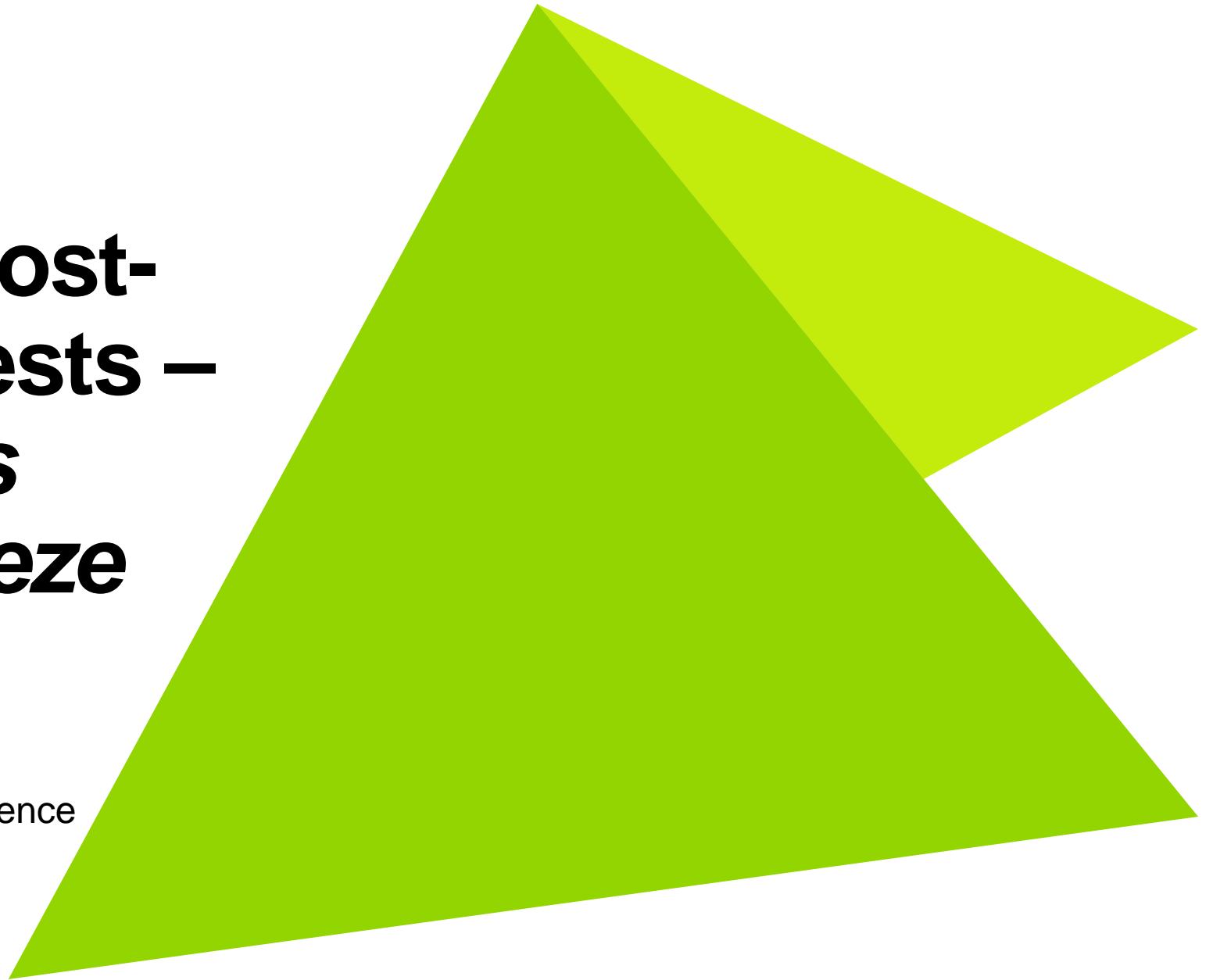




ComEd NEI Research and Cost- Effectiveness Tests – *The Juice that is Worth the Squeeze*

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ComEd Non-Energy Impacts

- Poll Question
- Types of NEIs
- Economic Impacts (Jobs and GDP)
- Societal Health Impacts
- Participant Health and Other Impacts
- Including NEIs in ComEd's Cost-Effectiveness Tests
- Key Take-Aways

Poll Question



Poll Answer



OVERVIEW – THREE TYPES OF NEIs



Economic: jobs created and other economic impacts of EE programs

Societal Health: reduced public citizens' health impacts from reduced emissions



Participant: benefits accruing to program participants i.e., reduced household members' health impacts like asthma and thermal stress due to air sealing and weatherization, and HVAC improvements



Utility: reduced utility costs from reduced carrying costs of arrearages, and reduced participation in bill assistance programs

NEIs AND THE ILLINOIS TECHNICAL REFERENCE MANUAL

NEIs currently in the IL TRM



- Societal: Avoided use of water (water savings)

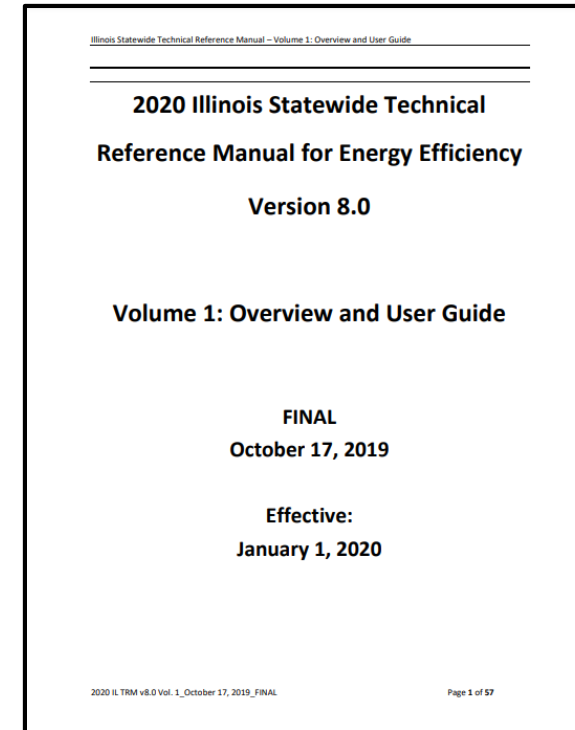


- Utility: Avoided environmental costs, i.e., the dollar value of reduced carbon emissions associated with switching to renewable energy sources

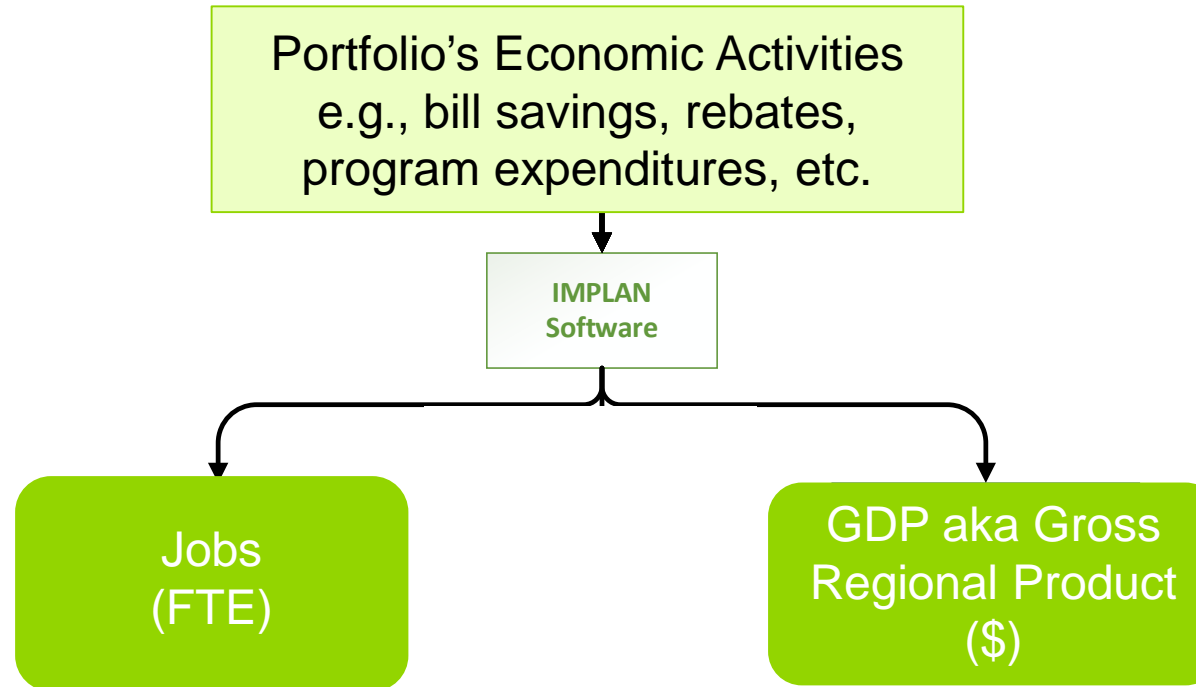


- Participant: Reduced O&M costs

This research expands the NEIs already deemed in the IL TRM.



Determining the Economic Impacts Of EE Programs



Three Step Process:

1. Input Data – Economic activities of EE programs
2. Economic Modeling – IMPLAN Software
3. Analyze Outputs – Jobs and Economic Stimulus

Economic Impacts of ComEd 2018 Portfolio



Impact Category

Jobs Created	14,650
Lifetime Economic Output	\$2.9 Billion



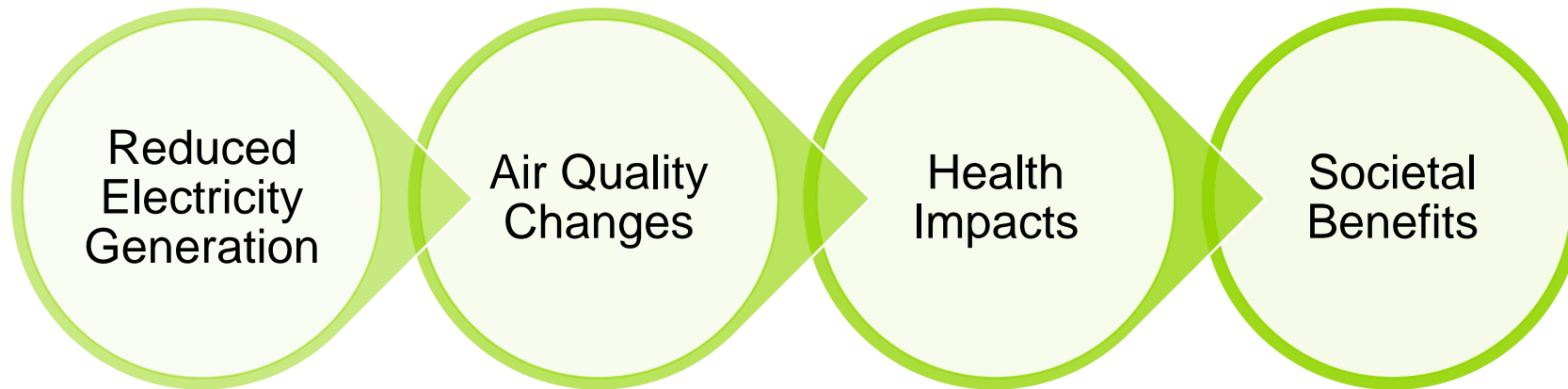
Societal Health NEIs due to Changes in Air Quality



EE programs > reduce fossil fuel generated electricity and natural gas use > reduce regional air emissions > improve societal health

Different than indoor air quality, which improves participant health

Fine Particulate Matter (PM_{2.5}) has been linked to a variety of health problems



Tools to Estimate Societal Health Benefits

U.S. EPA's AVERT and COBRA

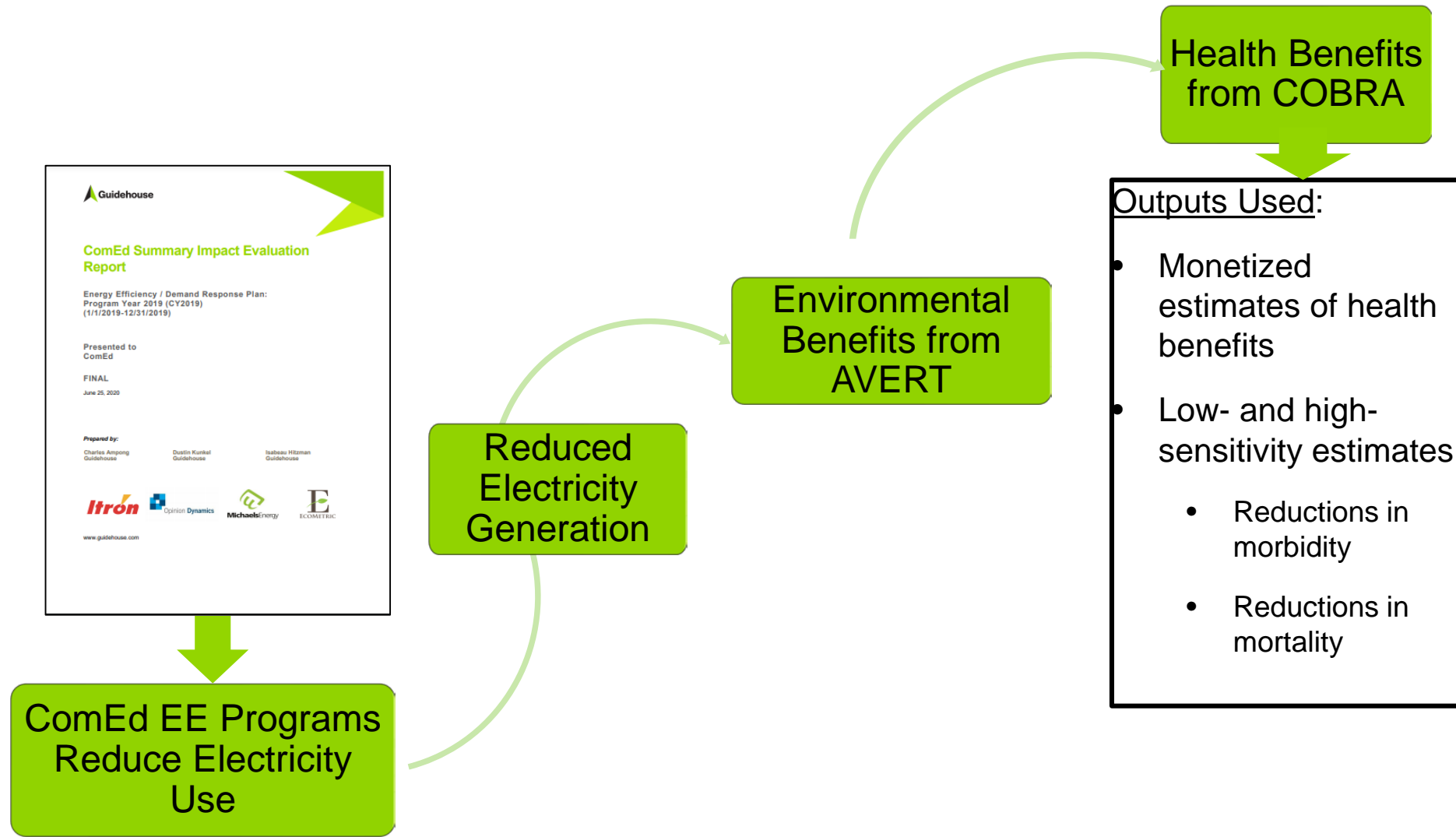


- US EPA's Air Emissions Team developed two tools to quantify the societal impacts of air emissions
 - AVERT = Avoided Emission and Generation Tool
 - COBRA = Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool
- AVERT and COBRA
 - Peer-reviewed, regulatory-quality, and customizable for Illinois
 - Used for EE program evaluation, planning, policymaking
 - Updated regularly
 - Apply to both reduced electricity generation and natural gas use



CO-Benefits Risk Assessment
(COBRA) Health Impacts
Screening and Mapping Tool

METHODOLOGY FOR DEVELOPING COMED SOCIETAL NEIS





ComEd Societal NEI Estimated Values

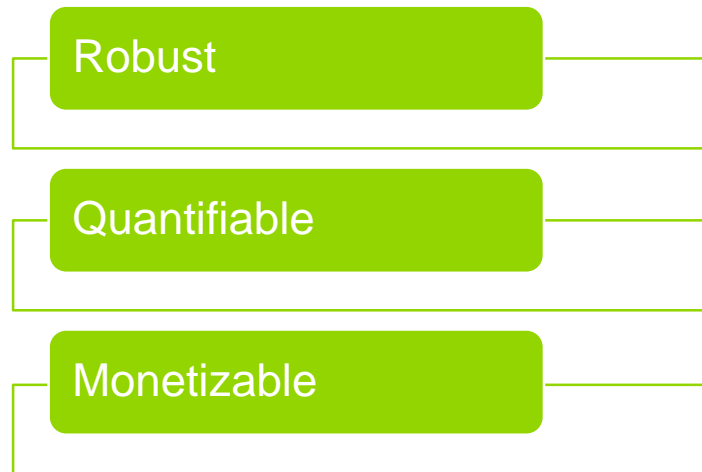
Implementation Year	\$ Total Health Benefits	\$ Total Health Benefits per kWh
CY2022	\$550,205,004	\$0.0354
CY2023	\$498,598,504	\$0.0320
CY2024	\$464,217,916	\$0.0298
CY2025	\$431,787,025	\$0.0277

Participant NEIs



Common stakeholder concerns:

- A clear link needs to be drawn between EE measure and NEI
- NEIs are too subjective and hard to quantify
- NEIs are not representative of Illinois' utilities' customers' experiences
- NEIs methodologies are not consistent from state-to-state
- Monetized values need to be based on reputable sources and transparent calculations



National WAP NEI
Research List

IL Evaluators'
Proposed
NEIs

IL SAG
Vetted

Evaluators developed
participant survey to
capture vetted NEIs



Fielding survey in 2021
with five comprehensive
income eligible
programs

Participant NEIs



Anticipated NEIs

Reduced asthma symptoms
Reduced arthritis symptoms
Reduced heat or cold-related illnesses

Fewer missed days at work

Anticipated Participant Benefits

Reduced need for asthma and arthritis-related medical visits and rescue inhaler use

Increased ability to afford prescriptions and other essentials

Monetizing Participant Health NEIs



Northern Illinois hospital data is used to convert health benefits from EE programs to monetary benefits



Proxy Participant NEIs from Massachusetts Research

Multi-Family Monetized Participant NEI Proxys

Participant NEI type	\$/Household
Thermal Comfort	29.20
Health & Safety (including Asthma Reduction)	38.17
Reduced missed days of work	67.79
Total	135.16

Sources: Three³ and NMR Group 2018; Guidehouse analysis.

Single-Family Monetized Participant NEI Proxys

Participant NEI type	\$/Household
Thermal Comfort	82.64
Health & Safety (including Asthma Reduction)	11.20
Reduced missed days of work	209.52
Total	303.36

Sources: Three³ and NMR Group 2016; Guidehouse analysis.

ILLUSTRATIVE EXAMPLE: NEI INFLUENCE ON COMED'S EE PROGRAMS' TRCs



Equation 2. IL TRC Benefits

$$B_{ILTRC} = \sum_{t=1}^N \frac{UAEP_t + UATD_t + UAA_t + EB_t + RC}{(1+d)^{t-1}} + \sum_{t=1}^N \frac{UAC_{at} + PAC_{at}}{(1+d)^{t-1}}$$

Equation 3. IL TRC Costs

$$C_{ILTRC} = \sum_{t=1}^N \frac{PNIC_t + IMCN_t + UIC_t}{(1+d)^{t-1}}$$

ILLUSTRATIVE EXAMPLE: NEI INFLUENCE ON COMED INCOME ELIGIBLE PROGRAMS' CY2018 TRCs

ComEd Programs	# of Participants	TRC Without NEIs	TRC with Societal NEIs	With Utility – NEIs (Actual of \$0.43/household/year)	With Participant NEIs	With all NEI categories
Multi-Family Energy Upgrades	4,094	0.76	0.97	N/A	1.36	1.75
Multi-Family – IL Home Weatherization Assistance Program (IHWAP)	79	0.26	0.39	N/A	0.31	0.44
Single-Family Energy Upgrades	1,563	0.71	0.86	0.71	1.37	1.52
Single-Family- IHWAP	365	0.39	0.49	0.39	0.62	0.72

ILLUSTRATIVE EXAMPLE:

NEI INFLUENCE ON COMED RESIDENTIAL AND BUSINESS PROGRAM'S CY2018 TRCs

CY2018 ComEd Programs	TRC Without NEIs	TRC with Societal NEIs
Residential: Multi-Family Energy Savings	1.54	2.53
Business: Small Business - Private	1.11	1.68

Key take-aways when considering NEIs in CE Tests



- Societal Economic – EE portfolio created jobs and GDP using IMPLAN and annual portfolio cost-effectiveness test info
- Societal Health – EE portfolio impacts on societal health using monetized values from AVERT & COBRA and portfolio annual savings info



- Participant NEIs – best represents value of NEIs in communities where household incomes are at or below 80% of Area Median Income.
- Participant NEIs - supports increased scope of equity-focused EE programs



- Most difficult to estimate and smallest in relative impact

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Illinois Energy Efficiency Stakeholder Advisory Group –
Non-Energy Impacts Working Group:

<https://www.ilsag.info/nei-working-group/>



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