments completed by an Energy Advisor for customer experience, rapport building, and education

- Customer education and sales results are critical to achieve savings goals

Advantages of Two Step Process (Contractor Centric)

Audit, testing and customer education conducted by 1 person can be completed in 2 – 3 hours regardless of health and safety barrier.

- Makes for easier scheduling
- H&S barrier projects are still paid/(\$) impact is limited
- Allows enough time for customer education

Scope of Work completed with supporting pictures and documentation, submitted for approval prior to work being completed

- Makes for easier scheduling – amount of time is determined by the SOW
- SOW and documentation is reviewed by the Companies prior to work being completed (QA/QC)

Service visit based on SOW has defined time duration

- Time is certain so it properly sets customer expectations
- All air sealing can be completed rather than having technicians leave to get to another appointment
- Air sealing and insulation may be completed on the same day

Additional focus of energy savings from insulation will be incentivized (conversion fee)

- Current model allows contractor to overlook potential important whole home measure priorities

Developing stronger customer relationship during Audit

- Improves customer satisfaction
- Allows for more opportunity to influence the customer to install needed upgrades

Disadvantages of Two Step Process (Contractor Centric)

Introduced greater uncertainty for contractor revenue (especially for smaller businesses) if they are not able to secure additional visits

Requires Sales effort to promote Service visit and Insulation

- **Opportunity:** Companies are prioritizing new sales training. Draft training plan circulated for contractor feedback

Concerns with 1 Technician in the field

- **Opportunity:** Most weatherization audit programs operate with 1 technician completing audit (including CT WAP). Contractors can still deploy additional technicians at their discretion.

Time required to plan and re-orient businesses around this new model

- **Opportunity:** 7-month transition period was provided for systems updates and training; what alternative timeline should be considered?

New model requires continued customer engagement by all Contractors after the Audit is required

- **Opportunity:** Current HES-IE contractors are familiar with this effort
- The Companies will provide training / support

Concerns regarding the transition duration to gain success in Service visit adoption (KPI)

- **Opportunity:** The Companies will be working with contractors to meet adoption rates to deliver Service visits
- The Companies will be proactively working with Contractors to ensure a successful April 1st start



QUESTIONS & DISCUSSION



II. Draft Implementation Manual with Thermal Boundary Updates

Draft Implementation Manual Update

Rewritten to align with, and define structure of, the HES and HES-IE program redesign

Incorporates NMR thermal boundary guidance - **R2222b**

Provides industry recognized **best practices** for Advisors and Technicians to follow for safe and effective work practices

Includes work specification **job aid** references for Advisors and Technicians to utilize in the field

Incorporates stakeholder feedback

HES / HES-IE Assessment

Final plan: Same model for both programs

Step 1, Assessment. Step 2, Services.

- Energy audit with Energy Advisor
- Gather existing conditions & make energy efficiency recommendations
- Health and safety check / testing (e.g., CAZ test in/out)
- Diagnostic testing: Blower door test, duct blaster, system air flow test
- DOE Home Energy Score (all customers who opt in)
- Customer report
- Customer education and sales
- → Statement of work (for approval)

Customer Process: HES

Step 1 - Assessment

- An energy efficiency audit and diagnostic tests, Customer report, DOE Score, and customer education
- DHW measures
- HES co-payment (waived if H&S barrier)
- Assessment length ~ 2 hours
- Customers commit to Services at end of assessment

Step 2 - Services

- Visit(s) that includes installation of major energy savings measures
- Air sealing, Insulation*
- Duct sealing (+ tests for ADS referral)
- Smart thermostats
- **Can be installed same day, or separately, by a CTIIN contractor*

Access to Rebates

- Insulation rebate after air sealing
- ADS rebate after manual duct sealing
- Future improvement - approved rebate recommendations sent electronically from Companies to Resource Innovations

Customer Process: HES-IE

Step 1 - Assessment

- An energy efficiency audit and diagnostic tests, Customer report, DOE Score, and customer education
- DHW measures
- Assessment length ~ 2 hours
- Customers commit to Services at end of assessment

Step 2 - Services

- Visit(s) that includes installation of major energy savings measures
- Air sealing, Insulation
- Duct sealing (+Advanced duct sealing, if eligible)
- Smart thermostats
- *IE: HVAC repairs, HVAC & Water heaters, Appliances, Windows, future IRA measures*

Customer Incentives

- Customer contracts with approved upgrades
- Includes: ARPA incentives (2024), future IRA HEAR rebates (2025+)

HES / HES-IE Statement of Work

Contractor staff will review recommendations for quality and completeness, and prepare a weatherization **Statement of Work (SOW) Work Plan**

Submit SOW with assessment support and pictures within **2 business days** of assessment

Include air sealing, insulation, duct sealing, thermostat recommendations

Companies will review / approve within **3 business days** of submittal

SOW Work Plan

Will use a Company provided template – training will be provided

Plan view – building floor plan and consolidated recommendations for air sealing, insulation and duct sealing

2 – 4-unit homes – SOW Work Plan should address entire structure (separate plan views by floor/unit)

| | | |
|---|--|-------------------------------|
| Customer: Example Customer Address: 123 Example Street Town: Example, CT 12345 | Home Phone: (860) 123-4567 Work Phone: () - Cell Phone: () - | |
| Project ID: Sample | Energy Auditor: Example Auditor | Reviewed by: Example Reviewer |
| <ol style="list-style-type: none"> Air Sealing 6 Hours Dam Hatch (2), Bath Fan (1), Recessed Light (1), Catwalk, Chimney, and Air Handler Install Soffit Baffles Vent Bath Fan to Exterior Flapper with R-8 Hose Open Attic R-9 to R-49 Cellulose Attic Slope R-0 to R-19 Cellulose Densepack Kneewall R-0 to R-13 Fiberglass Kneewall Floor R-9 to R-49 Cellulose Attic & Kneewall Hatch R-0 to R-12 Rigid Insulation 1st Floor Exterior Walls R-0 to R-13 Cellulose Densepack 2nd Floor Exterior Walls R-0 to R-13 Cellulose Densepack Rim Joist R-0 to R-19 Fiberglass Overhang R-0 to R-19 Cellulose Densepack Duct Sealing | | |
| | | |

SOW Work Plan

Supporting detail/math is shown in work plan to support review

Air sealing hours in SOW for both:

- 1) Air sealing hours **with** blower door test, or
- 2) Air sealing hours **without** blower door test*

*For PACM/Lead situations per Manuals, or in cases where blower door can't be run in a 2-4 building technician judgement required.

Table 1. HES & HES-IE Air Sealing with Attic Air Sealing

| Standard Air Seal Hours for Entire Home | |
|---|--------------|
| Total technician-hours | |
| Guidance for Home Size (Conditioned Square Feet) and Age | Hours |
| •Very small homes ≤ 1,000 square feet; or •Newer homes (built 2014 and after, regardless of size) | 4 |
| •Most homes (> 1,000 square feet); or •Homes built before 2014 | 6 |
| Additional Air Sealing Hours based on attic considerations <i>Per Technician Discretion and Justification</i> | |
| Examples: •≥ 6 inches Loose Insulation •≥ 6 inches Mix Batt & Loose Insulation •Cross Batt Insulation •Truss Construction •Kneewall Transition (1 hour Kneewall) | Up to 2 |
| Exception 1: At/Near BAS | 1 |
| Exception 2: Modular / Prefab | 3 |

Table 2. HES & HES-IE Air Sealing without Attic Air Sealing

| Air Sealing Hours for Areas of Home | |
|--|--------------|
| Total technician-hours | |
| Area | Hours |
| Floored Over Attic | 1 |
| Kneewall Transition (1 hour per Kneewall) | 2 |
| Basement/Crawlspace Rim Joist | 2 |
| Basement/Crawlspace Ceiling | 1 |
| Exception 1: At/Near BAS | 1 |
| Up to 3 hours total may be invoiced | |

Air Sealing Guidance

Air sealing incentive is **fixed payment** based on hours approved in SOW.

(Revised) guidance that **40-50%** of air sealing time is focused in the attic.

Consistent with BPI, air sealing and insulation required for an air/thermal barrier. Air sealing must be done before providing insulation rebate, unless dense pack is part of SOW.

2-4 Unit Homes

Recommend all units be accessed

- May be circumstances this isn't feasible
- At a minimum, need to confirm access to attic, basement, and building mechanicals during assessment
- Contractors should be engaging with the landlord
- Past participation: An assessment will be allowed even if one unit has participated to support serving the entire building; Duplicative services cannot be provided

The Companies are committed to working collaboratively with Contractors to improve services for 2-4 building

- Support for landlord outreach? More flexible participation requirements for rental units?
- Planning to engage contractors in brainstorming session to discuss ideas for improvements



Unconditioned
(no sources of heat in basement)



Semi-Conditioned
(mechanicals and/or heating distribution in basement but not intentionally conditioned)



Conditioned
(basement finished and/or intentionally conditioned)

NEW
DEFINITION
TO C&LM



Unconditioned
(no sources of heat in basement)

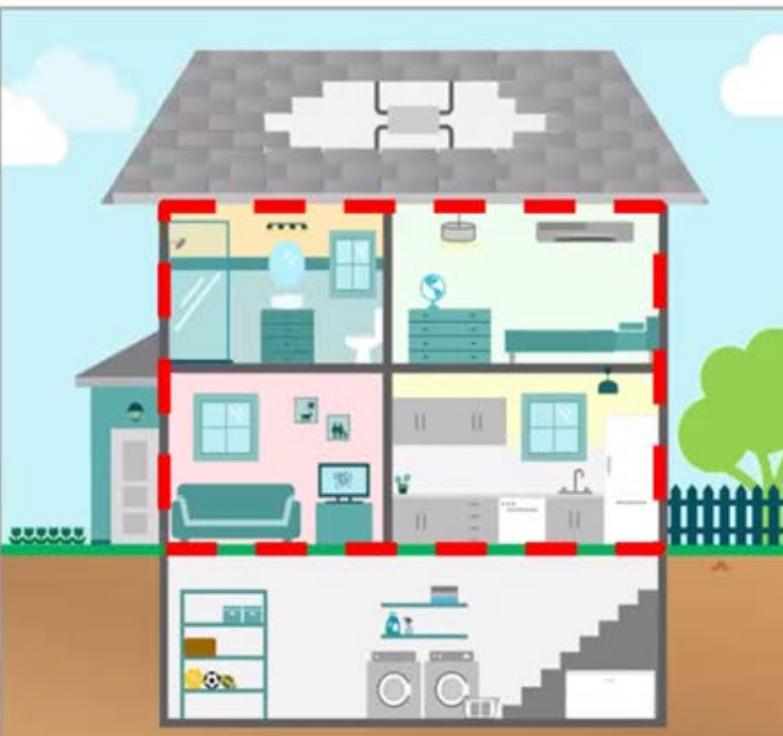


Semi-Conditioned
(mechanicals and/or heating distribution in basement but not intentionally conditioned)

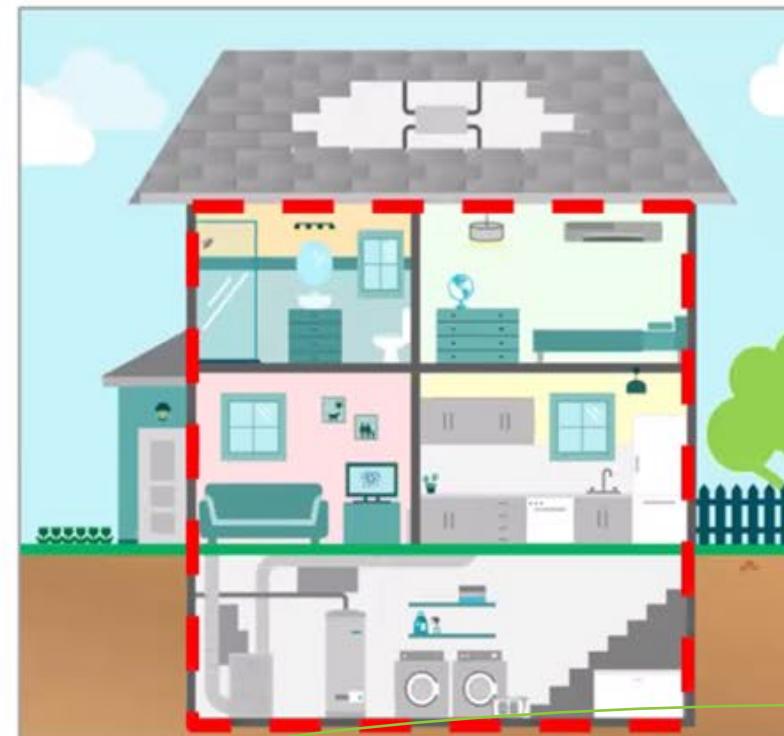


Conditioned
(basement finished and/or intentionally conditioned)

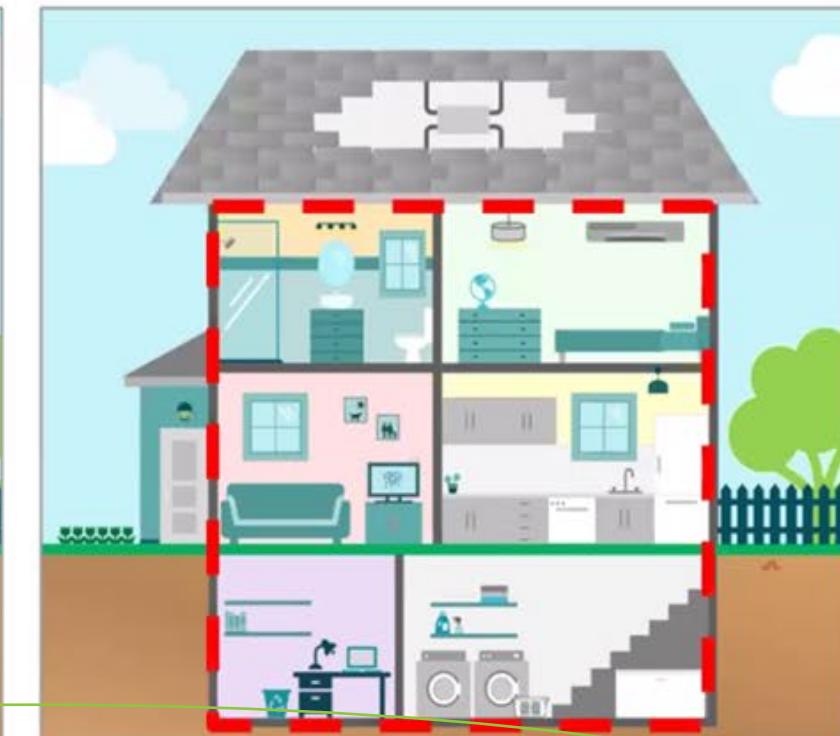
Semi-conditioned basements should be treated as INSIDE



Unconditioned



Semi-Conditioned



Conditioned

Thermal Envelope

Unconditioned Basements Utilizing Zonal Pressure Diagnostics (page 27 of the Draft Implementation Manual)

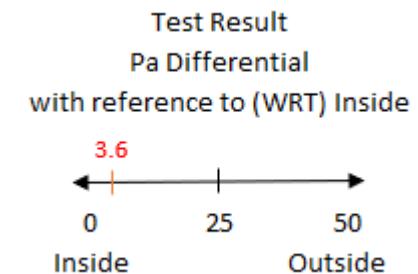
+/- 50 Pa Pressure Differential between living space (thermal envelope) and outside



This example shows the room being tested is connected to the living space (inside the thermal envelope)

Zonal Pressure differential between the **tested zone** (basement) and **living space**.

Results yielding 25 Pascals or more would mean the basement is outside the thermal envelope





QUESTIONS & DISCUSSION



III. Timeline: HES-IE RFP and HES & HES-IE RFI - Pricing

Remaining Next Steps and Timeline

DRAFT DOCUMENTS (FEES, FIELD MANUAL)

Contractor comments due by 10/4/2024

INCORPORATE UPDATES TO DOCUMENTS

Complete by 10/11/2024

HES-IE RFP and HES & HES-IE RFI – Pricing

Issue October 15, 2024, Due date November 15, 2024

TRAINING, DEVELOPMENT and DELIVERY

Q4 2024 (Development) Q1 2025 (Delivery)

TRANSITION: Process transition, System updates

Q4 2024 Development, Q1 2025 Deployment for April 1, 2025, Effective date

“FEES” (DRAFT: Awaiting Contractor feedback due 10/4/2024)

| Assessment Visit Fees | Service Visit Fees |
|------------------------------------|--|
| Assessment & SOW Fee | Air sealing fixed incentive (based on hours approved in SOW) – New structure |
| System Airflow Test | Duct sealing incentive |
| Blower Door Test Fee - New | Air sealing measures (door sweep, LED cans, whole house fan covers, etc.) – New |
| Duct Blaster Test Fee - New | Cut In Access – New |
| DOE Home Energy Score | Smart thermostats |
| Direct Install: Hot water measures | Air sealing conversion fee – New |
| | Duct sealing conversion fee - New |
| | Insulation conversion fee - New |
| | HES-IE Only: additional add-on measure payments |

1) HES-IE RFP

HES-IE Program RFP ~ October 15, 2024

- Not planning a separate HVAC / Water Heating RFP
- **Planning to build a shared list of HVAC / Water Heating Contractors for IE contractor use**

Target April 1, 2025, for new contracts

2) HES & HES-IE Pricing RFI

Release October 15, 2024

- Data received is analyzed and benchmarked against neighboring states

Target April 1, 2025, for new contracts





QUESTIONS & DISCUSSION



IV. Pricing Process

HES and HES-IE Pricing

Companies plan to collect input on
HES and HES-IE program pricing

Companies are planning to
benchmark pricing against
neighboring states to
assess/compare costs

Contractors **cannot** collaborate or
jointly discuss pricing among
themselves because of anti-trust law
violations and price fixing concerns





QUESTIONS & DISCUSSION

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