LOW-INCOME NON-ENERGY IMPACTS OF EE

Massachusetts Energy Efficiency Advisory Council
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DRAFT 070116
LOW-INCOME NON-ENERGY IMPACTS OFEE

• Describe NEIs
• List NEIs
• Health NEIs
• Health NEIs in Mass.
• Program impacts
Non-Energy Impacts?

- F/K/A Non-Energy Benefits (NEBs)
- “Non-electric benefits shall account for those benefits that are specific to Program Participants and shall be comprised of the following: (i) Resource benefits, which account for the avoided costs of natural gas, oil, propane, wood, kerosene, water, and other resources for which consumption is reduced as a result of the implementation of an Energy Efficiency Program. Resource benefits shall be calculated as the product of: (A) the reduction in consumption of the identified resource and (B) the avoided cost factor for each resource. (ii) Non-resource benefits, which include, but are not limited to: (A) reduced costs for operation and maintenance associated with efficient equipment or practices; (B) the value of longer equipment replacement cycles and/or productivity improvements associated with efficient equipment; (C) reduced environmental and safety costs, such as those for changes in a waste stream or disposal of lamp ballasts or ozone-depleting chemicals; and (D) all benefits associated with providing energy efficiency services to Low-Income Customers.”

DPU 11-120-A, Phase II, Energy Efficiency Guidelines (2013), sec. 3.4.4.1(b), gas at sec. 3.4.4.2(b).
Non-Energy Impacts (TRM Apdx C)

- Annual (discounted as avoided costs) or one-time, some by consumption unit
- Residential include:
  - Comfort, Noise reduction
  - Home durability, equipment maintenance
  - Property value
  - Light quality
- Low-income include above plus:
  - Safety
Non-Energy Impacts, cont’d

• C & I include:
  – Labor costs
  – Material handling & movement
  – Administrative costs
  – O & M
  – Product spoilage
  – Rent & sales revenue
  – Waste disposal

• Almost all NEIs based on studies by NMR Group (res., 2011) and DMV KEMA and Tetra Tech (C&I, 2012)
Needed:

• A better estimate of health benefits from energy efficiency.

There has been much work identifying health benefits in the US, but without monetizing them.
Overview of WAP Evaluation Products (Three Cubed)

**Energy Savings and Cost Effectiveness**
- Single-Family
- Mobile Homes
- Large Multifamily (NYC & national)
- Under-and Over-Performers Study
- Sustainable Energy Resources for Consumers Grant
- Others
  - Territories
  - Refrigerators
  - AC Pilot

**Co-Benefits**
- **Health & Household Related**
  - Washington State Asthma Study
  - Emissions Reductions
  - Indoor Air Quality Study
  - Macro-Economic Impacts
  - Social Network Assessment

**Process Assessments**
- National Occupant Survey
  - Energy Behavior
  - Health Condition
  - Home Condition
  - Budget Issues
- 15 Case Studies of Local Weatherization Agencies
- Weatherization Innovation Pilot Program Evaluation
- Others
  - Program Characterization
  - Field Process Study
  - Deferral Study
  - Surveys of Wx Staff, Trainees, Training Centers

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WAP Health & Household NEI Study
(Source: Three Cubed)

- Explored health & household NEIs of ‘traditional’ weatherization (i.e., installation energy conservation measures (ECMs) and non-ECMs)
- Conducted nationally representative pre- and post-weatherization (Wx) Occupant Survey (n= > 600), plus a comparison group (n= > 800)
- Monetized subset of benefits using combination of survey results, measures installed, medical databases, and other valuable secondary sources
- Grouped in tiers based on strength of data and methodology (1=strongest)

WAP Monetized Non-Energy Impacts

Included in this Supplemental Study
- Reduced Asthma
- Reduced Thermal Stress - Cold
- Reduced Thermal Stress - Hot
- Fewer Missed Days of Work
- Reduced CO Poisoning
- Increased Home Productivity
- Reduced Home Fires
Tailoring the National WAP Study to MA (Three Cubed)

• 1) Evaluated a subset of the NEIs monetized from the national WAP – Those with household benefits.

• 2) Except for asthma, apply the WAP results from households surveyed in the Cold Climate Region (MA, NY, CT, PA, OH, IN, IL, IA, and ME)
  – Larger, more robust sample size was used for asthma NEI given asthma prevalence does not vary significantly by climate region
  – Not all results are statistically significant – therefore, other lines of evidence (e.g., literature review, NMR study) used to substantiate application of derived NEIs for MA

• 3) Adjust national medical, wage, and other costs to MA and year 2014, apply LI population statistical data for MA

• 4) Recategorize avoided death benefit as a household benefit instead of a social benefit [as now in Mass.; only applies to Thermal Stress, CO, Fire]
<table>
<thead>
<tr>
<th>Key Measure</th>
<th>NEI Category</th>
<th>2011 NMR Analysis</th>
<th>2016 Three^3 Analysis</th>
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<td>Health and Safety</td>
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Comparison of Low-Income Health and Safety NEIs, by Key Measure – Preliminary, NMR/3 Cubed consensus ($/installed measure, per year)
Ralph Prahl:

• Due to **stronger methodology**, new study probably captures some health effects that 2011 MA study was unable to capture

• 2011 study depended on **participants’ ability to recognize and report health effects**, but new study does not

• New study able to incorporate estimates of lives saved – One key result is greatly **increased estimates of health benefits from reduced hypothermia and hyperthermia**
SUMMARY

• Wx $10.46 > $464.18 OR 44X

• HS $50.32 > $242.73 OR 4.8x
  – MANY MORE ASHPs COST-EFFECTIVE

• These values, while rigorously reviewed by PAs and evaluation consultants, are preliminary. They remain subject to finalization pursuant to the EM&V Framework.
POSSIBLE IMPLICATIONS: MEASURES

• PROGRAM MUCH MORE COST-EFFECTIVE
  – BROADER RANGE OF AIR SOURCE HEAT PUMP SITES
    * EXPANDED LEAN LEADERSHIP
  – MORE PRE-WEATHERIZATION REPAIRS?
  – OTHER MEASURES, WITH CAUTION
POSSIBLE IMPLICATIONS: OPERATIONS

- May require expansion of contractor infrastructure for specific measures. (Not a program design change.)

- Since the population served is low-income households, by definition without financial liquidity, reserve for repair of long-lived measures may be required -- accounted for in cost-effectiveness calculations, of course.
POSSIBLE IMPLICATIONS: FUNDING

• Ralph Prahl's policy question: Given the outsized role of health effects in program benefits, should we be seeking additional funding from health sector?
• Governance issues?
• More health-related measures, such as bi-level lighting to help prevent trips and falls?
• With same budget, a much broader scope of measures is possible.
For more information

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