

CT Non-Energy Impacts R1709

November 2, 2017

Presentation Overview

- Research Questions
- Research Tasks
- Detailed Task Review
- Deliverables and Schedule
- Discussion

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Research Questions

- What is CT's current NEI approach?
- What are the NEIs that should be included in CT C&LM research?
- What is the current state of the art for measuring each of these NEIs both nationally and regionally?
- Where and how are the NEIs used in calculating the cost-effectiveness of energy efficiency programs?
- How has the inclusion of NEIs impacted energy efficiency programs across the U.S.?
- What are the best available estimates of the NEIs for CT programs and measures?

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Research Questions Continued

- Which CT programs, measures, or NEI categories do not have defensible estimates?
- How can these NEIs be measured in this current study or in future studies?
- What NEIs should be considered for incorporation in future CT evaluations?
- What questions should be included in CT C&LM surveys to provide estimates of NEIs?
- How well does a test of this survey approach work in CT for a priority program or measure gap?

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Research Tasks



1. Kickoff Meeting
2. Literature Review
3. NEI Values Database
4. CT-Relevant NEI Values/Ranges
5. Survey Design, Instruments, and Analysis Plan
6. Primary Data Collection
7. Data Request
8. Reporting

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Literature Review Non-Energy Impacts



<u>Residential Benefits</u>	<u>C&I Benefits</u>
<ul style="list-style-type: none">• Economic• Environmental• Indoor Air Quality• Health & Safety• Home Comfort• Affordability• Property Value• Water Usage• O&M Expenditures• Others identified in lit review	<ul style="list-style-type: none">• Economic• Environmental• Office Air Quality• Office Comfort• Water Usage• O&M Expenditures• Labor Costs (eg, bulb changes)• Sales increase (eg, better lighting or public image)• Rent revenue• Others identified in lit review

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LITERATURE REVIEW



Literature Review Scope



- State-of-the-Art Methodologies
- Residential and C&I Programs
- Connecticut – current approach
- Northeastern Region (begin with MA research)
- United States
- International

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Literature Review Inclusion Requirements



- Only include studies if we can determine:
 - Data: What data were used as inputs?
 - Assumptions: What simplifying assumptions were made?
 - Methodology: How were the impacts calculated?
 - Limitations: What are the limitations of the study?
 - Applicability: Who do the estimates represent and can they be extended to other jurisdictions?
 - CT Application: Can these estimates be applied to CT programs? What refinements would be needed?

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Literature Review Summary Memo



- Content
 - Research conducted
 - Studies included
 - Findings
 - Range of values for CT
 - By fuel, program, measure
 - Gaps in information
- Draft memo
- Review comments and questions
- Deliver final memo
- Note: There may be multiple reviews / versions

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NEI VALUES DATABASE



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NEI Values Database Content



- User-friendly Excel spreadsheet
- Variables Included
 - Sector, Program, Measure
 - NEI values
 - NEI ranges
 - NEI sources
 - Assumptions made
 - Data used
 - Rigor of estimate (scale)
 - Confidence in values

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NEI Values Database Deliverable



- Draft Database
 - Internally documented
 - User-friendly
- Review and Comment
- Final Database
- Note: There may be multiple reviews / versions

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NEI Values Database Scope



- Use NEI Database
- Adjust values for CT if warranted
- Potential adjustments
 - Temperature: If different climate than CT, NEIs affected by temp extremes may need adjustment
 - Fuel Mix: If different heating fuel distribution than CT, environmental impacts may need adjustment
 - Economy: Economic multipliers for CT may differ substantially, so the economic impacts may need adjustment

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CT-RELEVANT NEI VALUES



CT Database Deliverable



- Draft Database
 - Internally documented
 - User-friendly
- Review and Comment
- Final Database
- Note: There may be multiple reviews / versions

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DETERMINING PROGRAM/MEASURE FOR SURVEY

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SURVEY DESIGN, INSTRUMENTS, AND ANALYSIS PLAN

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Survey Selection Factors

- Selection determined after lit review and database creation
- High priority program or measure
- Data not available in lit review – most important gap
- Or measure with benefit/cost ratio close to 1
- Needed for program/measure decision
 - Whether to include measure
 - Level of measure incentive

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Survey Design Plan

- Goal
 - Identify & Quantify CT NEIs
 - When not otherwise available, survey is needed
 - Or may need information to adapt secondary data
 - Allow for incorporation in future CT studies

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Economic Benefits Analysis



- Macroeconomic effects can be calculated using economic multipliers
 - Multipliers vary by program expenditure category
- Compare the multipliers for the industries most impacted by the CT program to those that would have been affected in the absence of the program
- Multipliers from the Regional Input-Output Modeling System II (RIMS-II) produced by the Bureau of Economic Analysis (BEA)

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Environmental Analysis



- *Energy Usage Reductions by Fuel Type*: Use electric and gas savings from recent impact analysis
- *Quantity Avoided Emissions by Pollutant*: Use public data to estimate the emissions avoided
- *Value of Avoided Emissions by Pollutant*: Use Air Pollution Emission Experiments and Policy (APEEP) Model to estimate dollar value

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Survey Deliverables



- Draft Analysis Plan
 - Sampling Plan
 - Designed to address key measures
 - Information can be used to augment measure decisions
 - Survey Design
 - Survey Instruments
 - Analysis Methods
 - NEI Computation Methods
 - NEI Inclusion in Benefit-Cost Analysis
- Template Residential survey instrument
- Template C&I survey instrument
- Review and Comment
- Final Analysis Plan
- Note: There may be multiple reviews / versions

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PRIMARY DATA COLLECTION



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Survey Materials



- Submit Draft
 - Data Request
 - Sampling & Analysis Plans
 - Mapping from questions to analysis
 - Survey Instrument
 - May test different methodologies or measurements
- Review and Comment
- Submit Final Versions
- Note: There may be multiple reviews / versions

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Survey Methodology



- Dependent on program/population selected
 - Note: selection will occur following completion of CT-Relevant NEI Values/Ranges
 - Also based on discussion with tech consultant & utilities
 - Research will provide information on most important gap
 - Or measure considered for elimination
- Postcard/web and/or telephone design
- Minimum 90/10 confidence level

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Survey Response



- Strategies to maximize response rate
 - Program participants over the past 6 months – 1 year
 - But need enough time to experience impacts
 - 10-15 minute maximum length
 - Survey pre-test
 - Initial advance letter (on utility stationery if possible)
 - Follow-up survey reminder letter or postcard
 - Phone may be needed
 - 12 telephone calls
 - Minimum three-week survey period
 - Day, evening, and weekend calls
 - Optional call-in number provided in the advance letter
 - Small participant incentive if acceptable to CT EEB

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Survey Implementation



- Select High-Priority Program/Measure
- Conduct Survey
- Clean & Process Data
 - Ensure mandatory questions are answered
 - Ensure skip patterns are followed (web/phone which would automate those checks)
 - Range and logic checks conducted
- Weight Survey Data

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Survey Deliverables



- Database
 - Customer id removed
 - NEI data provided
 - Available in requested format
- Database Walkthrough
 - For likely users & technical consultant
- Draft Report
- Review and Comment
- Final Report
- Note: There may be multiple reviews / versions

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Reporting Requirements Report Content



- Abstract
- Executive Summary
- CV/Error Ratio
- Direct link to PSD
- Context / comparison to previous reports & other similar programs

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REPORTING



Reporting Requirements Research Report



- Draft Research Report
 - Research Conducted
 - Lit Review Findings
 - NEI Database Information
 - Proposed Approach for NEIs
 - Summary of Survey Findings
 - Appendix: Detailing of data issues encountered
- Review and Comment
- Final Report
- Note: There may be multiple reviews / versions
- Present Findings

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DATA REQUEST

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Data Request Plan Program Data

- Program Expenditure Data
 - By Program
 - By Category
 - Admin
 - Marketing
 - Implementation
- Participants: Number of Participants
- Needed to compute economic benefits

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Data Request Plan Energy Savings Data

- All Requested at Program Level
 - Average Annual Energy Savings (gas and electric)
 - Measure Life
 - Needed to compute (per participant) economic & environmental benefits
 - HES-IE savings needed to compute affordability benefits
 - Number of Participants
 - Needed to compute total economic and environmental benefits
 - Benefit Cost Scores
 - Needed to assess which program to target for primary data collection
 - May prioritize program with ratio close to 1

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Data Request Plan Home Safety Issue Data

- HES/HES-IE and HVAC Program Data
- If they have information on the home safety issues that were identified during the audit or resolved during the measure installation visit(s)
- For use in health and safety impact analysis

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Data Request Plan Participant Data



- Request will come at later point, once target program is selected
- Data that will be requested
 - Contact information
 - Relevant program data

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DELIVERABLES AND SCHEDULE



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Deliverables and Schedule



Task	Week	Task	Week
1: Kickoff Meeting & Refined SOW	2	6: Data Collection and Estimation	
2: Lit Review, Best Practices, and Use		Draft Data Request	30
Draft Memo	8	Final Data Request	32
Final Memo	12	Draft Sampling and Analysis Plan Memo	32
3: NEI Values Database		Final Sampling and Analysis Plan memo	36
Draft Database	16	Draft Survey Instrument	32
Final Database	20	Final Survey Instrument	36
4: CT-Relevant NEI Values/Ranges		Database	42
Draft Database	22	Database Walkthrough	42
Final Database	22	Draft Report	44
Walkthrough Results	26	Final Report	48
5: Survey Design, Instruments, & Analysis Plan for CT NEIs		7: Reporting	
Draft Instrument & Analysis Plan	26	Draft Report	44
Final Instrument & Analysis Plan	30	Final Report	52
		Presentation	52