**Illinois Statewide**

**Technical Reference Manual**

**for Energy Efficiency**

**Attachment B**

**Illinois Statewide**

**Non Energy Benefits**

**Methodologies**

**DRAFT**

**Effective for Evaluation:**

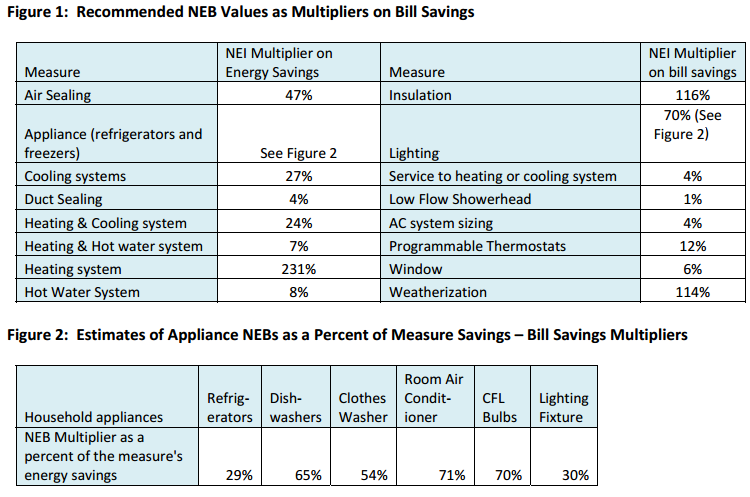
**June 1st, 2016**

# Residential Whole House Retrofit Non Energy Benefits

Figure 3 below represents Technical Advisory Committee (TAC)-approved multipliers to first year kWh or Therm savings to determine a lifetime net present value (NPV) of Non-Energy Benefits (NEBs) for measures in a Residential whole house retrofit program. This additional benefit should be added to the Energy benefits and applied in the Cost Effectiveness Tests.

The values are based upon a workpaper produced for the Illinois Technical Advisory Committee by Skumatz Economic Research Association*; Skumatz Lisa A., 2015, Considering the Inclusion of NEBs in IL TRM for Single and Multi-family Whole Building Retrofit Programs: The Issue of Measure-Based NEBs.*

The study examined literature from across the nation and found “consistency in some NEB categories, sufficient to indicate strong NEB values and attribution to some measures”. The ultimate recommendation was to base Illinois NEB values for whole house Retrofit program measures on an evaluation prepared for Massachusetts Program Administrators; *NMR Group, Inc., Tetra Tech (2011).* *Massachusetts Special and Cross-Sector Studies Area, Residential and Low-Income Non-Energy Impacts (NEI) Evaluation*. This study, itself based upon in-depth participant surveys and extensive literature review, was found to be robust and provides measure attribution and total non-energy benefits values consistent with other studies. Table 9-10 from this study provides the attribution of NEB values to energy efficiency measures through a whole house retrofit program and the values are summarized below in Figure 1. Note that two exceptions, appliances and lighting, are provided, where the recommendation was to instead use work performed in *Skumatz, Lisa A., 2004, Non‐Energy Benefits from ENERGY STAR®: Comprehensive Analysis of Appliance,Outreach, and Homes Programs, Proceedings of the 2004 ACEEE Summer Study, Asilomar, CA, August.* Figure 2 below provides these additional values, noting that the 2004 study results for lighting are further refined to remove impacts from longer measure lives and operation and maintenance (O&M) savings due to those already being accounted for in the TRM measures themselves.



Upon review, NRDC amended their proposal by requesting the removal of the lighting adders at this time stating that they believe “there is empirical evidence to suggest that there are lighting NEBs beyond those associated with either the environmental benefits and longer measure life than incandescents/halogens (which translates to O&M savings).  Lisa’s 2004 ACEEE paper makes that clear.  However, it is also true that environmental benefits and lifetime/O&M benefits, both of which are already captured in either avoided costs or the current TRM assumptions, are the biggest of the lighting NEBs”.[[1]](#footnote-1)  Lighting assumptions have therefore been removed from the following table.

To turn the percentage multipliers of bill savings from the tables above into a single lifetime NPV NEB adder per first year kWh or Therm, VEIC used the appropriate measure lifetime assumptions in the TRM and an average Electric and Therm residential retail rate (derived from Electric and Gas Sales Statistics documents published on the Illinois Commerce Commission website[[2]](#footnote-2)) to calculate the following factors[[3]](#footnote-3):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Figure 3: For measures in whole house retrofit program only** | | | | |  |
| To calculate a *single NPV* non-energy benefit, multiply the first year annual kWh or therm savings by: | | | | |  |
|  | | | | |  |
| **Electric Saving Measures** | **$/First year kWh** |  |  | **Gas Saving Measures** | **$/First year Therm** |
| Airsealing | $0.53 |  |  | Airsealing | $4.21 |
| Refrigerators | $0.28 |  |  | Dishwashers | $5.28 |
| Dishwashers | $0.66 |  |  | Clothes washers | $4.62 |
| Clothes washers | $0.58 |  |  | Duct Sealing | $0.43 |
| Room AC | $0.68 |  |  | Heating & Hot Water system | $0.85 |
| Cooling Systems | $0.34 |  |  | Heating System | $24.74 |
| Duct Sealing | $0.05 |  |  | Hot Water system | $0.65 |
| Heating & Cooling system | $0.30 |  |  | Insulation | $14.00 |
| Heating System | $2.92 |  |  | Service to heating or cooling | $0.06 |
| Hot Water system | $0.08 |  |  | Low Flow Showerhead | $0.07 |
| Insulation | $1.76 |  |  | Programmable Thermostat | $0.45 |
| Service to heating or cooling | $0.01 |  |  |  |  |
| Low Flow Showerhead | $0.01 |  |  |  |  |
| Programmable Thermostat | $0.06 |  |  |  |  |

# Commercial Retrofit Non Energy Benefits

For Commercial Retrofit programs, the following annual non energy benefits (NEBs) were approved through the TAC process. These are based upon another Massachusetts study: *KEMA, Inc, 2012, Massachusetts Program Administrators Final Report – Commercial and Industrial Non-Energy Impacts Study.*

VEIC reviewed this study and confirmed that it was appropriately based upon participant benefits and not societal benefits (so carbon emissions were not included), and that water impacts were also handled separately (so as not to double count water savings claimed through the TRM). The values proposed in this study, however, did include O&M benefits, and so the appropriate O&M percentages of total (also provided in the study in tables 4-7 and 4-12) were removed for those measures where these O&M impacts are already being accounted for directly in the TRM (namely lighting and CHP). The resultant values are provided in Figure 4 below:

|  |
| --- |
| **Figure 4: For measures in C&I Retrofit or Direct Install program only** |
| To calculate the *annual* non-energy benefit, multiply the kWh or therm savings by the following multiplier  for each year within the measures lifetime: |

|  |  |  |  |
| --- | --- | --- | --- |
| **Fuel** | **Program** | **Measure/End Use** | **Annual $ NEB / kWh** |
| Electric | C&I Large Retrofit or Direct Install | Rx Lighting | $0.01 |
| Rx HVAC | $0.10 |
| Custom HVAC | $0.02 |
| Custom Lighting | $0.02 |
| Refrigeration | $0.05 |
| Other | $0.06 |
| CHP | $0.01 |
|  | | | |
| **Fuel** | **Program** | **Measure/End Use** | **Annual $ NEB / First year Therm** |
| Gas | C&I Large Retrofit | Boiler Reset Controls | $1.35 |
| Steam Traps | $1.35 |
| Thermostats | $1.35 |
| Custom | $0.25 |
| C&I Direct Install | Thermostats | $1.35 |
| Duct Insulation | $1.35 |

Refining the Non Energy Benefit values presented above and the determination of appropriate values for additional measures should be an area of focus for future evaluation and discussion.

1. Email to TRM administrator from Chris Neme, 10/22/2015. [↑](#footnote-ref-1)
2. <http://www.icc.illinois.gov/publicutility/salesstatistics.aspx?type=e> [↑](#footnote-ref-2)
3. See ‘Residential Whole House Retrofit NEB factor calculator.xls’ for more details. [↑](#footnote-ref-3)