

Kohta Ueno
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Are Deep Energy Retrofits Worth It? Costs and Savings



Green Building Advisor

Musings of an Energy Nerd

Contemplating residential energy use

The High Cost of Deep-Energy Retrofits

A pilot project generates cost data on deep-energy retrofits of four buildings in Utica, New York

POSTED ON MAR 2 2012 BY MARTIN HOLLADAY

How much does it cost to perform a deep-energy retrofit at a 100-year-old single-family home? Thanks to a recent study in Utica, New York, we now know the answer: about \$100,000.

The research was sponsored by New York State Energy Research and Development Authority (NYSERDA), an agency that administers programs funded by public benefit charges tacked onto electric utility bills. The program paid for deep-energy retrofits at four wood-framed buildings in Utica, New York.

The project manager for the study was NYSERDA engineer Greg Pedrick. At the recent Better Buildings by Design conference in Burlington, Vermont, Pedrick gave a presentation, "Research Findings and Momentum for Deep Energy Retrofits," explaining the scope of work and summarizing the costs of the retrofits.

A big fan of deep-energy retrofits, Pedrick explained, "I want to see a fatter house with a smaller mechanical system."



Image 1 of 9
A tankless water heater provides space heat for the whole house. Two energy specialists from the Building Science Corporation, Kohta Ueno and Armin Ruedl, install an air handler equipped with a hydronic heat exchange coil in one of the homes enrolled in a deep-energy-retrofit project in Utica, New York.



2
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Deep Energy Retrofits Are Often Misguided

It's time for energy retrofit specialists to overcome their prejudice against PV systems

POSTED ON MAR 28 2014 BY MARTIN HOLLADAY

All through the 1980s and 1990s, a small band of North American believers worked to maintain and expand our understanding of residential energy efficiency. These were the pioneers of the home performance field: blower-door experts, weatherization contractors, and "house as a system" trainers. At conferences like Affordable Comfort, they gathered to share their knowledge and lick their wounds.

These pioneers understood what was wrong with American houses: They leaked air; they were inadequately insulated; they had bad windows; and their duct systems were a disaster.

Occasionally, these energy nerds would scoff at millionaire clients who were more interested in "green bling" — a phrase that usually described photovoltaic panels — than they were in reducing air leaks in their home's thermal envelope.



Image 1 of 3

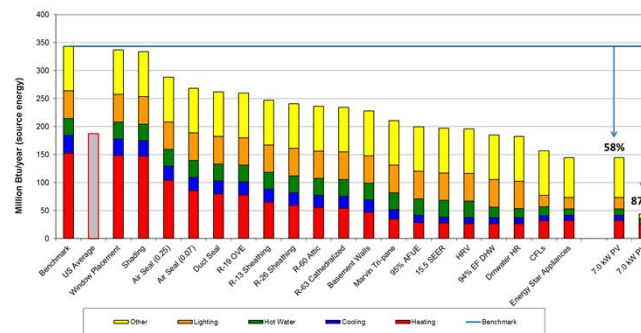
Deep energy retrofit jobs are frighteningly expensive. The energy retrofit work at this house (61 Oakwood Avenue in Sudbury, Massachusetts) cost \$241,000.



Are DERs Worth It?

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Parametric Simulations



Are DERs Worth It?

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Cost Effectiveness: Beyond Simple Payback

Extended Cost Effectiveness Analysis				
Cost	Savings [10 ⁶ Btu / yr]	\$ per 10 ⁶ Btu Saved (1 year)	Estimated Lifetime [yr]	\$ per 10 ⁶ Btu Saved (Lifetime)

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Cost Effectiveness: Beyond Simple Payback

Extended Cost Effectiveness Analysis				
Cost	Savings [10 ⁶ Btu / yr]	\$ per 10 ⁶ Btu Saved (1 year)	Estimated Lifetime [yr]	\$ per 10 ⁶ Btu Saved (Lifetime)

Basement Slab R-25 to R-30

\$1,452 0.61

4 kWp Photovoltaic System @ \$6/Wp (2011)

\$28,000

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So... Are DERs Worth It?

- Yes, PVs are cheap and getting cheaper!
- Run the numbers: savings vs. PVs worth understanding
- BUT still worth considering:
 - Addressing end-of service life cladding—once in generation upgrade opportunity
 - Fuel costs ≠ accounting for all carbon externalities
 - Dealing with existing moisture issues (damp basements, wall failures)
 - Dealing with existing comfort issues (drafts, windows)
 - Improving wall condensation resistance (running at higher winter RH safely)

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Questions?

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