



X1942 Non-Energy Impacts Study

Scoping with EA Team (Kickoff Draft)

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NMR Group, Inc.

Objectives

- Provide data and analyses to quantify NEIs for important residential and commercial programs and measures
- Fill gaps / provide NEIs missing from PSD or not used in C/E testing
- Build on previously accepted values and methods using defensible, transparent methods
 - Also develop template surveys & calculations for expansion to additional programs and measures
- Provide supportive information for CT Test review as appropriate and prepare for direction changes
 - Provide information for support of program review / refinement
- Identify next NEI research priorities

Background

- CT has been considering changes in C/E tests
 - Order #2: *The Companies are directed to include all NEIs in Appendix 6 of the PSD in the TRC test applied to programs and copays for customers who are low-income.*
- Appendix 6 of PSD includes LI and other NEIs:
 - NEIs for residential and C&I included but not currently used
 - Gaps in low income, residential, and C&I NEIs
- Project works to provide CT-specific NEI values to fill Appendix 6 gaps and support common directions for potential changes / updates in C/E tests
 - Participant focus because participant supports potential moves to PCT, TRC, SCT; project focuses on primary data collection

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Background: Appendix 6 of PSD

Table A6-1: Residential Non-Energy Impacts (Ref [2])

	HES	HES-IE	Rebate	MF
Comfort	0.25	0.17	0.31	0.14
Outside Noise	0.04	0.05	0.06	
Appliance Noise	0.05	0.06	0.15	
Maintenance	0.07	0.08	0.18	0.15
Home Value	0.12	0.07	0.24	0.09
Home Appearance	0.03	0.06	0.04	
Home Safety	0.05	0.07	0.05	0.21
Lighting Quality	0.08	0.14		
Complaints	0	0	0	0.08
Total	0.69	0.70	1.03	0.67

- HES-IE are the only NEIs applied in the TRC test
- Remainder available, but currently informational (program design, outreach, factsheets, marketing, etc)

A6-2: Commercial & Industrial Non-Energy Impacts (Ref [3])

NEI Category	NEI Dollar Impacts for Business and Energy Sustainability Programs (\$/source MMBtu Savings)		
	PRIME	O&M	RCx
Fuel oil, propane, and wood	N/A	N.D.	\$0.15
Fresh potable water supplies	N/A	\$0.06	\$0.82
Labor Requirements or Labor Associated Costs	\$153	\$0.42	N/A
Equipment Operations and Maintenance	N.D.	N.D.	\$0.53
Materials or Other Supply Needs	N.D.	\$1.47	(\$1.74)
Product Spoilage	N/A	\$0.44	N/A
TOTAL	\$153	\$2.39	(\$0.23)

Recent CT Research

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R4 (NMR)

- Estimated the HES/HES-IE/Rebates/MF NEIs included in Appendix 6 & used for HES-IE
 - Comfort
 - Appliance and outside noise
 - Maintenance
 - Home value and appearance
 - Home safety
 - Light quality
 - Ability to pay energy and other bills
 - Illnesses

HES-IE values
applied in TRC

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Recent CT NEI Research

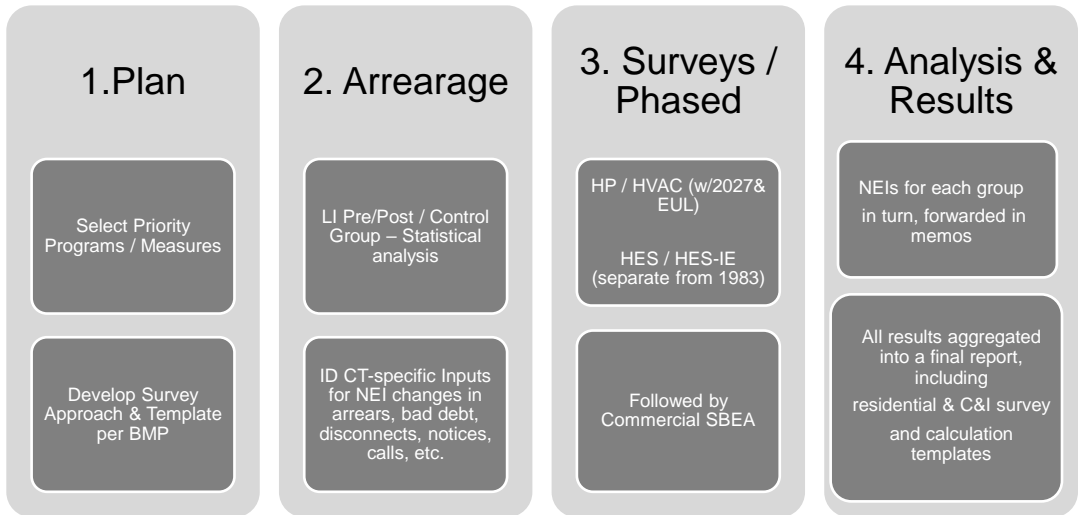
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R1709 (APPRISE), NEI Literature Review/Update

- Recommended quick, literature-based NEI values for noise and comfort for weatherization programs (not currently used)
- Recommended studying
 - Medical and health
 - Affordability
 - Arrearages
 - O&M
 - Water
 - Economic and environmental
- Not recommended as study priorities
 - Safety
 - Property value

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Tasks



Summary of Surveys



- Worked with the EA Team to identify priority measures / NEI gaps
 - Based on savings, gaps, programs, past NEI study recommendations
 - Measures of strategic focus in the 2019-21 Plan
 - Ability to leverage existing studies, such as R2027 (Res HVAC – heat pumps)

Surveys		Preliminarily Identified Measures
Res HVAC	Heat pumps	MSHP, Central ASHP, GSHP, HPWH
	Other HVAC	Boiler / furnace and CAC
HES / HES-IE	HES	Insulation, air sealing, and lighting
	HES-IE	Insulation, air sealing, lighting, and refrigerators
Commercial	SBEA	Looking into measures; similar study in the field in Massachusetts that is about 6 months ahead in the study process

BMP for Survey-Based NEIs



- Building on BMP used in literature and previously used for CT NEIs estimated in R4 (and currently in use)
- Basics – positive / negative and NTG (not take credit for NEIs not attributable to program)
- Sampling by measure, to develop measure-specific NEIs
 - Causal / measure link more appropriate, adaptable to program refinements / evolution (measure mix, and potentially demographics, etc.) over time
- NEIs relative to what would have been put in place / baselines important
 - Early replacement (ER) vs. Replace on Failure (ROF)
- Ask about total, combined NEI values
 - Account for potential overlap among NEIs

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NEIs Categories



Category ¹	HP & HVAC survey	HES / HES-IE survey	Arrear. Analysis	Commercial survey
Comfort	✓	✓		✓
Equipment reliability	✓	✓		✓
Equipment maintenance / O&M	✓	✓		✓
Equipment noise	✓	✓		✓
Health (various)	✓	✓		TBD
Ability to sell / rent	✓	✓		✓
Ability to pay	✓	✓		✓
Appearance	✓	✓		TBD
Safety	✓	✓		TBD
Missed work / school	✓	✓		
Interior / exterior noise	✓	✓		TBD
Light quality / failure		✓		TBD
Water bills	✓ (HPWH)			
Frequency of fuel deliveries	✓			TBD
Others	TBD	TBD		TBD
Arrearage, payment, etc.			✓	

¹ Includes collecting demographic data of program participants

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Survey NEI Analysis

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- Survey-based NEIs - Questions
 - Surveys ask respondents to compare the value of the NEI to expected energy savings
 - Labelled magnitude scale (LMS) - (e.g., less valuable, about the same value, more valuable)¹
 - These labels translate to numeric multipliers to calculate valuation – from within-sample or academic
 - Survey asks NEI as percent of expected energy savings for a randomized subset of NEIs
 - Minimize respondent burden
 - Includes questions to account for possible overlap among the NEIs
- Survey-based NEIs – Analysis
 - Convert LMS labels to % multipliers using responses
 - For each measure NEI, compute average % multiplier
 - Multiply times energy savings to calculate \$ NEI values

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Arrearage Data & Analysis

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Data:

- HES-IE participants and non-participants from 2017-2018 – pre/post/control group
 - Program participants & non-participants
 - Minimum 1-year post-participation billing & payment data including arrears, bill-payment, notices, etc.
 - Conduct from Q2 to Q3 2021

Low Income Arrearage Analysis:

- Pre/post/control group statistical comparisons for incidence & financial changes attributable to program
- Utility- and some participant-perspective NEIs (valuation differences)

Arrearages	Terminations / reconnections
Bad-debt write-offs	Late payments
Customer calls & collections	Notices
Safety-related emergency calls	Possible moving, other depending on data

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Deliverables



- Recommendations for PSD – released as completed and accumulated into final report
 - Heat Pump – Residential, June 2021 (interim memo)
 - Other Measures - Residential, August 2021 (interim memo)
 - Commercial, October 2021 (in report)
- Comprehensive report, including recommendations and detailed appendices
 - Draft, October 2021
 - Final, December 2021
- Includes survey templates for future CT work
 - Residential and commercial
 - Required databases with documentation
- Final presentation, December 2021

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Budget



Task	Budget
Planning & survey development / approach	\$24,000
Arrearage analysis	\$51,000
Data collection / surveys (5 groups)	\$176,000
Request and clean data	\$29,000
Analysis, templates and reporting	\$45,000
Total	\$325,000

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