



# **SAG NEI Working Group Meeting**

October 6, 2020



# Developing NEI values for Nicor Gas, Peoples Gas & North Shore Gas draft EE Portfolios for 2022-2025 cost-effectiveness tests

## Nicor Gas

- Draft memo sent on August 26th
- Comments & iterations on the draft
- Second draft sent on September 11th with draft EE Portfolios for Plan 2022-2025 values for Societal NEIs, and Participant and Utility NEI apportionment methodology

## Peoples Gas & North Shore Gas

- Draft memo sent to PG & NSG on September 17th

# OVERVIEW – TYPES OF NEIS – AND STATUS OF VALUES FOR PLAN 4 TRCs



Societal: reduced public citizens' health impacts from reduced emissions from fossil-fuel generation



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

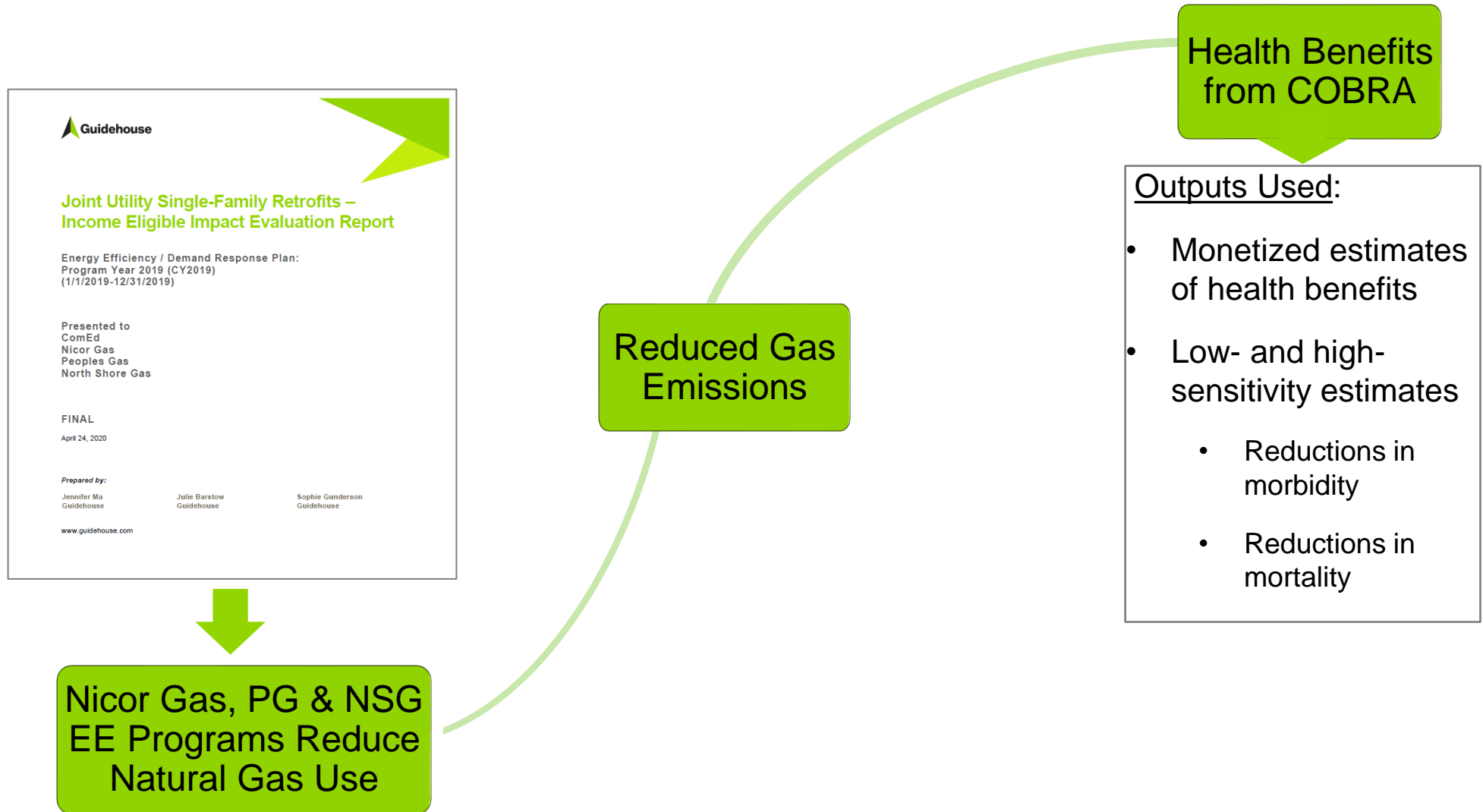


Utility: reduced utility costs from reduced carrying costs of arrearages, disconnections, reconnections, etc.

**Recommended Societal  
NEIs for Plan 2022-2025  
cost-effectiveness tests  
for Nicor Gas, Peoples  
Gas & North Shore Gas**



# METHODOLOGY FOR DEVELOPING SOCIETAL NEIS FOR NICOR GAS, PEOPLES GAS & NORTH SHORE GAS

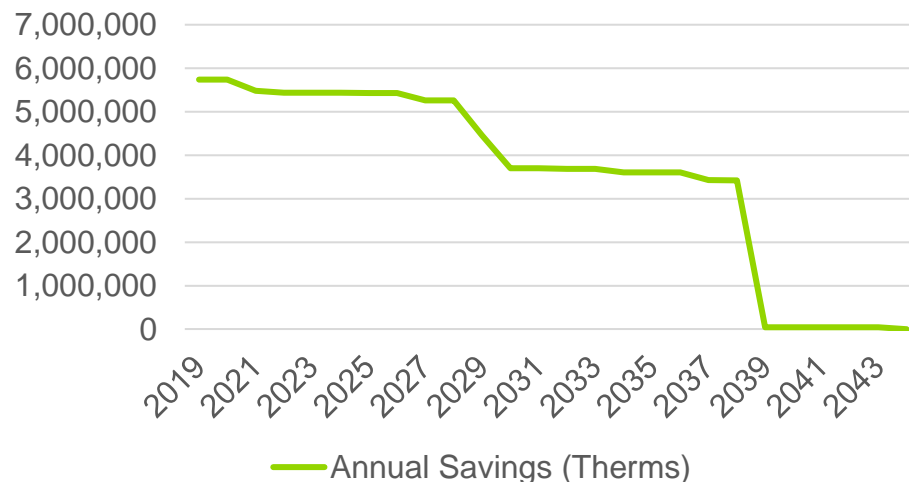


# Approach to Societal NEIs for Nicor Gas, Peoples Gas & North Shore Gas

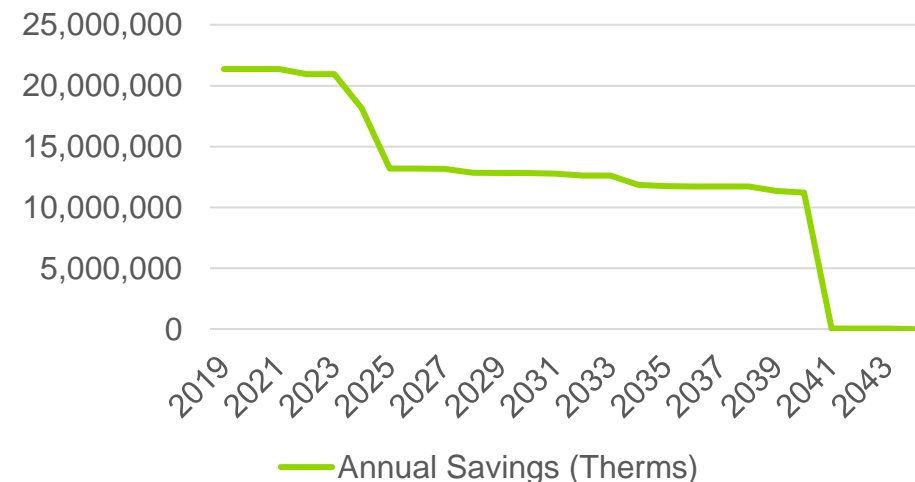
Similar to ComEd Societal NEI estimation, Guidehouse used the lifetime net savings for all CY2019 programs.

- The figures below illustrate lifetime net savings for Nicor Gas' residential and non-residential sectors
- The following slides present Societal NEI analysis conducted for Nicor Gas as an example

Residential Sector CPAS: Year 2019 – 2044

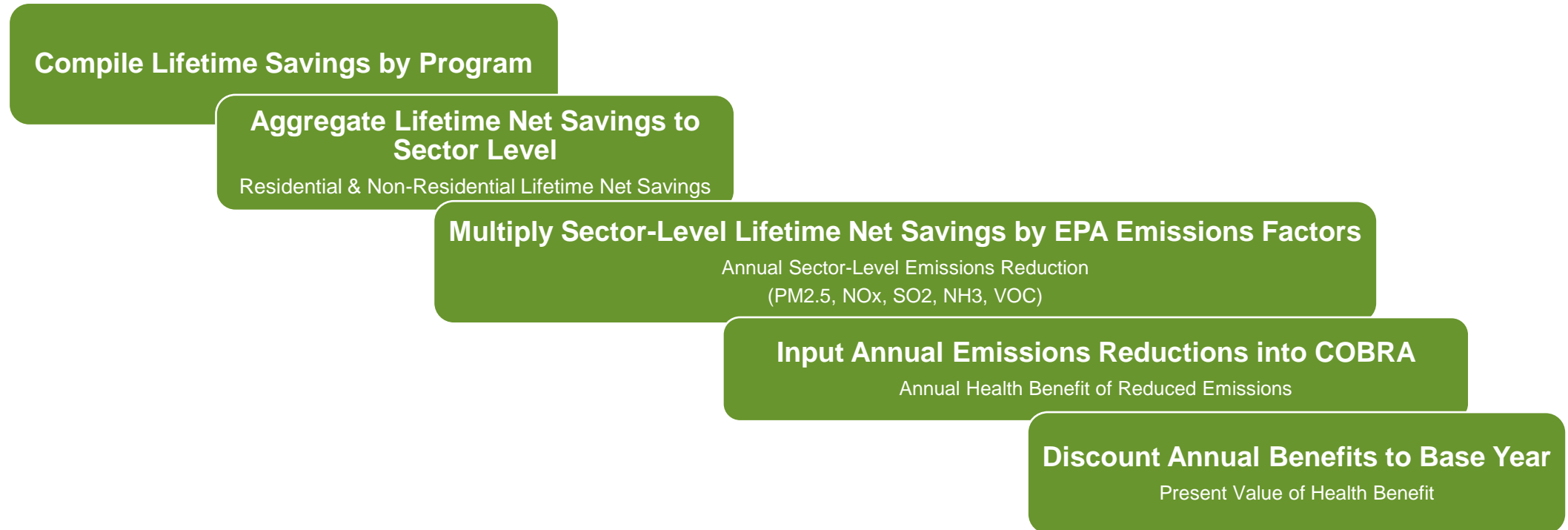


Non-Residential Sector CPAS: Year 2019 – 2044



# Methodology for Nicor Gas, Peoples Gas & North Shore Gas Societal NEIs

Guidehouse totaled lifetime net savings for all CY2019 programs, grouped savings by sector (residential and non-residential), then estimated emissions reductions & health benefits from each sector's annual savings.



# Estimating Emissions Reductions

Guidehouse applied emissions factors provided by the EPA to sector-level lifetime net savings to estimate the annual emissions reductions from sector-level lifetime savings.

### Non-Residential & Residential Emissions Factors

Pollutant	Non-Residential Factors (lb/MMCF)	Residential Factors (lb/MMCF)
PM <sub>2.5</sub>	0.43	0.43
NOx	100	94
SO2	0.6	0.6
NH3	0.49	20
VOC	5.5	5.5



### Residential Emissions Reductions (CY2022)

Year	Therms Savings	MMCF Savings	SO2 (tons)	Nox (tons)	NH3 (tons)	PM 2.5 (tons)	VOC (tons)
2022	5,743,078	554	0.17	26.03	5.54	0.12	1.52
2023	5,743,078	554	0.17	26.03	5.54	0.12	1.52
2024	5,482,150	529	0.16	24.85	5.29	0.11	1.45
2025	5,411,519	525	0.16	24.66	5.25	0.11	1.44
2026	5,411,519	525	0.16	24.66	5.25	0.11	1.44
2046	42,207	4	0.00	0.19	0.04	0.00	0.01
<b>Total</b>	<b>91,809,346</b>	<b>8,853</b>	<b>2.66</b>	<b>416.11</b>	<b>88.53</b>	<b>1.90</b>	<b>24.35</b>

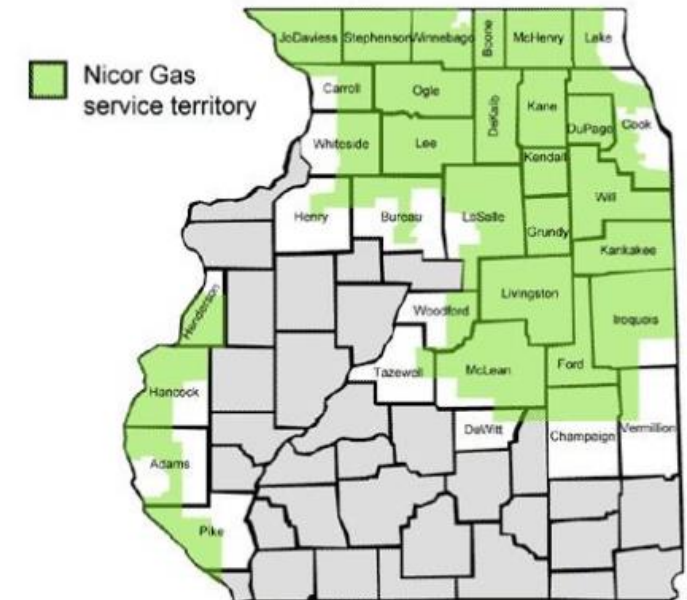


# Using COBRA to Estimate Lifetime Societal NEIs: Nicor Gas Example

Guidehouse conducted the COBRA analysis on an annual basis to estimate Societal NEIs for draft EE portfolios 2022-2025.

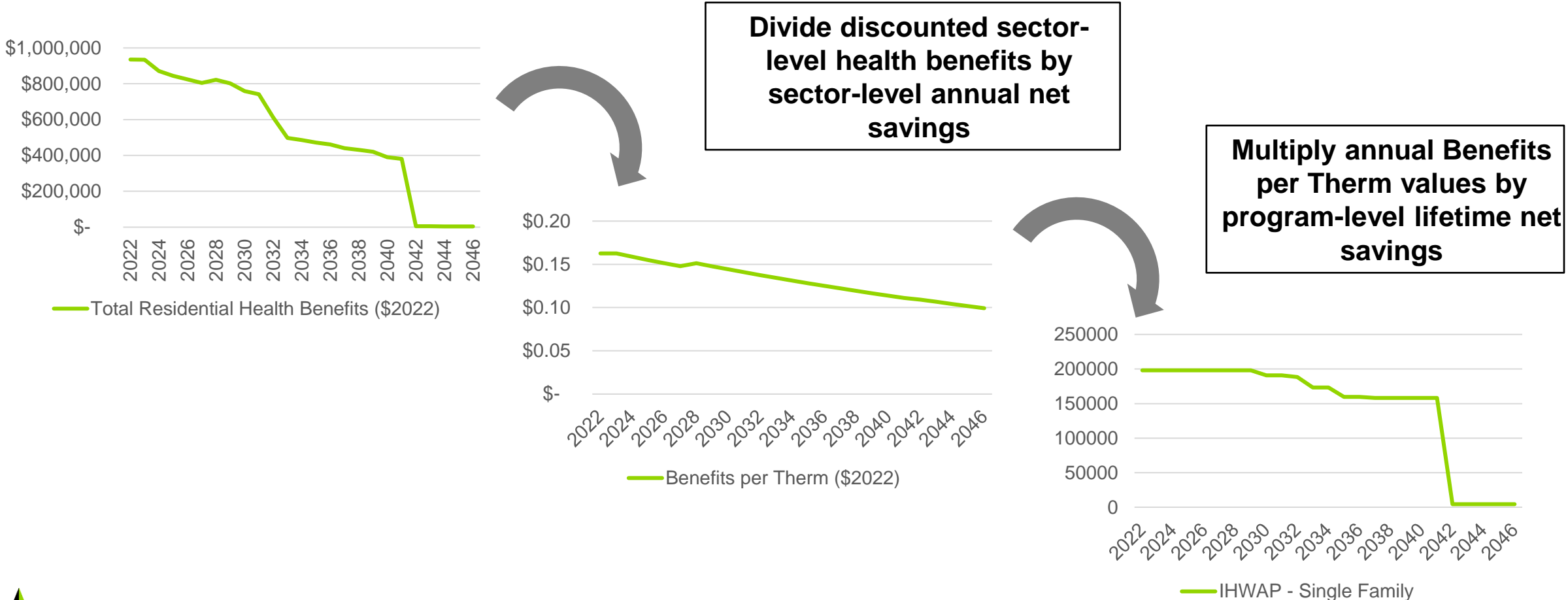
- CY2019 programs & associated lifetime net savings are estimates of gas utilities' CY2022-CY2025 programs.
- Guidehouse selected Nicor Gas service territory's counties for the emissions locations.
- Emissions reductions occurred in residential and non-residential sectors.
- To estimate pollution reductions & health benefits from residential and non-residential gas savings, we selected the following COBRA emissions tiers:
  - Residential sector: Residential Natural Gas Emissions Tier
  - Non-Residential sector: Commercial/Institutional Gas Emissions Tier
- Guidehouse used a custom valuation file with a 2.40 percent discount rate, deemed by IL TRM beginning in v9.0.
- Guidehouse used the average of low- and high-sensitivity health benefits.

Nicor Gas Service Territory



# Program-level Health Benefits Estimation

Total program-level health benefits can be determined by calculating annual sector-level health benefits per therm, multiplying by annual program-level savings, then summing the annual stream.



# Nicor Gas: Draft EE 2022-2025 Portfolio Sector-Level Societal NEIs

Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Residential	91,809,346	CY2022	\$12,949,428	\$0.1426
		CY2023	\$12,960,206	\$0.1427
		CY2024	\$12,948,852	\$0.1425
		CY2025	\$12,988,958	\$0.1430

Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Non-Residential	321,616,716	CY2022	\$47,775,950	\$0.1586
		CY2023	\$47,995,656	\$0.1597
		CY2024	\$48,148,621	\$0.1605
		CY2025	\$48,305,396	\$0.1613

## Recommended Applications:

- Option 1: Multiply the averaged sector-level dollar per therm estimates by the program-level lifetime savings.
- Option 2: Multiply the annual dollar per therm estimates found in report appendices by the program-level CPAS.

Dollar per therm benefits should only be applied to the therms saved from a given implementation year (e.g. CY2023) and not savings from prior implementation years.

*Due to a baseline shift in COBRA in 2028, health sensitivity to pollution increases relative to 2022 – 2027. When combined with the shape of the lifetime savings, this causes an increase in the total health benefits between CY2022 and CY2025.*

# PG & NSG: Draft EE 2022-2025 Portfolio Sector-Level Societal NEIs

## Peoples Gas Sector-Level Results

Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Residential	69,818,663	CY2022	\$12,235,430	\$0.1758
		CY2023	\$12,273,284	\$0.1764
		CY2024	\$12,310,227	\$0.1769
		CY2025	\$12,348,056	\$0.1775

## North Shore Gas Sector-Level Results

Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Residential	11,057,852	CY2022	\$1,390,256	\$0.1252
		CY2023	\$1,401,642	\$0.1263
		CY2024	\$1,411,145	\$0.1271
		CY2025	\$1,420,875	\$0.1278

Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Non-Residential	37,949,860	CY2022	\$6,920,747	\$0.1867
		CY2023	\$6,947,130	\$0.1875
		CY2024	\$6,968,813	\$0.1881
		CY2025	\$6,991,016	\$0.1888

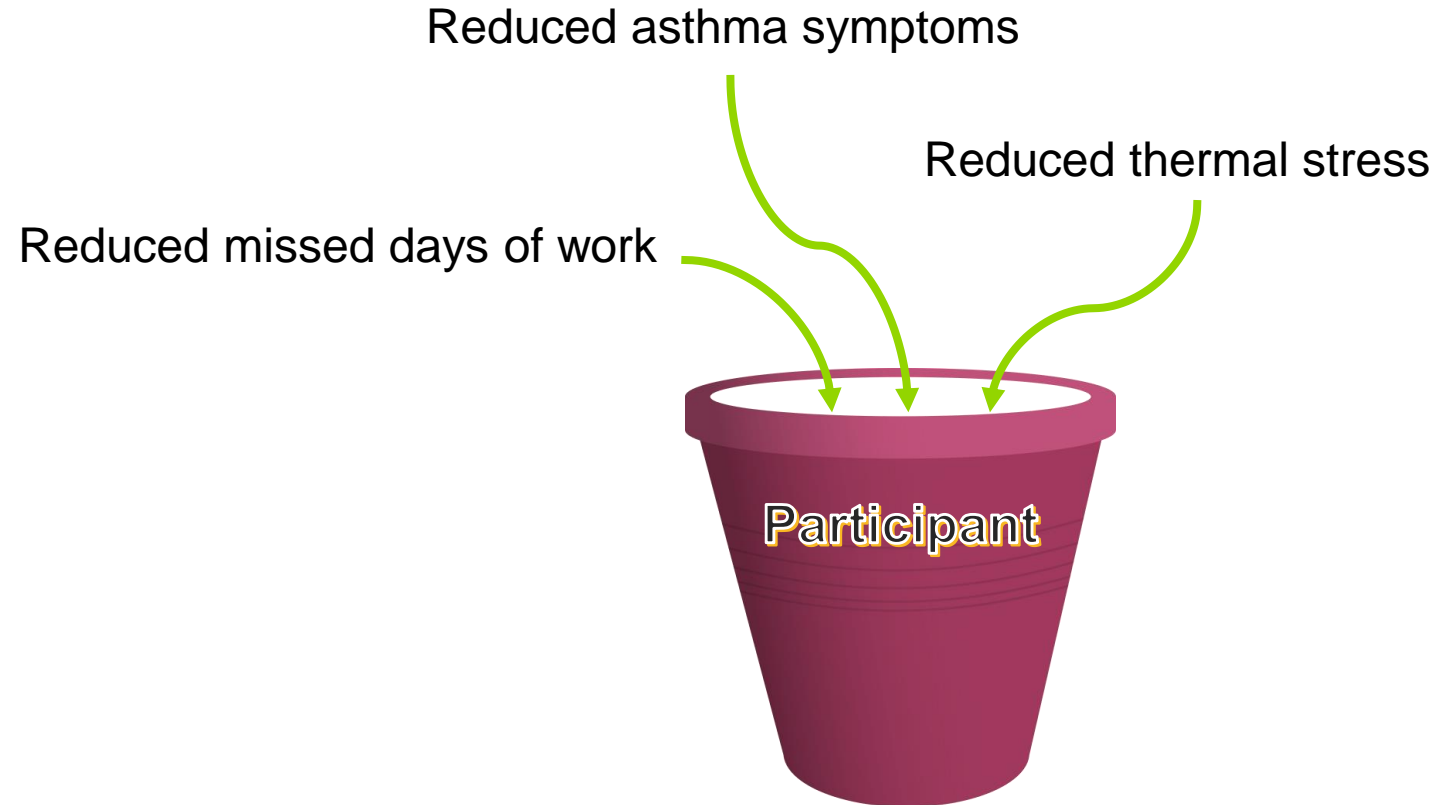
Sector	CY2019 Verified Net Lifetime Savings (Therms)	Program Year	\$ Total Health Benefits	\$ Total Health Benefits per Net Therm (Average)
Non-Residential	5,991,530	CY2022	\$811,400	\$0.1323
		CY2023	\$823,671	\$0.1338
		CY2024	\$830,066	\$0.1346
		CY2025	\$836,614	\$0.1354

**Recommended Participant  
NEIs for selected IE  
programs' 2022-2025 cost-  
effectiveness tests for  
Nicor Gas, Peoples Gas &  
North Shore Gas, and  
ComEd**



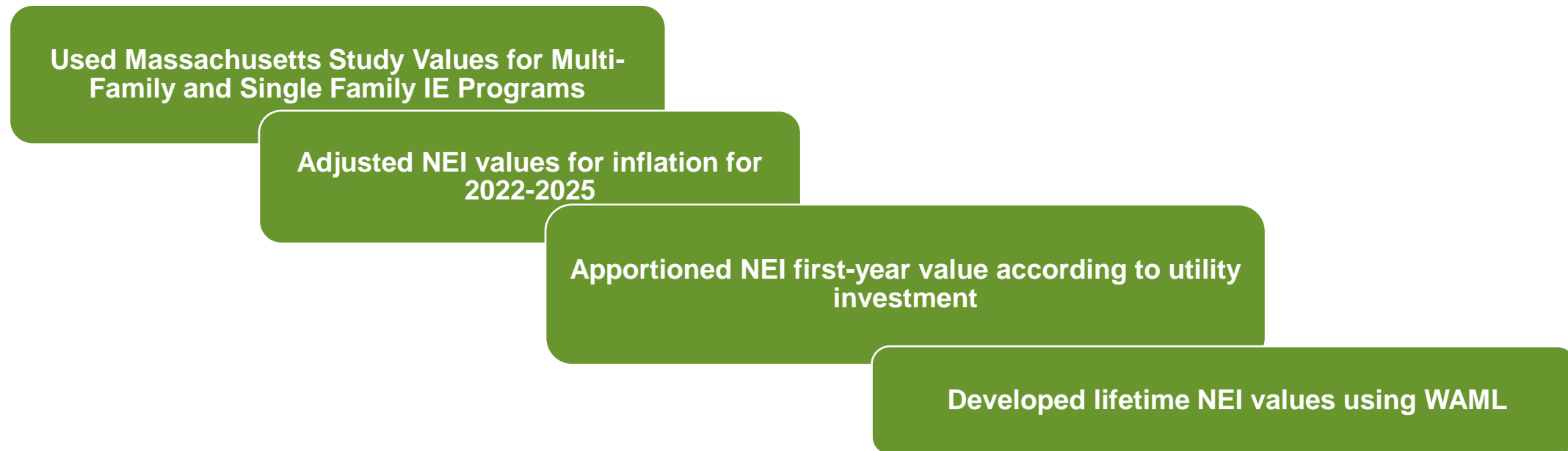
# Income Eligible Joint Programs with Participant NEIs

- Public Housing Energy Savings
- Multi-Family – IHWAP
- Multi-Family – Elevate
- Single Family – IHWAP
- Single Family – CBA



# Methodology for Nicor Gas, Peoples Gas & North Shore Gas, and ComEd Participant NEIs Lifetime Values

Guidehouse evaluated lifetime Participant NEI values using this methodology:



# Sources for Recommended Participant NEIs

Guidehouse conducted a literature review and determined these sources best correspond with our methodology to estimate values for Participant NEIs in Illinois.

State	Research Study	Year Published	Authors
Massachusetts	Low-Income Multifamily Health- and Safety-Related NEIs Study (TXC 50) Preliminary Findings Report	2018	Three <sup>3</sup> Inc. and NMR Group, Inc.
Massachusetts	Massachusetts Special and Cross-Cutting Research Area: Low-Income Single-Family Health- and Safety-Related Non-Energy Impacts (NEIs) Study	2016	Three <sup>3</sup> Inc. and NMR Group, Inc.



# MA Study Values Adjusted for Inflation

Guidehouse used historical Consumer Price Index values, as well as a long-term inflation forecast, to model predicted inflation of the values used in MA cost-effectiveness tests.

Adjusted Income Eligible Multi-Family Program – First-year per Participating Household Values

Participant NEI type	Massachusetts LIMF Program Value (\$2018)	Inflated \$2022	Inflated \$2023	Inflated \$2024	Inflated \$2025
Thermal Comfort	27.19	29.20	29.80	30.39	30.96
Health & Safety (Asthma Reduction)	35.55	38.17	38.96	39.74	40.49
Reduced missed days of work	63.13	67.79	69.18	70.57	71.89

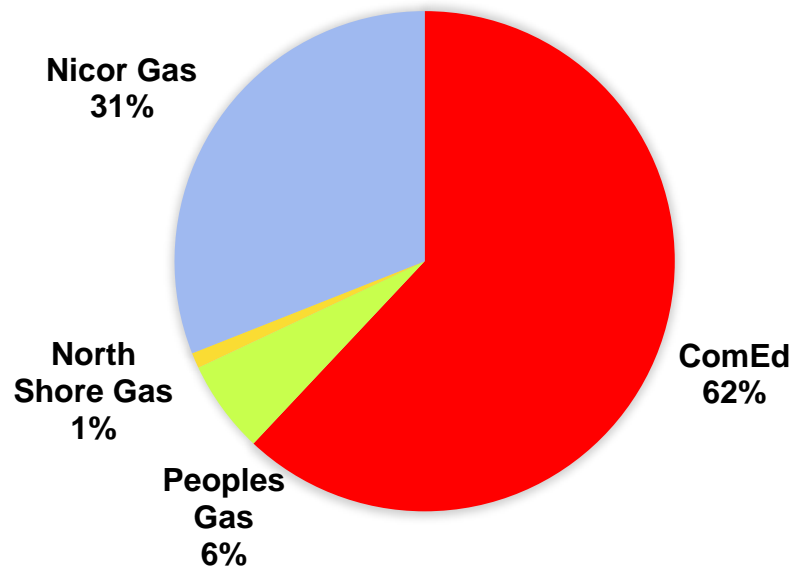
Adjusted Income Eligible Single Family Program - First-year per Participating Household Values

Participant NEI type	Massachusetts LISF Program Values (\$2016)	Inflated \$2022	Inflated \$2023	Inflated \$2024	Inflated \$2025
Thermal Comfort	73.68	82.64	84.26	85.88	87.43
Health & Safety (Asthma Reduction)	9.99	11.20	11.42	11.64	11.85
Reduced missed days of work	186.81	209.52	213.63	217.74	221.66

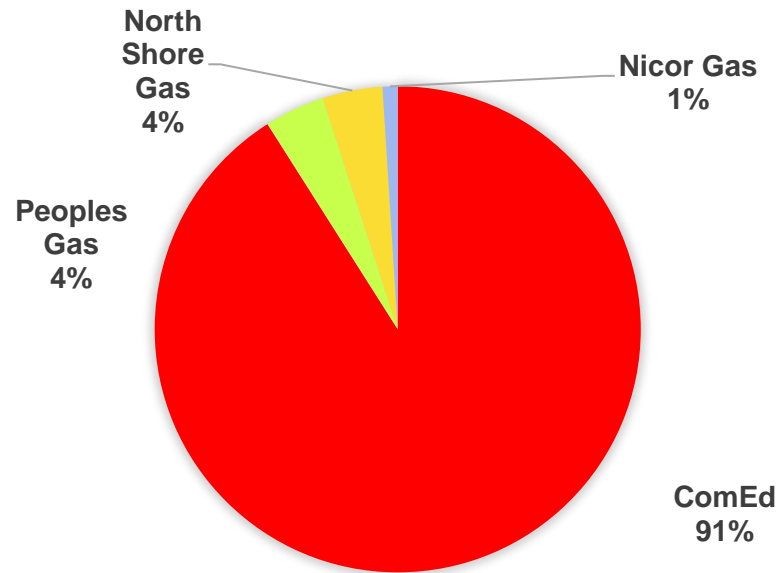
# NEIs Apportioned per Utility Investments in Joint Programs

## Multi-Family

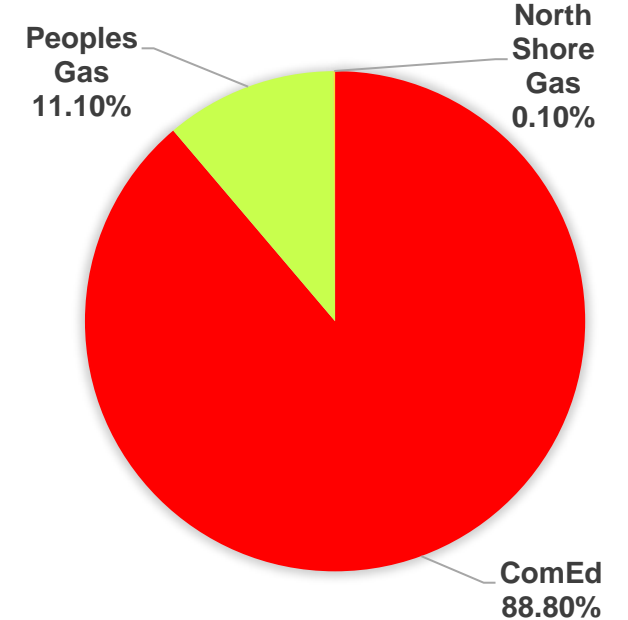
### Public Housing Energy Savings



### Multi-Family - IHWAP



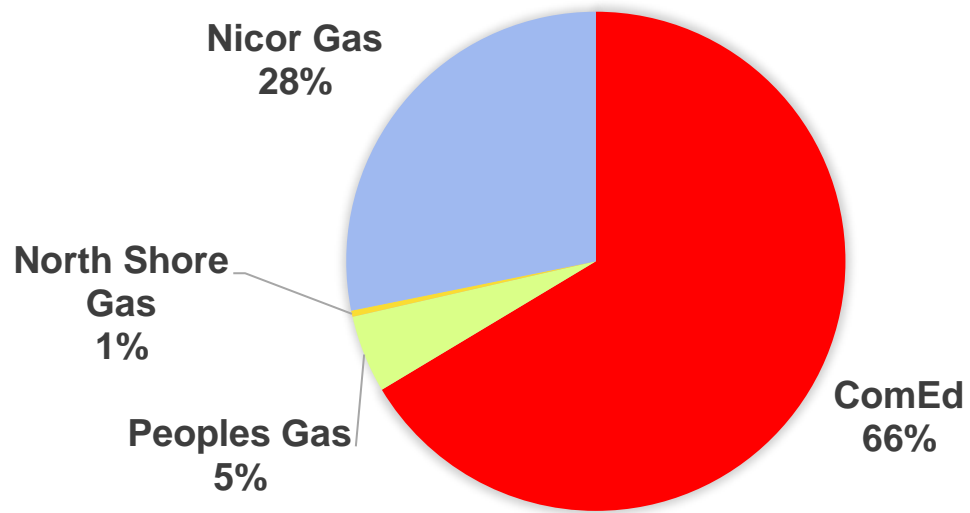
### Multi-Family - IEMS (Elevate)



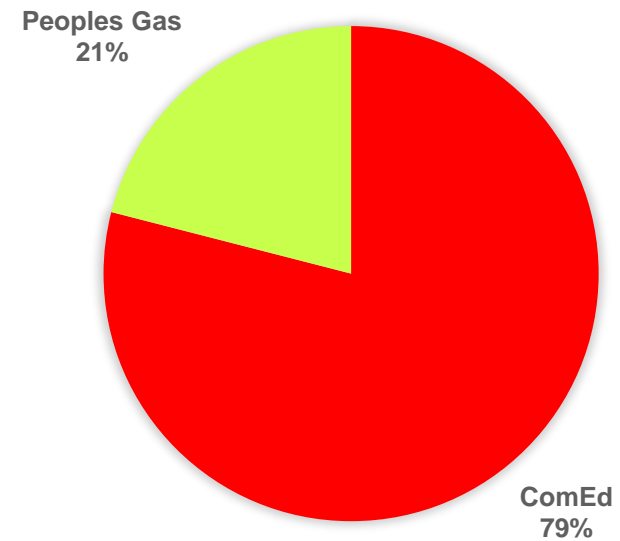
# NEIs Apportioned per Utility Investments in Joint Programs

## Single Family

Single Family - IHWAP



Single Family - CBA



# Example of Applying Apportionment across Utilities for Single Family - IHWAP

Below is an example apportionment for first-year participant NEIs for the Single Family – IHWAP program for CY2022.

Apportioned Participant NEIs for CY2022 First-Year Values  
Associated with Single Family – IHWAP Program

	ComEd	Peoples Gas	North Shore Gas	Nicor Gas	Total
	66%	5%	0.43%	28%	100%
<b>Thermal Comfort</b>	54.70	4.15	0.35	23.43	82.64
<b>Health &amp; Safety (including Asthma Reduction)</b>	7.42	0.56	0.05	3.18	11.20
<b>Reduced missed days of work</b>	138.69	10.53	0.89	59.40	209.52
<b>Total</b>	<b>200.81</b>	<b>15.25</b>	<b>1.30</b>	<b>86.00</b>	<b>303.36</b>

When available, use the primary monetized values from ComEd Primary Participant NEI research

# Example of Applying WAML to Estimate CY2022 Lifetime Participant NEI values for Single Family - IHWAP

## Single Family Retrofits – IHWAP Program/per Household (\$2022)

CY2022	ComEd	Peoples Gas	North Shore Gas	Nicor Gas	Total
Single Family Retrofits - IHWAP	66%	5%	0.43%	28%	100%
Thermal Comfort	\$811	\$ 78.50	\$ 6.50	\$417	\$1,310
Health & Safety (including Asthma Reduction)	\$110	\$10.60	\$0.88	\$56	\$ 178
Reduced missed days of work	\$2,060	\$199	\$16.50	\$1,060	\$3,330
<b>Total</b>	<b>\$2,980</b>	<b>\$288</b>	<b>\$23.90</b>	<b>\$1,530</b>	<b>\$ 4,820</b>

Numbers do not sum exactly due to rounding.

# Utility NEIs for selected IE programs in draft Plan 2022-2025 cost-effectiveness tests



# Utility NEI Update

## Secondary Sources:

- Massachusetts and Maryland Studies
- Public Service Commission of Maryland Order Order-No. 87082 EmPOWER Maryland Energy Efficiency Goal Allocating and Cost-Effectiveness

## Primary Sources:

- ComEd customer collection data and cost of collection activities
  - Disconnection notices and reconnection notices
  - Customer calls and collections
  - Participation in alternative payment programs
- Analysis has not produced statistically significant findings
  - “Noisy” data – difficult to find signals
  - Pre-treatment 2017, treatment 2018, post-treatment 2019 included Polar Vortex
- Guidehouse refining analysis with ComEd billing department experts
- Utility NEI recommendations based on the best available data will be presented in December



# Status Update: NEI Research for Ameren Illinois and ComEd



# Status Update: Societal NEI Research for ComEd



# ComEd Societal NEIs



Guidehouse finalized analysis of Societal NEIs for ComEd's draft Plan 6 programs and will send to ComEd by October 9th.

- Emissions are now bounded over the entirety of CPAS timeline to account for changes in efficiency of electric generating units.
- Per FEJA language, Societal NEIs include health benefits for the entire United States.
- Per ComEd direction on August 21, Guidehouse has used CY2019 program savings as proxies for Plan 6 (CY2022-CY2025) NEIs.
- In addition, Guidehouse has conducted sensitivity checks on Societal NEIs:
  - Portfolio-level vs. program-level estimation.  
Result: Differences in results between two approaches were **not statistically significant**.
  - Bounded vs. Unbounded Emissions Rates  
Result: Adjusting emissions rates yielded Societal NEIs that are **7 to 20 percent lower** than under use of unadjusted emissions rates.

# Societal NEI Updates

Guidehouse estimates of Societal NEIs range from \$504 million for CY2025 programs to \$589 million for CY2022 programs.

Implementation Year	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
CY2022	15,561,383,503	\$589,549,463	\$0.0379
CY2023		\$556,068,262	\$0.0357
CY2024		\$528,529,501	\$0.0340
CY2025		\$504,355,227	\$0.0324

- The table above presents the total estimated health benefits from CY2022-2025 implementation of CY2019 programs.
- Guidehouse recommends use of program-level Societal NEI estimates – presented as \$ Total Health Benefits and \$ Total Health Benefits per kWh.
  - CY2022 shown in the following slides as an example.

# Societal NEI Updates

## CY2022 Societal NEI Estimates: Business Programs

Program	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
Business Instant Discounts	2,349,286,754	\$90,649,431	\$0.0386
Incentives - Standard	2,523,306,236	\$93,704,140	\$0.0371
Small Business - Private	2,060,833,826	\$73,872,678	\$0.0358
LED Streetlighting	1,085,008,536	\$41,651,702	\$0.0384
Incentives - Custom	392,043,313	\$13,382,667	\$0.0341
Industrial Systems	204,197,559	\$8,214,708	\$0.0402
Retro Commissioning	264,270,255	\$11,171,669	\$0.0423
Non-residential New Construction	326,020,928	\$10,362,489	\$0.0318
Strategic Energy Management	116,483,031	\$5,315,030	\$0.0456
Virtual Commissioning	138,458,643	\$5,706,011	\$0.0412

# Societal NEI Updates

## CY2022 Societal NEI Estimates: Business Programs - continued

Program	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
Small Business - Public	101,985,150	\$4,134,631	\$0.0405
Small Business Kits	40,331,185	\$1,689,121	\$0.0419
Business Grocery	77,386,496	\$2,686,600	\$0.0347
Business Telecomm	36,115,724	\$1,462,905	\$0.0405
Facility Assessments	15,351,676	\$710,675	\$0.0463
Nonprofit Retrofits	28,483,445	\$1,186,740	\$0.0417
Agriculture	5,968,397	\$206,919	\$0.0347

# Societal NEI Updates

## CY2022 Societal NEI Estimates: Residential Programs

Program	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
Lighting Discounts	894,620,160	\$39,154,029	\$0.0438
Fridge & Freezer Recycling	131,815,805	\$5,762,804	\$0.0437
Appliance Rebates	380,811,814	\$14,916,092	\$0.0392
Single-Family Assessment	154,186,907	\$6,790,959	\$0.0440
Multi-Family Assessments	96,644,176	\$4,116,695	\$0.0426
Residential HVAC	141,986,555	\$4,833,922	\$0.0340
Elementary Education Kits	65,606,467	\$2,762,781	\$0.0421
Weatherization	11,756,935	\$352,024	\$0.0299
Residential New Construction	4,632,592	\$144,740	\$0.0312
Residential Behavior	136,820,857	\$6,920,305	\$0.0506

# Societal NEI Updates

## CY2022 Societal NEI Estimates: Income Eligible Programs

Program	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
Food Bank-LED Distribution	342,830,665	\$15,383,587	\$0.0449
Lighting Discounts - IE [Combined with Appliance Rebates - IE]	352,743,099	\$14,913,088	\$0.0423
UIC-ERC Income Eligible Kits	125,141,693	\$5,371,223	\$0.0429
Appliance Rebates - IE [Combined with Lighting Discounts - IE]	53,474,216	\$2,314,583	\$0.0433
Multi-Family Retrofits - IE	27,837,171	\$1,124,735	\$0.0404
Public Housing Retrofits	20,103,572	\$847,811	\$0.0422
Affordable Housing New Construction	33,433,046	\$1,105,141	\$0.0331
Single-Family Retrofits - CBA	30,182,989	\$988,688	\$0.0328
Single-Family Retrofits - IHWAP	20,842,705	\$725,212	\$0.0348
Multi-Family Retrofits - IHWAP	6,888,251	\$246,742	\$0.0358
Manufactured Housing Retrofit	2,870,129	\$110,311	\$0.0384

# Societal NEI Updates

## CY2022 Societal NEI Estimates: Voltage Optimization

Program	CY2019 Verified Net Lifetime Savings (kWh)	\$ Total Health Benefits	\$ Total Health Benefits per kWh (Average)
Voltage Optimization	2,760,622,546	\$94,555,877	\$0.0343



# ComEd Participant Survey Update



- Guidehouse finalizing analysis of Participant NEIs and apportionments for ComEd's draft Plan 6 selected programs and will send to ComEd by October 9th.
- Final Participant Survey with added language:
  - Accounts for Covid-19 impacts
  - Added arthritis questions
  - Survey invitations will be distributed during direct install portion of program implementation in late October to participants in:
    - Public Housing Energy Savings
    - Multi-Family Retrofits (IHWAP and Elevate)
    - Single Family Retrofits (IHWAP and Chicago Bungalow Association)
- Guidehouse will collect survey results for 12-months and will report preliminary findings in six months

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