Roadmapping Health and Residential Energy Efficiency: Unlocking New Customers and Funding

May 15, 2017
1:30 – 5:00 p.m.
Panelists

- Steve Cowell, E4TheFuture, President
- Kevin Kennedy, MPH, CIEC, Children’s Mercy Hospitals and Clinics, Director of Environmental Health
- Jonathan Wilson, MPP, National Center for Healthy Housing, Director of Research
- Larry Zarker, Building Performance Institute, Chief Executive Officer

Moderators:
- Ely Jacobsohn, DOE Program Manager, Home Performance with ENERGY STAR
Questions for Audience (Show of Hands)

1. What sector are you from? (State/local gov’t, utility, implementer, nonprofit, contractor, other)
2. What is your level of experience with the subject? (Newbie, Somewhat experienced, Solid experience, Expert level)
3. How long have you been working in the field of residential energy efficiency? (0-1, 2-5, 6-10, >10)
4. How long has your program been operating? (0-1, 2-5, 6-10, >10)
Agenda for Workshop

- **Part 1**
  - DOE Health and Home Performance Initiative Description
  - Health and Home Performance Roadmap Update
  - Health and Home Performance Research and Filling Gaps
  - Engaging the Health Sector in Home Performance
  - Engaging Utilities and Regulators about Health
  - Workforce Training and Certification
  - Describing Part 2 Activities

- **Part 2**
  - Breakout Sessions
Health and Home Performance Initiative

ID & leverage substantiated benefits to occupant health from home performance improvement activities:

- Literature review (National Center for Healthy Housing)
- Roadmap to leverage home performance-health connection to grow industry
- Create consumer marketing for communication with key stakeholders
## DOE Roadmap to Integrate Health & Home Performance

<table>
<thead>
<tr>
<th>Element</th>
<th>What We Have</th>
<th>What We Need</th>
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<tbody>
<tr>
<td>Goals and Objectives</td>
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<td>Value to Stakeholders</td>
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<td>Workforce Development</td>
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<td>Policy &amp; Regulatory Environment</td>
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<td>Marketing and Demand</td>
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<td>Success Measures</td>
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<td>Research</td>
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<td>Demonstrations</td>
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<td>Standards/Protocols</td>
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<td>Resources</td>
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<td>Funding Development/Access</td>
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</tbody>
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### Home Rx: The Health Benefits of Home Performance

A Review of the Current Evidence

- Jonathan Wilson, National Center for Healthy Housing (NCHH)
- David Jacobs, NCHH
- Amanda Reddy, NCHH
- Ellen Tohn, Johns Hopkins Environmental Strategies
- Jonathan Cohen, U.S. Department of Energy (DOE)
- Ely Jacobs, DOE

December 2016
# DOE Roadmap to Integrate Health & Home Performance

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<tbody>
<tr>
<td>Goals and Objectives</td>
<td>?</td>
<td>Goals/objectives by stakeholder group, i.e. programs, contractors, homeowners, medical community</td>
</tr>
<tr>
<td>Value of Health-EE Integration to Stakeholders</td>
<td>HPC: Standard Practice Manual for Cost Effectiveness (coming soon)</td>
<td>?</td>
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<tr>
<td>Workforce Development</td>
<td>BPI Healthy Home Evaluator</td>
<td>What credentials needed for credibility from medical community and insurance groups?</td>
</tr>
<tr>
<td>Policy and Regulatory Environment</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
# DOE Roadmap to Integrate Health & Home Performance

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Marketing and Demand</td>
<td>HUD: Everyone Deserves a Safe &amp; Healthy Home</td>
<td>Language to manage liability risk</td>
</tr>
<tr>
<td>Success Measures</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
| Research                 | • DOE Literature Review: Home Rx: The Health Benefits of Home Performance  
                         | • E4theFuture White Paper: Occupant Health Benefits of Residential Energy Efficiency  
                         | • WAP Evaluation                           | ?                                         |
## DOE Roadmap to Integrate Health & Home Performance

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<tbody>
<tr>
<td>Demonstrations</td>
<td>• Children’s Mercy Hospital Kansas City</td>
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<tr>
<td></td>
<td>• Allegheny County Dept. of Health</td>
<td></td>
</tr>
<tr>
<td>Standards/Protocols</td>
<td>Examples from:</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td>• Mold/moisture in homes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Formaldehyde in manufactured housing</td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Funding Development/Access</td>
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<td>?</td>
</tr>
</tbody>
</table>
Coming Soon: Part 2 Breakouts

- Break out audience by topic:
  - Value of Healthcare-EE Integration to Stakeholders
  - Workforce Development
  - Policy & Regulatory Environment
  - Access to Funding
- Topics explored based on:
  - Stakeholder views
  - Implementation strategies
Thank You

- Provide feedback on this session in the new Summit App!

- Download the app to your mobile device or go to bbsummit.pathable.com

- Stakeholder sign up sheet for involvement and/or updates on DOE Roadmap efforts

Contact: homehealth@csra.com
Questions/Comments?
Jonathan Wilson
National Center for Healthy Housing
Research Findings: Health Benefits of Residential Energy Efficiency

Jonathan Wilson, Director of Research
May 15, 2017
Literature Review Overview

• **Goal:**
  o Investigate impact of home performance measures on resident health

• **Objectives:**
  o Build the case for contractors and home performance advocates so they can:
    ➢ Educate home performance clients
    ➢ Educate current funders (utilities, DOE)
    ➢ Educate medical community
Studies Considered

• 40 Studies met criteria for inclusion

  o  Base energy efficiency:  6
  o  Enhanced energy efficiency:  7
  o  Green construction:  9
  o  Ventilation:  8
  o  Supplemental Services:  10

    (Room air cleaners, wood stove replacement, gas stove replacement)
How energy efficiency can reduce health risks

- Insulation/Air Sealing: Warmer drier air, improved indoor temperatures & relative humidity, leading to:
  - Fewer heat or cold related deaths
  - Less hypertension, heart disease
  - Fewer asthma symptoms, respiratory risks, COPD
  - Fewer heart disease risks
  - Fewer cancer risks due to radon, formaldehyde, other sources
  - Less stress, better mental health

- Heating System Upgrades: Reduced hospital and medical visits

- Ventilation/Vent Dryers: Less moisture, mold, particulates, pollutants, combustion by-products, allergens, leading to:
  - Lower bills, better comfort
  - Fewer heart disease risks
  - Fewer cancer risks due to radon, formaldehyde, other sources
  - Less stress, better mental health

- Efficient Cooking Appliances: Improved indoor temperatures & relative humidity

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National Center for HEALTHY HOUSING
## Observed Effects

<table>
<thead>
<tr>
<th>Reduced Respiratory &amp; Allergy Symptoms</th>
<th>Other Health Improvements</th>
<th>Reduced Emergency Dept. Visits or Hospitalizations</th>
<th>Indoor Environmental Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies</td>
<td>Headaches</td>
<td>Asthma</td>
<td>Moisture</td>
</tr>
<tr>
<td>Asthma*</td>
<td>Hypertension</td>
<td>Other respiratory</td>
<td>Condensation</td>
</tr>
<tr>
<td>Colds</td>
<td>Thermal stress</td>
<td></td>
<td>VOCs</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>Overall health</td>
<td></td>
<td>Formaldehyde</td>
</tr>
<tr>
<td>Throat irritation</td>
<td>Mental health</td>
<td></td>
<td>Radon</td>
</tr>
<tr>
<td>Wheeze</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Italics: some negative outcomes

* VOCs: Volatile Organic Compounds

* The majority of studies reported asthma improvements; one study documented mixed results

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National Center for
HEALTHY HOUSING
Documented Health Benefits of Energy Efficiency

- Occupants experience fewer respiratory-related Emergency Dept visits after energy efficiency (EE) (National Evaluation of WAP)

- Occupants report better control of their asthma (Breysse)

- Occupants report better physical and mental health after EE (multiple studies)
EE = Health Improvements

Better Health
30% to 40%

Worse Health
37% to 26%

Weatherization “Plus”
Highline Communities, King County, WA

STUDY GROUP: WEATHERIZATION PLUS COMMUNITY HEALTH WORKER

COMPARISON GROUP: COMMUNITY HEALTH WORKER ONLY
Examples of Services Provided

- Standard weatherization +
- 61% new bath fans - most with timer
- 61% carpets removed
- 26% vapor barriers in crawl space
- 24% kitchen range fans
- Other measures as needed
- $4200/apartments (11)
  $6300/duplex or homes (23)

Study Outcome:
Changes in Mold and Moisture

- Mold: -47%, -28%, -29%, -50%
- Moisture: -47%, -37%, -29%
Study Outcome: % of Children with Well-Controlled Asthma

Baseline for both groups: 0%

1 Year

71%  48%  23%

Added Benefit

National Center for HEALTHY HOUSING
Ventilation

• Eight studies of ventilation systems were considered
• Indoor environmental conditions generally improved with enhanced ventilation
  o Asthma triggers
  o Mold
  o Volatile Organic Compounds
  o *Nitrogen dioxide increased*
• Installation of whole-house ventilation associated with lower dust mite levels
• Installation of HRV/ERVs associated with fewer asthma respiratory symptoms
• 3 studies – all controlled trials with at-risk children or children with asthma
• Studies also observed improvements in CO$_2$, VOCs, and airborne mold
• Installation of exhaust ventilation to meet 62.2-2010 associated with fewer headaches among children when compared to 62.2-1989
• Homes in both groups had lower CO₂ and formaldehyde levels after work
• Homes in a second study also observed reductions in radon after installation of exhaust ventilation
Additional Research Needs

• Studies of healthcare utilization
• Studies focused on residents who have a pre-existing respiratory health condition would enhance the research base
• Studies of work in market-rate housing
• Studies of environmental outcomes when health effects take time to be observed
  o Also, studies should better document the practices used by the energy efficiency contractors
Take Home Message

• Consumers want improved comfort and better health; it is a key marketing opportunity

• Multiple studies find that residents feel better, have fewer respiratory symptoms, and experience fewer headaches after energy efficiency measures

• The health effects are supported by IAQ changes

• No one should use this research to guarantee health effects for any particular client, but the evidence is clear that population health benefits are real
Questions: Contact Jonathan Wilson – jwilson@nchh.org

Thanks to Ellen Tohn of Tohn Environmental Strategies.
Questions/Comments?
Healthy Home Performance-What Health Care Needs

Kevin Kennedy,
Children’s Mercy Hospital
Everyone here will experience some kind of chronic health condition in their lifetime.

Where do we manage our health?
Asthma and allergies strike 1 out of 5 Americans

5 million Parkinson’s
5 million Alzheimer’s
6 million Stroke
12 million Cancer
13 million Coronary Heart Disease
26 million Diabetes

www.aafa.org - ALLERGY FACTS & FIGURES
The US spends more on health care and less on contributors to health problems than anywhere else.
Mismatch:
Lots of Health Care,
Not Enough Health

Boston Paradox, Lots of Health Care,
Not Enough Health—NGHI, 2007
Most of us are healthy and find indoor air acceptable for 80% of us.
The 20% who are not healthy represent 80% of health care costs.

From National Inst. of Health Care Management, 2012
The Asthma Management Guidelines say environmental factors are key.

- **Stepwise Approach**
  - Assessment and Monitoring
  - Education for Partnership
  - Medication

- Environmental Factors and Co-Morbid Conditions

- Asthma Control
  - Reduce Impairment
  - Reduce Risk
One Managed Care Example

One Plan in KC area:

– 8000 Pediatric Asthma Patients in Plan

– 5000 Diagnosed
  (3000 not seeing Physician)

– 80% or 4000 Intermittent

– 20% or 1000 Persistent

– 1 - 2% Severe or ~200 Patients
Many health conditions are known to get better from environmental improvement:

- **Diagnosis**
  - Asthma
  - Rhinitis
  - Hypersensitivity
  - Pneumonitis
  - Aspergillosis
  - Sinusitis
  - Other Respiratory Conditions

- **Other Criteria**
  - Symptoms are perennial & flare on exposure
  - Environment exposures has (or may have) been suspected of triggering symptoms
  - Continued exposure is likely
  - Patient has some control over environment
Important Survey of State-by-State Reimbursement Policies

HEALTHCARE FINANCING OF HEALTHY HOMES:

Findings from a 2014 Nationwide Survey of State Reimbursement Policies

November 2014
Rebecca Morley, MSPR, and Amanda Reddy, MS, National Center for Healthy Housing
Kate Horton, JD, MPH, RN, and Mary-Beth Macarey, JD, MPH, Milken Institute School of Public Health at the George Washington University

Key Findings: States are moving slowly

- 27 states (54%) reported having some Medicaid reimbursement policy in place for
  - home-based asthma services
  - follow-up services for children with lead exposure.
- 7 states (14%) reported that one or more private payers in the state provide or reimburse for home-based asthma services
- An additional 7 states (14%) report that one or more private payers are actively exploring putting these services into place.
- Only 3 states (6%) reported knowledge of private payers who reimburse for or provide lead follow-up services
We need to advocate for state policies that reimburse for home visits.

**Missouri Policy Finalized**

- Medicaid reimbursement for home-based asthma education services
- Home Environmental Assessment
- Two national credentials approved for individuals to provide Environmental Assessments:
  - NEHA Healthy Home Specialist
  - BPI Healthy Home Evaluator

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**Medicaid reimbursement for home-based asthma education services**

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**Proposed Rules**

**Asthma Education**

1. Asthma educators must have the credentials set forth in this subsection.
2. Any professional background with the corresponding professional degree from an accredited institution in good standing; and
3. Asthma educators must have one (1) of the following certifications in good standing:
   - Current and active National Asthma Educator Certification (AEC);
   - Thirty-five (35) Continuous Education Unit (CEU) every five (5) years; or
   - Retake AEC asthma educator exam within the timeframe set forth by the AEC;
4. State certification. The provider must have certification from an approved Missouri training program that utilizes the National Asthma Educator Curriculum "Teaching an Asthma Educator and Care Manager." A Missouri training program certificate means that the student is competent to provide services upon graduation and with the same level of expertise and for the same professional degree as for the national certification, including:
   - Program may contain a mix of didactics with a minimum work in the field; and
   - The graduates are required to maintain the same number of CEUs as the national program.
   - Thirty-five (35) CEUs every five (5) years; or
   - Retake certification exam every seven (7) years.
5. The qualified academic university-based center responsible for tracking asthma educators must maintain an up-to-date database of certified asthma education providers in Missouri and will monitor compliance with national and state certifications.
6. Minor programs. A minor in someone who is working towards a certificate. Once certified, the asthma educator must become a mentor for individuals who are seeking their national certification. Mentors, who must be an enrolled Medicaid provider, can have a maximum of three (3) mentees at a time. Mentors have the capability of billing MHD for their services, which means cannot.
7. Services provided by a provider under the supervision of the mentor can be billed to MHD by the mentor. Individuals that qualify for a mentorship are individuals not certified as asthma educators and seeking national or state certifications. Those individuals can be mentored for a maximum timeframe of eighteen (18) months to a maximum of one thousand (1,000) hours of service. Once one thousand (1,000) hours are obtained, the mentor must attempt to obtain the national or state certification.
8. Home environmental assessment must have the credentials set forth in this subsection.

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Building Analysts are perfect Healthy Home Assessors

- **Building Diagnostics**
  - Training in building science
  - Trained in measurement
  - Understand combustion safety
  - Have knowledge of basic health and safety
Energy audits and healthy home assessments are very similar processes.
Healthy Home Performance is Here!

Energy Performance

Very Healthy

Very Efficient

Unhealthy & Inefficient

We can Measure Healthy!!

**Thanks to Eric Werling for conceiving of this illustration**
Why Hasn’t This Happened Already?

Some possible reasons:

• Health care providers don’t know how to find healthy home professionals
• Healthy home professionals don’t know how to communicate with health care providers
• Health Insurers and managed care comp. are still nervous about who pays for what
• Health providers and insurers may prefer to contract for a package of healthy home services
Kevin Kennedy, k kennedy@cmh.edu
Questions/Comments?
Steve Cowell, President

E4TheFuture
Developed in coordination with US DOE’s Home Rx Health Impact Study

Fall 2016
How EE Can Reduce Health Risks

- **Insulation**
  - Warmer drier air, improved indoor temperatures & relative humidity
  - Fewer heat or cold related deaths
  - Fewer asthma symptoms, respiratory risks, COPD
  - Fewer heart disease risks
  - Fewer cancer risks due to radon, formaldehyde, other sources

- **Air Sealing**
  - Less moisture, mold, particulates, pollutants, combustion by-products, allergens
  - Less hypertension, heart disease
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  - Fewer cancer risks due to radon, formaldehyde, other sources

- **Heating System Upgrades**
  - Lower bills, better comfort
  - Less stress, better mental health

- **Ventilation**
  - Vent Dryers

- **Efficient Cooking Appliances**

Reduced hospital and medical visits

Lower bills, better comfort
### Example: Monetized Values for Health Impacts (MA 2016)

<table>
<thead>
<tr>
<th>NEI Value</th>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
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<tbody>
<tr>
<td></td>
<td>Household W/Avoided Death Benefit</td>
<td>Household W/O Avoided Death Benefit</td>
<td>Societal</td>
</tr>
<tr>
<td>Reduced asthma symptoms</td>
<td>$9.99</td>
<td>$9.99</td>
<td>$322.01</td>
</tr>
<tr>
<td>Reduced cold-related thermal stress</td>
<td>$463.21</td>
<td>$4.67</td>
<td>$33.73</td>
</tr>
<tr>
<td>Reduced heat-related thermal stress</td>
<td>$145.93</td>
<td>$8.28</td>
<td>$27.00</td>
</tr>
<tr>
<td>Fewer missed work days</td>
<td>$149.45</td>
<td>$149.45</td>
<td>$37.36</td>
</tr>
<tr>
<td>Reduced use of short-term, high-interest loans</td>
<td>$4.72</td>
<td>$4.72</td>
<td>$0</td>
</tr>
<tr>
<td>Reduced CO poisoning (5-year life)</td>
<td>$36.98</td>
<td>$0.25</td>
<td>$1.87</td>
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<tr>
<td>Increased home productivity</td>
<td>$37.75</td>
<td>$37.75</td>
<td>$0</td>
</tr>
<tr>
<td>Reduced home fires</td>
<td>$93.84</td>
<td>$9.77</td>
<td>$17.87**</td>
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#### Annual Total—per weatherized home

<table>
<thead>
<tr>
<th></th>
<th>Household W/Avoided Death Benefit</th>
<th>Household W/O Avoided Death Benefit</th>
<th>Societal</th>
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<tbody>
<tr>
<td>Annual Total</td>
<td>$941.87</td>
<td>$224.88</td>
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<td>$1,381.71</td>
<td>$664.45</td>
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EE Program Cost-Effectiveness and Health Impacts

Challenges:

- Health benefits typically not included in CE analyses
  - For neither indoor or outdoor air quality benefits
  - For neither Participant Impacts and Societal Impacts
- Costs and benefits are not symmetrically treated
- Robust data needed to monetize health impacts ($$)

Opportunities:

- Integrated health/EE programs can help utility programs in various ways, not only with CE
- New cost-effectiveness guidance can help support inclusion of health impacts
Cost-effectiveness testing used to determine if the benefits of an energy efficiency program outweigh the costs (where B/C > 1.0)
Integrated EE/Health Programs

For EE program CE analyses – integrated EE/health programs can either increase benefits and/or decrease program costs by leveraging costs with health industry.

\[
\begin{array}{c|c}
\text{BENEFITS} & \text{BENEFITS} \\
\uparrow & \downarrow \\
\text{COSTS} & \text{COSTS}
\end{array}
\]
Integrated EE/Health Programs
Value Proposition for Utilities (1)

- Opportunity to coordinate home visit (health assessment & energy audit) could streamline program costs and leverage funds across health and EE industries.

- Existing integrated program implementation has been coordinated successfully between low income public programs (state or Federal) and a local hospital.
  - Integrating non-low income utility programs is more challenging, as is multi-family.
Customers care about IAQ in their homes/buildings. Integrated EE/Health Programs can help to:

- Engage customers
- Increase program participation
- Market program e.g., hospitals referrals to patients
- Increase program cost-effectiveness
- Inform regulators about health impact value to customers
Integrated EE/Health Programs
Challenges for Utilities

- How to incorporate potential resource or benefit sharing between multiple sources that are each highly regulated
- How to best operationalize shared funding between EE and health industry
- Liability concerns for utilities / HP contractors
- Privacy and security concerns (e.g., info regarding repeat emergency room visits)
National Standard Practice Manual
For Energy Efficiency Cost-Effectiveness

Prepared by
The National Efficiency Screening Project

Forthcoming May 18, 2017
## EE Program Cost-Effectiveness
### Accounting for Health-Related Impacts

<table>
<thead>
<tr>
<th>Non-Utility Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant impacts</strong></td>
<td>Impacts on program participants, includes participant portion of measure cost, other fuel savings, water savings, and participant non-energy costs and benefits</td>
</tr>
<tr>
<td><strong>Impacts on low-income customers</strong></td>
<td>Impacts on low-income program participants that are different from or incremental to non-low-income participant impacts. Includes reduced foreclosures, reduced mobility, and poverty alleviation</td>
</tr>
<tr>
<td><strong>Other fuel impacts</strong></td>
<td>Impacts on fuels that are not provided by the funding utility, for example, electricity (for a gas utility), gas (for an electric utility), oil, propane, and wood</td>
</tr>
<tr>
<td><strong>Water impacts</strong></td>
<td>Impacts on water consumption and related wastewater treatment</td>
</tr>
<tr>
<td><strong>Environmental impacts</strong></td>
<td>Impacts associated with CO₂ emissions, criteria pollutant emissions, land use, etc. Includes only those impacts that are not included in the utility cost of compliance with environmental regulations</td>
</tr>
<tr>
<td><strong>Public health impacts</strong></td>
<td>Impacts on public health; includes health impacts that are not included in participant impacts or environmental impacts, and includes benefits in terms of reduced healthcare costs</td>
</tr>
<tr>
<td><strong>Economic development and jobs</strong></td>
<td>Impacts on economic development and jobs</td>
</tr>
<tr>
<td><strong>Energy security</strong></td>
<td>Reduced reliance on fuel imports from outside the state, region, or country</td>
</tr>
</tbody>
</table>
Efficiency as a Resource

EE is one of many resources that can be deployed to meet customers’ needs, and therefore should be compared with other energy resources (both supply-side and demand-side) in a consistent and comprehensive manner.

| Policy Goals | A jurisdiction’s primary cost-effectiveness test should account for its energy and other applicable policy goals and objectives. These goals and objectives may be articulated in legislation, commission orders, regulations, advisory board decisions, guidelines, etc., and are often dynamic and evolving. |
| Symmetry | Cost-effectiveness practices should be symmetrical, where both costs and benefits are included for each relevant type of impact. |
| Hard-to-Quantify Impacts | Cost-effectiveness practices should account for all relevant, substantive impacts (as identified based on policy goals,) even those that are difficult to quantify and monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard-to-monetize impacts is preferable to assuming those costs and benefits do not exist or have no value. |
| Forward-Looking Analysis | Analysis of the impacts of resource investments should be forward-looking, capturing the difference between costs and benefits that would occur over the life of the subject resources as compared to the costs and benefits that would occur absent the resource investments. |
| Transparency | Cost-effectiveness practices should be completely transparent, and should fully document all relevant inputs, assumptions, methodologies, and results. |
Step 1: Identify and articulate the jurisdiction’s applicable policy goals.

Step 2: Include all the utility system costs and benefits.

Step 3: Decide which non-utility impacts to include in the test, based on applicable policy goals.

Step 4: Ensure that the test is symmetrical in considering both costs and benefits.

Step 5: Ensure the analysis is forward looking and incremental.

Step 6: Develop methodologies to account for all relevant impacts, including hard to quantify impacts.

Step 7: Ensure transparency in presenting the inputs and results of the cost-effectiveness test.

Includes health? If yes, then go to Step 4 to identify benefits, and then use Step 5 guide you on options for quantifying impacts.
### NPSM – Different Approaches to Account for All Relevant Impacts

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction-specific studies</td>
<td>Jurisdiction-specific studies on EE costs and avoided cost offer the best approach for estimating and monetizing relevant impacts.</td>
</tr>
<tr>
<td>Studies from other jurisdictions</td>
<td>If jurisdiction-specific studies are not available; studies from other jurisdictions or regions, as well as national studies, can be used for estimating and monetizing relevant impacts.</td>
</tr>
<tr>
<td>Proxies</td>
<td>If monetized impacts are not available; well-informed and well-designed proxies can be used as a simple substitute.</td>
</tr>
<tr>
<td>Quantitative and qualitative information</td>
<td>Relevant quantitative and qualitative information can be used to consider impacts that cannot or should not be monetized.</td>
</tr>
<tr>
<td>Alternative thresholds</td>
<td>Pre-determined thresholds that are different from one (1.0) can be used as a simplistic way to account for relevant impacts that are not otherwise accounted for.</td>
</tr>
</tbody>
</table>
Questions/Comments?
Developing the Workforce to Deliver Comfort, Health and Safety in E.E. Retrofits

Raising the Bar in Home Performance Contracting

Larry Zarker
BPI
LZarker@bpi.org
Some of the Things We Find During the Energy Audit
A Growing Asthma Epidemic in the U.S.

Of the 21.8 million people reported to have asthma in the U.S., approximately 4.6 million cases are estimated to be attributable to dampness and mold exposure in the home.
Asthma Prevalence Intensity in Children (0-17)
Tragedy of Lead

Prevent Childhood Lead Poisoning

The Impact

535,000
U.S. children ages 1 to 5 years have blood lead levels high enough to damage their health.

24 MILLION
homes in the U.S. contain deteriorated lead-based paint and elevated levels of lead-contaminated house dust.

4 MILLION
of these are home to young children.

It can cost
$5,600
in medical and special education costs for each seriously lead-poisoned child.

Visit www.cdc.gov/nceh/lead to learn more.
5,300 Water Systems Violate EPA Lead Rules

Affecting Nearly 18 Million People
Gas Leak Explosion Levels Home
The Indoor Air Quality Market Should Total $8.3 Billion in 2016 and $10.8 Billion by 2021

The indoor air quality market in the U.S. totaled $7.8 billion in 2015. The market should total $8.3 billion in 2016 and $10.8 billion by 2021, increasing at a compound annual growth rate (CAGR) of 5.3% from 2016 to 2021.

For more information please click on:
http://www.researchandmarkets.com/publication/mg23nzp/3877143
Researchers think the yearly cost of asthma in the United States is around $56 billion.

The direct costs make up almost $50.1 billion. Hospital stays are the largest part of that cost.

Indirect costs make up $5.9 billion. This includes lost pay from sickness or death and lost work output from missed school or work days.

In 2009, researchers found that the direct cost of asthma is about $3,259 per person each year.
Where are the HHE Business Opportunities?

Aging in Place Elderly Assessments to Prevent Trips and Falls

Asthma and Respiratory Infection Trigger Assessments in Homes

Post Surgery Recovery in the Home: A Greater Likelihood of Infection

Hospitals are penalized financially for repeat admissions, so they have an interest in keeping their customers well at home.

Aetna estimates a cost of $800 for emergency room visits and $8,800 for hospital stays.

CDC: Costs for falls to Medicare in 2015 totaled over $31 billion with a $30,000 cost for hospital stay.
Where are the HHE Business Opportunities?

Medicaid Starting to Reimburse for the Healthy Home Assessment

Utility Programs Focusing on Comfort, Health and Safety + E.E.

Eliminating Major Trip and Fall Hazards in Homes
Define Your Capabilities. Educate Your Audiences.

**Health Specialists**
- Local Allergy and Asthma Treatment Centers
- Immunologists
- Ear, Nose and Throat Specialists
- Pulmonologists
- Pediatric Physicians
- General Practitioners
- Local Hospitals (Community Investment)

**Local Government**
- Public Health Agencies
- Certified Lead Paint Abatement Contractor
- Licensed Mold Remediation Service Provider
- Become a Certified Radon Tester
- Federal/State Certification for Asbestos Remediation

**Educators**
- Provide Information to Parent/Teacher Associations

**Care Givers**
- In-home Nurses and Care Givers

**Real Estate Professionals**
- Realtors, Appraisers, and Inspectors
- Lenders

**Shows**
- Bridal Shows
- Pet Shows (differentiate from the home & garden crowd)

**Media**
- Provide Case Studies to Local TV, Radio and Newspapers
- Participate in Social Media Sites Relating to Health Issues
- Build a Strong Web Site with Credible Information
- Engage SEO/SEM and Lead Generation Consultants
Powerful Case Studies Build Credibility

Breathing Better

Vilandre Case Study: Our home is making us sick
2000 Built, 2 Story, 1600 sq ft, Family of 4

Assessment
A homeowner requested a full home assessment of air quality and energy efficiency after feeling that her home was contributing to chronic illness in her family of four. The family wanted to open their windows for fresh air, but couldn't because heavy smoke from a neighbor with wood burning stoves. The whole family was suffering from respiratory issues.

- Asthma: Two people were on medications, including a form of steroids. The other two family members were showing the beginning signs of asthma.
- Allergies: Family members would frequently wake with sneezing attacks in the middle of the night.
- Dry throats & itchy eyes: The family would wake in the morning with dry sore throats and scratchy eyes.

Wearing a Coat in the House

Tiedt Case Study: Wearing a Coat in the House

Assessment
Karen Tiedt was cold in her own home and her energy bills were very high. When Karen invited friends over to eat or play cards, they would often be forced to keep their coats on inside the house. Karen's home relied on baseboard heaters, which are a very inefficient way to heat a home, and her utility bill was high.

Despite raising the baseboard heaters to the maximum settings, her home was drafty and cold. Then, one winter, the units stopped working altogether.

Karen called the team at Revival Energy.

Customer Testimonial - Karen T
A “Two Inhaler” Family Case Study

Source: Revival Energy Group
Healthy Home Evaluator Certification

• The Healthy Home Evaluator micro-credential builds upon the knowledge of the certified BPI Building Analyst, the BPI Energy Auditor, the BPI QC Inspector, or the Multi-family Building Analyst by establishing the competencies required to conduct an in-depth healthy home environmental risk assessment.

• The Healthy Home Evaluator assesses and characterizes home-based environmental health and safety hazards by integrating qualitative observations with quantitative diagnostics to determine and prioritize recommendations that address existing and potential hazards.

• The Healthy Home Evaluator communicates the identified risks and hazards to the occupant with the goal of improving health and quality of life.

Created in partnership with the Green & Healthy Homes Initiative (GHHI)
Help Break the Link Between Unhealthy Housing and Unhealthy Families: Earn the Healthy Home Evaluator (HHE) Credential

www.bpi.org/hhe
Curriculum Development and Train-the-Trainer

- Development of a model curriculum for trainers to use in preparation for the Healthy Home Evaluator exam
- Piloted in Kansas City through Children’s Mercy Hospital
- A Master Trainer session with 4-6 individuals completed in December
- A Train-the-Trainer initiative is underway to bring the curriculum to the BPI Test Center network of over 135 training organizations
- First TtT session held with 17 Test Centers in Toledo, OH in January
- The HHS curriculum is now available for use by BPI Test Centers and the HHS Training Network
- A live online Train-the-Trainer session was held on April 20 and 21

Led by Healthy Housing Solutions with funding support from the U.S. Department of Housing and Urban Development
Announcing....

www.healthyhomeenvironment.org/
Get a Healthy Home Evaluation ASAP!
Discussion? Questions? Ideas?

Please contact:
Larry Zarker, CEO
Building Performance Institute
lzarker@bpi.org
(202) 256-3893 (direct)
Coming Soon: Part 2 Breakouts

- Break out audience by topic:
  - Value of Healthcare-EE Integration to Stakeholders
  - Workforce Development
  - Policy & Regulatory Environment
  - Developing Access to Funding
- Topics explored based on:
  - Stakeholder views
  - Implementation strategies
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