

Deep Energy Retrofit Measures Verification

Raynham and Springfield, MA



Deep Energy Retrofit Measures

Welcome!

Thanks to Our Sponsors!

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Workshop Agenda

- 9:00 am – 9:15 am
Welcome and introduction
- 9:15 am – 10:00 am
Overview of Massachusetts and Rhode Island DER programs,
Why guidance and incentives are needed
Potential savings and value proposition
- 10:00 am – 3:00 pm
The Joe zone

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Workshop Agenda

- 10:00 am – 3:00 pm, Dr. Joe
Essential principles, critical functions
Applying enclosure principles to retrofit
Retrofit examples
- 12:00 pm – 12:45 pm
LUNCH
- 12:45 pm – 1:00 pm
A few words from our sponsors

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Workshop Agenda

- 3:15 pm – 4:15 pm
Pulling it all together: Specifications, Plans, Staged Retrofit, DER Pilot Verification Examples
- 4:15 pm – 4:30 pm
Closing Remarks

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Who are you?

- Builders, contractors
- Architects, designers
- Developers
- Energy efficiency program sponsors
- Energy efficiency program implementation
- Regulators, program evaluators
- Building performance consultants
- Homeowners interested in DER
- Realtors, real estate professionals
- Other

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Why are you here?

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What is Deep Energy Retrofit?

- Existing buildings brought to advanced energy performance
 - 50% savings
 - Focus on the building – physical asset
- Leapfrog current housing
 - Position for another 50-100 years of service

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What is DER?

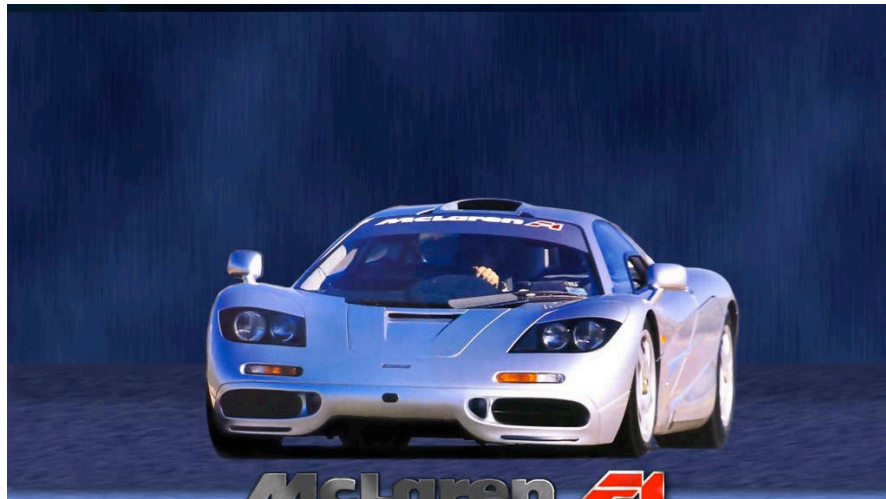


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What is DER?



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What is Deep Energy Retrofit?

- Comprehensive High Performance
 - Durability
 - Comfort
 - Indoor air quality
 - Aesthetics
 - Amenity
 - Energy

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Things you should know about DER

- **50% total energy reduction is a really BIG deal!**
- Especially if we still want to live in these houses
 - Coffee pots, toasters, microwaves, TV' s, computers, refrigerators, dishwashers, clothes washers, dryers, freezers, lighting...
 - Appliances and gadgets from “Big Box”

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Things you should know about DER

- **50% total energy reduction is a really BIG deal!**
- *If we're not going to radically change how we live, then we have to very radically change what we live in.*

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Things you should know about DER

High performance leaves less room for error:

- Drying potential reduced
- Uncontrolled ventilation may have compensated for a multitude of sins
- The existing building is working but we may not know how it is working

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Key Concepts of Deep Energy Retrofit

- Be *aware* of change
 - (different than beware of change!)

- Modifications to the building must reduce known risks
 - Make the system more robust, not less

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Things you should know about DER

- There are approximately 60 million units of housing in the U.S. that were built prior to 1960.
- Most of these will need major systems replaced in the near future.
- As siding, windows, roof claddings, mechanicals replaced, opportunities arise to reduce the overall energy use of these homes

CAPTURE OPPORTUNITIES !

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Key Concept of Deep Energy Retrofit

- Any significant reworking of an assembly/system essentially inoculates that assembly/system from further improvement for the services life
 - Consider service life of measures
 - Will components of an assembly provide appropriate performance for the full service life

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DER performance parameters:

- Performance Targets – 5, 10, 20, 40, 60 and 0.1
- Performance Imperatives

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Performance Targets:

- R 5 Windows
- R 10 Slab
- R 20 Foundation Walls
- R 40 Above-Grade Walls
- R 60 Roof
- Air tightness 0.1 cfm 50 / s.f. enclosure

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Performance Imperatives:

- Technically Sound
- Sufficiently Robust

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Critical Enclosure Control Functions:

- Control (liquid) water
- Control air flow
- Thermal control
- Vapor control

“Technically Sound” = performs control functions

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Foundation Walls:

- Performance Target – R 20
- Performance Imperatives –
 - Control (liquid) water
 - Control air flow
 - Thermal control
 - Vapor control

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Basement Slabs:

- Performance Target – R 10
- Performance Imperatives –
 - Control (liquid) water
 - Control air (soil gas) flow
 - Thermal control
 - Vapor control

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Roof/Attic:

- Performance Target – R 60
- Performance Imperatives –
 - Control (liquid) water
 - Control air flow
 - Thermal control
 - Vapor control

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Walls:

- Performance Target – R 40
- Performance Imperatives –
 - Control (liquid) water
 - Control air flow
 - Thermal control
 - Vapor control

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Windows:

- Performance Target – R 5 (U-value 0.2)
- Performance Imperatives –
 - Control (liquid) water
 - Control air flow
 - Thermal control
 - Vapor control

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Deep Energy Retrofit Measures

- Cladding Attachment over Thick Exterior Insulation
 - ***It Works!***



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