

Non-Energy Benefits (NEBs) Modeling – A Comprehensive Analysis Tool Valuing NEBs For Commercial, Residential, and Other Programs

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Significant progress has been made in the measurement of non-energy benefits (NEBs), as well as in the recognition and use of these benefits in planning, marketing, and evaluating programs. The authors reviewed hundreds of reports and studies, assembled the best available primary and secondary data, and assessed a wide array of quantification approaches to develop a flexible spreadsheet modeling tool that estimates NEBs for more than 40 individual benefits categories. The model allows the authors to compute tailored estimates of NEB values associated with variations in an array of program and scenario settings. The model is built up from work undertaken during 13 projects for 10 utilities covering 15 residential, non-residential, commissioning, traditional, and MT programs. The work incorporates data from more than 1,500 surveys, 350 evaluation, environmental, and other reports, and interviews with 35 experts – and assembles all the data, references, and documented computational methods into one tool. The model estimates benefits valued from three different perspectives:

- **Utility / ratepayer:** including savings in carrying arrearages, write-offs, labor (fewer calls), and other savings, valued using utility labor cost and financial assumptions.
- **Societal / economic / environmental:** including benefits in reduced emissions, job creation, and other societal benefits, valued using societal and public goods assumptions.
- **Participant:** including bill savings from other utilities (if relevant), improved comfort or productivity, improved property value, lower maintenance, and other benefits depending on whether the participant is commercial or residential. These are estimated using participant valuation assumptions.

The participant-side NEB valuations in the model are based on three measurement methods we developed and adapted, including willingness to pay, relative valuation, and state-of-the-art scaling techniques. The model incorporates results from numerous surveys with residential and commercial participants / decision-makers, and adapts participant valuations based on key assumptions.

The model computes the individual NEB value estimates for the utility, societal, and participant perspectives based on variations in scenario settings, including:

- Program type including weatherization, education, loan, rebate, commissioning, and others.
- Customer target sector including residential, low income, commercial / industrial, or sub-sectors.
- Program measures or interventions included.
- Utility / area, generation fuel type, climate, and other characteristics.
- Included and excluded NEB benefits categories.
- Financial assumptions, including discount rates, etc.

The model reduces the time involved in computing NEBs and streamlines data collection / analysis efforts; organizes computations; and allows simple and clear re-computations of NEBs, PV, and B/C ratios based on changes in input assumptions. Results are presented in tables, graphs, and pie charts. The work not only supports estimates of NEBs, but quick assessment of value ranges and sensitivity of results to input assumptions and variations in estimation method. The results allow users to 1) quickly assess the impacts of program and other assumptions on the computation of benefits; 2) design programs to maximize all or subsets of benefits; 3) present more inclusive assessments of costs and benefits; 4) help identify target customers for marketing and outreach; and 5) inform program marketers of the types of benefits valued by participants – which can provide information for a more

persuasive message for program outreach than asking for participation on the basis of efficiency or bill savings alone.