



# ComEd Cost-Effectiveness Analysis CY2023 Report

Energy Efficiency/Demand Response Plan:  
Program Year 2023 (CY2023)  
(1/1/2023-12/31/2023)

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# 1. Overview

As part of ComEd's energy efficiency program evaluation for calendar year 2023 (CY2023), Guidehouse determined program- and portfolio-level cost-effectiveness using the utility cost test (UCT) and the Illinois total resource cost (TRC) test. This analysis included quantifying the program, measure, and portfolio costs for implementing the energy efficiency programs, along with the benefits derived from these investments. This report contains TRC values with and without Societal non-energy impacts (Societal NEIs). The following sections include the results of the cost-effectiveness analysis for each program in ComEd's portfolio and a detailed breakdown of all the costs and benefits included in the analysis.

Guidehouse conducted the analysis using spreadsheet and Analytica tools. Summaries of the program-level inputs are provided separately from this report. ComEd and the Illinois Commerce Commission provided comments on the methodologies and inputs used for the analysis and the resulting TRC values and UCT values.

The savings numbers and results included in this report are reflective of only ComEd's Energy Efficiency Portfolio Standard (EEPS) programs. For programs that are jointly implemented by ComEd and one or more Illinois gas utilities (including Nicor Gas, Peoples Gas [PG], and North Shore Gas [NSG]), only ComEd's portion of the program savings and costs are included in this report.<sup>1</sup> The combined joint TRC and UCT values for these programs will be shared in a forthcoming memo.

The Illinois TRC test is defined in the Illinois Power Agency Act (see 20 ILCS 3855/1-10) as follows:<sup>2</sup>

*“Total resource cost test” or “TRC test” means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures and including avoided costs associated with reduced use of natural gas or other fuels, avoided costs associated with reduced water consumption, and avoided costs associated with reduced operation and maintenance costs, as well as other quantifiable societal benefits, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire; reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases. In discounting future societal costs and benefits for the purpose of calculating net present values, a societal discount rate based on actual, long-term Treasury bond yields should be used. Notwithstanding anything to the contrary, the*

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<sup>1</sup> For programs that are jointly offered by ComEd and gas utilities, the term savings claimed by ComEd are included in this analysis.

<sup>2</sup> See Section 1-10 Definitions of the Illinois Power Agency Act:  
<http://www.ilga.gov/legislation/ilcs/ilcs5.asp?ActID=2934&ChapterID=5>

*TRC test shall not include or consider a calculation of market price suppression effects or demand reduction induced price effects.*

The Illinois TRC test differs from traditional TRC tests due to its requirement to include a reasonable estimate of the financial costs associated with future regulations and legislation on the emissions of greenhouse gases (GHG) and the use of the societal discount rate. These differences add a benefit to investments in efficiency programs that are typically included in the societal cost test in other jurisdictions.

Table 1-1 summarizes the CY2023 TRC and UCT values for all EEPS programs in ComEd’s CY2023 portfolio. Overall, the CY2023 portfolio aggregate TRCs and UCTs show the portfolio was cost-effective, with aggregate TRC values of 2.90 (with Societal NEIs) and 2.05 (without Societal NEIs), and a UCT value of 1.35.

**Table 1-1. Summary of CY2023 TRC and UCT Values for ComEd Programs**

Program	Illinois TRC Test (With Societal NEIs)	Illinois TRC Test (Without Societal NEIs)	UCT
Retail/Online	6.67	5.04	3.69
Product Distribution	6.28	4.43	3.43
Multifamily Upgrades	1.28	0.90	0.57
Single-Family Upgrades	1.16	1.00	0.53
Contractor / Midstream Rebates	3.73	3.16	1.53
New Construction - IE	1.21	1.02	0.67
Behavior - Res/IE	9.82	8.32	5.24
Electric Home New Construction	2.15	1.93	0.94
ASI kWh Purchase	4.93	4.09	6.40
<b>Residential &amp; Income Eligible Total*</b>	<b>4.45</b>	<b>3.34</b>	<b>2.10</b>
Incentives	2.32	1.51	1.29
Small Business	3.49	2.37	1.27
Midstream/Upstream	4.87	3.42	2.82
Targeted Systems	2.16	1.41	0.75
Behavior - Bus/Pub	2.91	1.75	0.92
New Construction - Bus/Pub	1.26	0.87	1.45
Assessments	0.43	0.26	0.14
<b>Business &amp; Public Sector Total*</b>	<b>2.93</b>	<b>1.97</b>	<b>1.36</b>
Heat Pump Water Heater Pilot	0.55	0.50	0.11
ENERGY STAR Retail Products Platform	2.04	1.37	5.12
Industrial EMIS	1.21	0.73	0.73
<b>Pilot &amp; Market Transformation Total*</b>	<b>1.94</b>	<b>1.30</b>	<b>3.31</b>
Voltage Optimization	1.34	0.89	0.55
<b>Portfolio Total without IE &amp; with VO*†</b>	<b>2.23</b>	<b>1.60</b>	<b>1.21</b>
<b>Portfolio Total with IE &amp; without VO*†</b>	<b>3.13</b>	<b>2.22</b>	<b>1.47</b>
<b>Portfolio Total without IE, VO, &amp; Pilots*</b>	<b>2.37</b>	<b>1.72</b>	<b>1.34</b>
<b>Portfolio Total with IE &amp; VO*†</b>	<b>2.90</b>	<b>2.05</b>	<b>1.35</b>

Notes: This table contains only ComEd programs. In CY2023, ComEd purchased kilowatt-hour savings from Nicor Gas’ Air Sealing and Insulation (ASI) offering. ComEd’s purchase of therms from the Nicor ASI program is not a ComEd program, but the savings and TRC results are counted in ComEd’s residential sector.

\*The TRC and UCT values are calculated using the sum of all the offerings’ benefits and costs.

†Portfolio Total rows include Pilots & Market Transformation.

Source: Guidehouse analysis

**Both the Residential and Business sectors achieved TRC cost-effectiveness in PY2023.** While performance remained strong across the portfolio, changes were seen on both the cost and benefits side of the equation:

- The portfolio benefits in CY2023 are slightly lower than those seen in CY2022<sup>3</sup>. In CY2022, the portfolio accrued nearly \$658 million in electric production and capacity benefits, while that number was closer to \$595 million (Table 3-1) in CY2023. The environmental adder continued to contribute significant benefits, totaling \$378 million in CY2023.
- CY2023 saw the addition of the gas heating penalty to the TRC analysis, based on Illinois Energy Efficiency Policy Manual 3.0 requirement.<sup>4</sup> This update introduced over \$28 million in fossil fuel costs stemming from heating penalties, bringing portfolio CY2023 costs close to their CY2022 levels despite lower spending.

## 1.1 Illinois TRC Equation

Guidehouse used Equation 1 to calculate the Illinois TRC.

### Equation 1. Illinois TRC

$$BCR_{ILTRC} = B_{ILTRC} / C_{ILTRC}$$

Where:

$BCR_{ILTRC}$	=	Benefit-cost ratio of the Illinois TRC test
$B_{ILTRC}$	=	Present value of benefits of an Illinois program or portfolio
$C_{ILTRC}$	=	Present value of costs of an Illinois program or portfolio

The evaluation team calculated the benefits of the Illinois TRC using Equation 2.

### Equation 2. Illinois TRC Benefits

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

Guidehouse calculated the costs of the Illinois TRC using Equation 3.

### Equation 3. Illinois TRC Costs

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

Where benefits are defined as:

UAEP <sub>t</sub>	=	Utility avoided electric and capacity production costs in year t
UATD <sub>t</sub>	=	Utility avoided transmission and distribution (T&D) costs in year t

<sup>3</sup> <https://www.ilsag.info/wp-content/uploads/ComEd-CY2022-TRC-Report-23-06-28-Final.pdf>

<sup>4</sup> [https://www.ilsag.info/wp-content/uploads/IL\\_EE\\_Policy\\_Manual\\_Version\\_3.0\\_Final\\_11-3-2023.pdf](https://www.ilsag.info/wp-content/uploads/IL_EE_Policy_Manual_Version_3.0_Final_11-3-2023.pdf)

UAA <sub>t</sub>	=	Utility avoided ancillary costs in year t
EB <sub>t</sub>	=	Environmental benefits in year t
UACat	=	Utility avoided supply costs for the alternate fuel in year t
RC	=	Net present value (NPV) of replacement costs of baseline bulbs
S NEI	=	NPV societal NEI benefit

And costs are defined as:

PNIC <sub>t</sub>	=	Program non-incentive costs in year t
IMCN <sub>t</sub>	=	Net incremental costs in year t
UIC <sub>t</sub>	=	Utility increased supply costs in year t

And:

d	=	Societal discount rate
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The Illinois TRC test allows for utilities to account for the NPV of the avoided cost of purchasing shorter lifetime bulbs, which accrue to program participants because of the significantly longer lifetimes of efficient LED light bulbs. In general, the avoided cost per bulb is determined by comparing the estimated useful life of efficient and baseline bulbs to determine the number of baseline bulb purchases that are avoided. Based on the average purchase price of baseline bulbs, NPV is determined by discounting the value of these avoided purchases over the course of the lifetime of the efficient bulb. Illinois Technical Reference Manual version 11.0 (IL TRM v11.0) provides deemed NPVs per bulb based on efficient bulb type, socket type (commercial or residential), and lumen range. These benefits were included in the program calculations.

Policy Manual Version 3.0<sup>5</sup> asserts that negative avoided costs (accrued through electrification or other impacts) be treated as increases in TRC costs rather than decreases in TRC benefits, as was previously treated. Additionally, electricity avoided cost impacts (energy and demand) are grouped to create a net cost change due to electricity. These updates are reflected in the TRC ratios and report tables.

## 1.2 UCT Equation

The UCT approaches cost-effectiveness from the perspective of the utility, in this case ComEd. The UCT determines whether the energy supply and capacity costs avoided by the utility exceed the overhead and cost outlays that the utility incurred to implement energy efficiency programs. The structure of the calculation is similar to the Illinois TRC with a few key changes. As the UCT is primarily focused on utility outlays, incentives paid by the utility to either participants or third-party implementers are included in the calculation in place of incremental or participant costs. Additionally, as non-energy benefits accrue to society rather than to the utility implementing energy efficiency programs, these benefits are not included in the UCT formula.

Using the equation terms previously defined for the Illinois TRC equation, Equation 4 shows the UCT equation.

<sup>5</sup> [https://www.ilsag.info/wp-content/uploads/IL\\_EE\\_Policy\\_Manual\\_Version\\_3.0\\_Final\\_11-3-2023.pdf](https://www.ilsag.info/wp-content/uploads/IL_EE_Policy_Manual_Version_3.0_Final_11-3-2023.pdf)

**Equation 4. UCT**

$$BCR_{UCT} = B_{UCT} / C_{UCT}$$

Where:

- BCR<sub>UCT</sub>** = Benefit-cost ratio of the UCT
- B<sub>UCT</sub>** = Present value of benefits to a utility of a program or portfolio
- C<sub>UCT</sub>** = Present value of costs to a utility of a program or portfolio

The benefits of the UCT are calculated using Equation 5.

**Equation 5. UCT Benefits**

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

The costs of the UCT are calculated using Equation 6.

**Equation 6. UCT Costs**

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

Where the new term, *PIN<sub>t</sub>*, is defined as the program incentives provided by the utility in year t.

Similar cost test changes from the final draft policy in Policy Manual Version 3.0 apply to the UCT as described in Section 1.1.

### 1.3 Cost-Effectiveness Data Requirements

Table 1-2 outlines the data points collected from different stakeholders to conduct cost-effectiveness analysis. The data is categorized into generic and program-specific categories.

**Table 1-2. Data Points Needed to Conduct EEPS Cost-Effectiveness**

Category	Data Point	Source
Generic	<ul style="list-style-type: none"> <li>• Avoided Energy Costs (\$/kWh)</li> <li>• Avoided Capacity Costs (\$/kW)</li> <li>• Avoided T&amp;D Electric (\$/kWh)</li> <li>• Avoided Gas Production (\$/therm)<sup>6</sup></li> <li>• Avoided Water Costs (\$/gallon)</li> <li>• Escalation Rates</li> <li>• Environmental Damages (GHG Adders)</li> <li>• Discount Rate</li> </ul>	ComEd

<sup>6</sup> From Nicor Gas.



Category	Data Point	Source
Program Specific	• Participants/Measure Count	Guidehouse
	• Verified Ex Post Energy and Demand Savings	
	• Realization Rate	
	• Net-to-Gross Ratio	
	• Measure Life	
	• Incremental Measure Costs <sup>7</sup>	
	• NPV Replacement Costs	
	• Societal NEI Benefit	ComEd
	• Non-Incentive Costs	
	• Utility Incentive Costs	
	• Direct Install Costs	
	• Incremental Measure Costs	

Source: Guidehouse analysis

This report summarizes the results for the total ComEd EEPS portfolio at the program level and includes program-specific inputs and range of assumptions, a description of each of the data points, and the basis of their determination and their reasonableness.

<sup>7</sup> Incremental measure costs come from program tracking data, program contractor invoices, and deemed value sources from the IL TRM.

## 2. Summary of Results and Portfolio-Level Data Inputs

Table 2-1 summarizes the CY2023 cost-effectiveness analysis results by benefit and cost components relevant to each cost test for the portfolio without the inclusion of income eligible components, pilots and market transformation, or voltage optimization. The results indicate that ComEd’s CY2023 EEPS portfolio is cost-effective under both the UCT and the TRC tests for the Residential and Business sectors.

**Table 2-1. Summary of ComEd CY2023 Residential and Business Sectors’ Cost-Effectiveness Test Values (\$ Thousands)**

Data Point	UCT		Illinois TRC Test	
	UCT Benefits	UCT Costs	Illinois TRC Benefits	Illinois TRC Costs
Electricity Cost Changes	\$398,322	\$26	\$398,322	\$26
Fossil Fuel Cost Changes	\$53,087	\$28,476	\$53,087	\$28,476
Water Cost Changes	N/A	N/A	\$67	\$0
Environmental Adder (GHGs)	N/A	N/A	\$248,144	\$5
Societal NEI Benefit	N/A	N/A	\$289,530	\$8
NPV Replacement Costs	N/A	N/A	\$61,931	\$0
Non-Incentive Costs	N/A	\$109,706	N/A	\$109,706
Incentive Costs	N/A	\$199,666	N/A	N/A
Net Participant Costs	N/A	N/A	\$0	\$304,484
Present Value Totals (with Societal NEI)	\$451,409	\$337,874	\$1,051,081	\$442,705
Present Value Totals (without Societal NEI)	\$451,409	\$337,874	\$761,551	\$442,697
Ratio (with Societal NEI)	1.34		2.37	
Ratio (without Societal NEI)	1.34		1.72	

Note: All categories exclude income eligible, pilots and market transformation, and voltage optimization.

Source: Guidehouse analysis

On the cost side, net participant costs represent the largest component followed by the incentive costs of program implementation. For the UCT, the sum of all incentives provided is used in place of net participant costs. The sum of all incentives is less than the sum of all incremental costs.

### 2.1 Avoided Costs

As discussed in Section 1.3, avoided cost data is provided by ComEd and is typically updated annually. The definitions of each avoided cost data point used in the analysis and their respective sources are as follows:

- Avoided Energy Costs (\$/kWh):** Avoided electric production costs are those associated with purchasing energy from Pennsylvania-New Jersey-Maryland Interconnection (PJM).

- **Avoided Electric Capacity Costs (\$/kW):** Avoided electric capacity costs are those associated with the construction of additional electricity generation facilities to meet peak demand. Incremental reductions in the amount of electricity demand during peak hours can delay or eliminate the need to build additional generation. ComEd is a participant in the Reliability Pricing Model, which is PJM's forward capacity market.
- **Avoided T&D Electric (\$/kW):** Avoided T&D costs are a benefit associated with not needing to build T&D infrastructure to meet demand at peak times.
- **Avoided Electric Ancillary (\$/kWh):** Avoided ancillary is a benefit associated with avoided costs attributable to the Open Access Transmission Tariff that applies to utilities that participate in the PJM market.
- **Avoided Gas Costs (\$/therm):** This value is from Nicor Gas and is used to account for gas interactive effects due to lighting.
- **Avoided Water Costs (\$/gal):** This value accounts for savings associated with efficient water fixtures and clothes washers. The avoided water costs of \$8.59/1,000 gallons (as provided by ComEd) was used for the analysis.

## 2.2 Non-Incentive Costs

Non-incentive costs are program administrator costs (related to energy efficiency) that are not otherwise classified as financial incentives paid to customers or incentives paid to third parties. In other words, non-incentive costs are equal to all program administrator costs minus incentives.

Examples of non-incentive costs include:

- Costs for overhead, labor, and materials required to develop, deliver, and administer functions related to the implementation of energy efficiency programs or portfolios such as rebate processing, measurement and verification (M&V), quality assurance, advertising and marketing, and customer relations
- Program administrator payment to a third party whose principal purpose is not to reduce the cost of the efficient measure to the customer
- Program administrator payment to a third party to cover the cost of services that are principally intended to be a form of marketing, as opposed to being truly necessary for any customer implementation of efficient measures
- Sales performance incentive fund formula (SPIFF) paid out to a third party

There are currently some performance-based programs where the third-party program implementer is paid an amount per kilowatt-hour that includes incentives and non-incentives. Guidehouse worked with ComEd to separate out the costs appropriately.

## 2.3 Incentives

Incentives<sup>8</sup> include financial incentives paid to customers plus incentives paid to third parties. Financial incentives paid to customers are payments<sup>9</sup> made by a program administrator directly to an end-use customer to encourage the customer to participate in an efficiency program and offset some or all of the customer's costs to purchase and install a qualifying efficient measure, ultimately resulting in a reduction in the net price paid by the customer for the efficient measure. This rebate type of incentive is often referred to as a downstream incentive, which has the result that the net price to the customer of an energy efficiency program-sponsored measure is reduced by the amount of the incentive.

Incentives paid to third parties are payments made by a program administrator to a third party that is principally intended to reduce the net price to the customer of purchasing and installing a qualifying efficient measure. These incentives include payments made by a program administrator to service providers, manufacturers, wholesalers, distributors, contractors, builders, retailers, implementation contractors, or other non-customer stakeholders that are principally intended to defray the incremental cost to the customer of purchasing and installing an efficient measure. They also include payments made by a program administrator to an implementation contractor to cover the full cost of direct installation measures (materials and labor) for the portion not covered by the customer. Incentives paid to third parties also include payment made by a program administrator to a third party to cover the full cost of study-based services (e.g., facility energy audits, energy surveys, energy assessments, retro-commissioning) that are truly necessary for a customer to implement efficient measures, as opposed to being principally a form of marketing. Incentives paid to third parties also include payment made by a program administrator to an implementation contractor to cover the cost of pickup and recycling of duplicative functioning equipment before its expected life is over (e.g., appliance recycling programs). The portion of the payments covered by the customers are not included in the incentives paid to third parties.

## 2.4 Incremental Costs

Incremental costs are the difference between the cost of the efficient measure and the cost of the most relevant baseline measure that would have been installed (if any) in the absence of the efficiency program. Installation costs (material and labor) and operations and maintenance (O&M) costs are included if there is a difference between the efficient measure and the baseline measure. In cases where the efficient measure has a significantly shorter or longer life than the relevant baseline measure (e.g., LEDs versus halogens), the avoided baseline replacement

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<sup>8</sup> Incentive definitions can be found in Section 8.4 TRC Costs of the Illinois Energy Efficiency Policy Manual Version 1.1. The Illinois TRC test requires that "all incremental costs of end use measures (including both utility and participant contributions)" should be reflected as costs in the TRC test calculation. As long as "all incremental costs of end-use measures" are included in the TRC test calculation, there is no need to add program administrator contribution costs (i.e., incentives) and participant contribution costs as separate components to the TRC test. However, program administrator contribution costs (i.e., incentives) are needed to calculate the Program Administrator Cost Test (PACT)/UCT because those are a component of the program administrator expenses. Most TRC modeling software requires users to input the incentives as a separate input in addition to providing all incremental costs such that the PACT/UCT can be calculated. For this reason, the separate incentives input in the TRC model is not used when calculating the TRC test because these costs are already reflected in the incremental cost input, and if the model were to use both the incentives input and the incremental cost input, it would result in double counting of costs in the TRC analysis.

<sup>9</sup> Payments include non-measure items of value that would be treated as transfer payments, e.g., gift cards.

measure costs are accounted for in the TRC analysis as a benefit. The incremental cost input in the TRC analysis is not reduced by the amount of any incentives.

Examples of incremental cost calculations include:

- The incremental cost for an efficient measure that is installed in new construction or is being purchased at the time of natural installation, investment, or replacement is the additional cost incurred to purchase an efficient measure over and above the cost of the baseline or standard (i.e., less efficient) measure (including any incremental installation, replacement, or O&M costs if there is a difference between the efficient measure and baseline measure).
- For a retrofit measure where the efficiency program caused the customer to update their existing equipment, facility, or processes, where the customer would not have otherwise made a purchase, the appropriate baseline is zero expenditure and the incremental cost is the full cost of the new retrofit measure (including installation costs).
- For the early replacement of a functioning measure with a new efficient measure, where the customer would not have otherwise made a purchase for several years, the appropriate baseline is a dual baseline that begins as the existing measure and shifts to the new standard measure after the expected remaining useful life of the existing measure ends. The incremental cost is the full cost of the new efficient measure (including installation costs) being purchased to replace a still-functioning measure less the present value of the assumed deferred replacement cost of replacing the existing measure with a new baseline measure at the end of the existing measure's life.
- For study-based services that are truly necessary for a customer to implement efficient measures, as opposed to being principally intended to be a form of marketing, the incremental cost is the full cost of the study-based service.

## 2.5 Discount Rate

Guidehouse applied the discount rate to determine the present value of the cumulative benefits (e.g., avoided electric production, capacity T&D, and ancillary) that accrue over the life of the measures included in each program. The discount rate should reflect the societal discount rate as defined in the legislation to be the actual, long-term treasury bond yields. The societal discount rate of 2.40% is used to calculate the TRC and UCT values.

## 2.6 Line Losses

Line losses were incorporated in the calculation of the benefits. The energy and demand savings calculated by the evaluation are estimated at the customer or meter level. The savings that accrue to ComEd ratepayers are those at the generator level and so the estimated savings are increased by the line losses within ComEd's T&D network. Guidehouse calculated total benefits using the energy line losses of 10.07% and the peak line losses of 10.66% as provided by ComEd.

## 2.7 Miscellaneous EEPS Portfolio Costs

In addition to costs allocated directly to energy efficiency programs, the cost-effectiveness analysis included portfolio-level costs that are not directly incurred by specific programs. These costs may include administrative, R&D, outreach, advertising, evaluation, M&V, legal, and other expenses. As statutory cost-effectiveness is measured at the portfolio level, ComEd does not allocate these costs to individual programs. Table 2-2 outlines the portfolio-level costs included in the analysis.

**Table 2-2. Breakdown of Portfolio-Level Costs**

Portfolio-Level Cost Component	Value (\$)
M&V	\$8,953,101
R&D	\$10,670,989
Market Development	\$1,101,059
Legal	\$19,748
Tracking System	\$2,169,577
Labor (Non-Program-Specific)	\$4,513,044
General Program Costs	\$5,554,048
Residential Outreach	\$1,755,205
Business Outreach	\$8,834,969
Income Eligible Outreach	\$1,590,292
General Education & Awareness	\$3,805,603
<b>Total</b>	<b>\$48,967,635</b>

Source: Guidehouse analysis of ComEd data

## 2.8 Societal NEIs

Societal NEIs occur when energy efficiency programs reduce electricity generated from fossil fuels, which reduces emissions including PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, and CO<sub>2</sub>. This reduction in emissions causes reduced adverse health impacts, which are monetizable. The Societal NEIs were incorporated in the CY2023 analysis for the TRC values only. As discussed in previous sections, this report provides TRC results both with and without NEIs included.

Guidehouse quantified and monetized these Societal NEIs using the U.S. Environmental Protection Agency (EPA) AVOIDed Emissions and geneRation Tool (AVERT) and CO–Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool.

### 3. Program-Specific Data

Table 3-1 and Table 3-2 summarize the CY2023 cost-effectiveness calculations and results for each program. These tables include the value of each benefit and cost component for each program and EEPS totals for each sector (e.g., residential, business, income eligible [IE], market transformation [MT], pilots). For programs jointly implemented by ComEd and one or more Illinois gas utility, the table includes only the electric portion of the program savings (unless ComEd claims the gas savings) and cost-benefit calculations.

Table 3-3 summarizes the CY2023 ComEd Electrification Measures' energy consumption, savings, and costs (total cost, total utility cost, average cost, average utility cost).

**Table 3-1. ComEd Program-Level Benefits, Costs, and Illinois TRC without Gas Data from Joint Programs (\$ Thousands)**

Program	Benefits							Costs							IL TRC Test (NPV replacement cost as benefit)						
	Electricity Cost Changes	Fossil Fuel Cost Changes	Water Cost Changes	Environmental Adder (GHGs)	Societal NEI	NPV Replacement Costs	Incremental Costs (Net)	Electricity Cost Changes	Fossil Fuel Cost Changes‡	Water Cost Changes	Environmental Adder (GHGs)	Societal NEI	NPV Replacement Costs	Non-Incentive Costs	Incentive Costs	Incremental Costs (Net)	IL TRC Benefits (w/o NEI)	IL TRC Costs (w/o NEI)	IL TRC Test Net Benefits (w/o NEI)	IL TRC Test (w/NEI)	IL TRC Test (w/o NEI)
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	(q) = a+b+c+d+f+g	(r) = h+i+j+k+m+n+p	(s) = q-r	(t) = (q+e)/(r+i)	(u) = r / s
Retail/Online	\$67,301	\$66,787	\$43	\$47,523	\$65,004	\$20,019	\$0	\$0	\$5,681	\$0	\$0	\$0	\$0	\$11,738	\$18,943	\$22,585	\$201,673	\$40,004	\$161,669	6.67	5.04
Product Distribution	\$93,177	\$1,889	\$53	\$60,888	\$80,057	\$35,263	\$0	\$0	\$8,615	\$0	\$0	\$0	\$0	\$3,938	\$15,184	\$30,621	\$191,270	\$43,175	\$148,096	6.28	4.43
Multifamily Upgrades	\$13,991	\$4,607	\$1	\$11,715	\$12,460	\$0	\$0	\$5	\$176	\$0	\$0	\$1	\$0	\$11,858	\$20,346	\$21,471	\$30,314	\$33,510	(\$3,195)	1.28	0.90
Single-Family Upgrades	\$7,136	\$11,933	\$9	\$4,062	\$3,958	\$1,482	\$0	\$21	\$250	\$0	\$5	\$7	\$0	\$10,347	\$25,619	\$14,005	\$24,621	\$24,628	(\$7)	1.16	1.00
Contractor / Midstream Rebates	\$14,915	\$479	\$0	\$12,910	\$5,147	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,279	\$7,815	\$6,688	\$28,304	\$8,967	\$19,337	3.73	3.16
New Construction - IE	\$1,369	\$242	\$1	\$1,129	\$510	\$0	\$0	\$0	\$36	\$0	\$0	\$0	\$0	\$1,400	\$961	\$1,242	\$2,740	\$2,678	\$62	1.21	1.02
Behavior - Res/IE	\$34,449	\$0	\$0	\$20,306	\$9,845	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,577	\$0	\$0	\$54,755	\$6,577	\$48,178	9.82	8.32
Electric Home New Construction	\$619	\$0	\$0	\$566	\$136	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$353	\$305	\$263	\$1,186	\$615	\$571	2.15	1.93
ASI kWh Purchase	\$881	\$718	\$0	\$338	\$398	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250	\$0	\$223	\$1,937	\$473	\$1,463	4.93	4.09
<b>Res &amp; IE Total</b>	<b>\$233,839</b>	<b>\$86,654</b>	<b>\$106</b>	<b>\$159,437</b>	<b>\$177,516</b>	<b>\$56,765</b>	<b>\$0</b>	<b>\$26</b>	<b>\$14,758</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$52,086</b>	<b>\$89,172</b>	<b>\$97,098</b>	<b>\$536,801</b>	<b>\$160,627</b>	<b>\$376,174</b>	<b>4.45</b>	<b>3.34</b>
Incentives	\$90,104	\$6,843	\$0	\$55,488	\$81,829	\$1,028	\$0	\$0	\$2,366	\$0	\$0	\$0	\$0	\$13,017	\$59,502	\$86,200	\$153,462	\$101,583	\$51,879	2.32	1.51
Small Business	\$119,094	\$1,087	\$0	\$69,649	\$90,558	\$1,279	\$0	\$0	\$4,319	\$0	\$0	\$0	\$0	\$10,331	\$79,673	\$66,041	\$191,108	\$80,692	\$110,416	3.49	2.37
Midstream/Upstream	\$71,316	\$0	\$0	\$39,776	\$48,306	\$2,860	\$0	\$0	\$7,033	\$0	\$0	\$0	\$0	\$3,101	\$15,131	\$23,164	\$113,952	\$33,298	\$80,654	4.87	3.42
Targeted Systems	\$22,535	\$277	\$0	\$15,442	\$20,313	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,577	\$20,725	\$17,557	\$38,254	\$27,134	\$11,119	2.16	1.41
Behavior - Bus/Pub	\$7,811	\$0	\$0	\$6,937	\$9,786	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,048	\$2,451	\$2,378	\$14,748	\$8,425	\$6,323	2.91	1.75
New Construction - Bus/Pub	\$6,493	\$0	\$14	\$4,628	\$5,119	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,976	\$2,495	\$10,894	\$11,135	\$12,870	(\$1,734)	1.26	0.87
Assessments	\$230	\$4	\$0	\$194	\$280	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$488	\$1,225	\$1,152	\$429	\$1,641	(\$1,212)	0.43	0.26
<b>Business &amp; Public Sector Total</b>	<b>\$317,583</b>	<b>\$8,210</b>	<b>\$15</b>	<b>\$192,113</b>	<b>\$256,191</b>	<b>\$5,166</b>	<b>\$0</b>	<b>\$0</b>	<b>\$13,718</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$53,374</b>	<b>\$181,201</b>	<b>\$207,386</b>	<b>\$523,088</b>	<b>\$265,643</b>	<b>\$257,445</b>	<b>2.93</b>	<b>1.97</b>
Heat Pump Water Heater Pilot	\$44	\$0	\$0	\$42	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$141	\$270	\$31	\$86	\$173	(\$86)	0.55	0.50
ENERGY STAR Retail Products Platform	\$4,747	\$844	\$31	\$3,053	\$4,241	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$306	\$786	\$6,039	\$8,675	\$6,345	\$2,330	2.04	1.37
Industrial EMIS	\$185	\$0	\$0	\$159	\$227	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$152	\$100	\$320	\$344	\$473	(\$128)	1.21	0.73
<b>Pilot and Market Transformation Total</b>	<b>\$4,976</b>	<b>\$844</b>	<b>\$31</b>	<b>\$3,255</b>	<b>\$4,477</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$600</b>	<b>\$1,156</b>	<b>\$6,070</b>	<b>\$9,106</b>	<b>\$6,990</b>	<b>\$2,116</b>	<b>1.94</b>	<b>1.30</b>
Voltage Optimization	\$38,614	\$0	\$0	\$23,652	\$31,331	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$70,018	\$0	\$0	\$62,266	\$70,018	(\$7,752)	1.34	0.89
<b>Portfolio Total without IE &amp; with VO*†</b>	<b>\$441,912</b>	<b>\$53,931</b>	<b>\$98</b>	<b>\$275,050</b>	<b>\$325,338</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$180,324</b>	<b>\$200,822</b>	<b>\$310,554</b>	<b>\$832,923</b>	<b>\$519,385</b>	<b>\$313,537</b>	<b>2.23</b>	<b>1.60</b>
<b>Portfolio Total with IE &amp; without VO*†</b>	<b>\$556,398</b>	<b>\$95,708</b>	<b>\$152</b>	<b>\$354,805</b>	<b>\$438,184</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$142,846</b>	<b>\$271,530</b>	<b>\$310,554</b>	<b>\$1,068,995</b>	<b>\$481,908</b>	<b>\$587,087</b>	<b>3.13</b>	<b>2.22</b>
<b>Portfolio Total without IE, VO, &amp; Pilots*</b>	<b>\$398,322</b>	<b>\$53,087</b>	<b>\$67</b>	<b>\$248,144</b>	<b>\$289,530</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$109,706</b>	<b>\$199,666</b>	<b>\$304,484</b>	<b>\$761,551</b>	<b>\$442,697</b>	<b>\$318,854</b>	<b>2.37</b>	<b>1.72</b>
<b>Portfolio Total with IE &amp; VO*†</b>	<b>\$595,013</b>	<b>\$95,708</b>	<b>\$152</b>	<b>\$378,457</b>	<b>\$469,515</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$212,865</b>	<b>\$271,530</b>	<b>\$310,554</b>	<b>\$1,131,261</b>	<b>\$551,926</b>	<b>\$579,335</b>	<b>2.90</b>	<b>2.05</b>

\*The TRC and UCT values are calculated using the sum of all the offerings' benefits and costs.

†Portfolio Total rows include Pilots & Market Transformation.

‡Gas heating penalties from energy efficiency measures designed to save electricity are being calculated as part of the overall fossil fuel cost changes.

Source: Guidehouse analysis



**Table 3-2. ComEd Program-Level Benefits, Costs, and UCT without Gas Data from Joint Programs (\$ Thousands)**

Program	Benefits							Costs							IL UCT					
	Electricity Cost Changes	Fossil Fuel Cost Changes	Water Cost Changes	Environmental Adder (GHGs)	Societal NEI	NPV Replacement costs	Incremental Costs (Net)	Electricity Cost Changes	Fossil Fuel Cost Changes‡	Water Cost Changes	Environmental Adder (GHGs)	Societal NEI	NPV Replacement costs	Non-Incentive Costs	Incentive Costs	Incremental Costs (Net)	IL UCT Benefits	IL UCT Costs	IL UCT Test Net Benefits	IL UCT Test
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	(v) = a+b	(w) = h+i+n+o	(x) = v-w	(y) = v/w
Retail/Online	\$67,301	\$66,787	\$43	\$47,523	\$65,004	\$20,019	\$0	\$0	\$5,681	\$0	\$0	\$0	\$0	\$11,738	\$18,943	\$22,585	\$134,088	\$36,362	\$97,726	3.69
Product Distribution	\$93,177	\$1,889	\$53	\$60,888	\$80,057	\$35,263	\$0	\$0	\$8,615	\$0	\$0	\$0	\$0	\$3,938	\$15,184	\$30,621	\$95,066	\$27,738	\$67,328	3.43
Multifamily Upgrades	\$13,991	\$4,607	\$1	\$11,715	\$12,460	\$0	\$0	\$5	\$176	\$0	\$0	\$1	\$0	\$11,858	\$20,346	\$21,471	\$18,598	\$32,384	(\$13,786)	0.57
Single-Family Upgrades	\$7,136	\$11,933	\$9	\$4,062	\$3,958	\$1,482	\$0	\$21	\$250	\$0	\$5	\$7	\$0	\$10,347	\$25,619	\$14,005	\$19,069	\$36,236	(\$17,168)	0.53
Contractor / Midstream Rebates	\$14,915	\$479	\$0	\$12,910	\$5,147	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,279	\$7,815	\$6,688	\$15,394	\$10,094	\$5,300	1.53
New Construction - IE	\$1,369	\$242	\$1	\$1,129	\$510	\$0	\$0	\$0	\$36	\$0	\$0	\$0	\$0	\$1,400	\$961	\$1,242	\$1,611	\$2,397	(\$787)	0.67
Behavior - Res/IE	\$34,449	\$0	\$0	\$20,306	\$9,845	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,577	\$0	\$0	\$34,449	\$6,577	\$27,872	5.24
Electric Home New Construction	\$619	\$0	\$0	\$566	\$136	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$353	\$305	\$263	\$619	\$657	(\$38)	0.94
ASI kWh Purchase	\$881	\$718	\$0	\$338	\$398	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$250	\$0	\$223	\$1,599	\$250	\$1,349	6.40
<b>Res &amp; IE Total</b>	<b>\$233,839</b>	<b>\$86,654</b>	<b>\$106</b>	<b>\$159,437</b>	<b>\$177,516</b>	<b>\$56,765</b>	<b>\$0</b>	<b>\$26</b>	<b>\$14,758</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$52,086</b>	<b>\$89,172</b>	<b>\$97,098</b>	<b>\$320,493</b>	<b>\$152,696</b>	<b>\$167,796</b>	<b>2.10</b>
Incentives	\$90,104	\$6,843	\$0	\$55,488	\$81,829	\$1,028	\$0	\$0	\$2,366	\$0	\$0	\$0	\$0	\$13,017	\$59,502	\$86,200	\$96,947	\$74,885	\$22,062	1.29
Small Business	\$119,094	\$1,087	\$0	\$69,649	\$90,558	\$1,279	\$0	\$0	\$4,319	\$0	\$0	\$0	\$0	\$10,331	\$79,673	\$86,041	\$120,180	\$94,323	\$25,857	1.27
Midstream/Upstream	\$71,316	\$0	\$0	\$39,776	\$48,306	\$2,860	\$0	\$0	\$7,033	\$0	\$0	\$0	\$0	\$3,101	\$15,131	\$23,164	\$71,316	\$25,265	\$46,051	2.82
Targeted Systems	\$22,535	\$277	\$0	\$15,442	\$20,313	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$9,577	\$20,725	\$17,557	\$22,812	\$30,302	(\$7,490)	0.75
Behavior - Bus/Pub	\$7,811	\$0	\$0	\$6,937	\$9,786	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,048	\$2,451	\$2,378	\$7,811	\$8,499	(\$687)	0.92
New Construction - Bus/Pub	\$6,493	\$0	\$14	\$4,628	\$5,119	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,976	\$2,495	\$10,894	\$6,493	\$4,471	\$2,022	1.45
Assessments	\$230	\$4	\$0	\$194	\$280	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$488	\$1,225	\$1,152	\$234	\$1,713	(\$1,479)	0.14
<b>Business &amp; Public Sector Total</b>	<b>\$317,583</b>	<b>\$8,210</b>	<b>\$15</b>	<b>\$192,113</b>	<b>\$256,191</b>	<b>\$5,166</b>	<b>\$0</b>	<b>\$0</b>	<b>\$13,718</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$53,374</b>	<b>\$181,201</b>	<b>\$207,386</b>	<b>\$325,794</b>	<b>\$239,458</b>	<b>\$86,335</b>	<b>1.36</b>
Heat Pump Water Heater Pilot	\$44	\$0	\$0	\$42	\$9	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$141	\$270	\$31	\$44	\$411	(\$367)	0.11
ENERGY STAR Retail Products Platform	\$4,747	\$844	\$31	\$3,053	\$4,241	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$306	\$786	\$6,039	\$5,591	\$1,093	\$4,498	5.12
Industrial EMIS	\$185	\$0	\$0	\$159	\$227	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$152	\$100	\$320	\$185	\$252	(\$67)	0.73
<b>Pilot and Market Transformation Total</b>	<b>\$4,976</b>	<b>\$844</b>	<b>\$31</b>	<b>\$3,255</b>	<b>\$4,477</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$600</b>	<b>\$1,156</b>	<b>\$6,070</b>	<b>\$5,820</b>	<b>\$1,756</b>	<b>\$4,064</b>	<b>3.31</b>
Voltage Optimization	\$38,614	\$0	\$0	\$23,652	\$31,331	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$70,018	\$0	\$0	\$38,614	\$70,018	(\$31,404)	0.55
<b>Portfolio Total without IE &amp; with VO†</b>	<b>\$441,912</b>	<b>\$53,931</b>	<b>\$98</b>	<b>\$275,050</b>	<b>\$325,338</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$180,324</b>	<b>\$200,822</b>	<b>\$310,554</b>	<b>\$495,844</b>	<b>\$409,649</b>	<b>\$86,195</b>	<b>1.21</b>
<b>Portfolio Total with IE &amp; without VO†</b>	<b>\$556,398</b>	<b>\$95,708</b>	<b>\$152</b>	<b>\$354,805</b>	<b>\$438,184</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$142,846</b>	<b>\$271,530</b>	<b>\$310,554</b>	<b>\$652,106</b>	<b>\$442,878</b>	<b>\$209,228</b>	<b>1.47</b>
<b>Portfolio Total without IE, VO, &amp; Pilots*</b>	<b>\$398,322</b>	<b>\$53,087</b>	<b>\$67</b>	<b>\$248,144</b>	<b>\$289,530</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$109,706</b>	<b>\$199,666</b>	<b>\$304,484</b>	<b>\$451,409</b>	<b>\$337,874</b>	<b>\$113,535</b>	<b>1.34</b>
<b>Portfolio Total with IE &amp; VO†</b>	<b>\$595,013</b>	<b>\$95,708</b>	<b>\$152</b>	<b>\$378,457</b>	<b>\$469,515</b>	<b>\$61,931</b>	<b>\$0</b>	<b>\$26</b>	<b>\$28,476</b>	<b>\$0</b>	<b>\$5</b>	<b>\$8</b>	<b>\$0</b>	<b>\$212,865</b>	<b>\$271,530</b>	<b>\$310,554</b>	<b>\$690,721</b>	<b>\$512,897</b>	<b>\$177,824</b>	<b>1.35</b>

\*The TRC and UCT values are calculated using the sum of all the offerings' benefits and costs.

†Portfolio Total rows include Pilots & Market Transformation.

‡Gas heating penalties from energy efficiency measures designed to save electricity are being calculated as part of the overall fossil fuel cost changes.

Source: Guidehouse analysis



Program	Component	IE	End Use Type	Savings Category	Qty	Increase in Electricity Consumption (kWh)	Average Increase in Electricity Consumption (kWh)	Decrease in Gas Consumption (therms)	Average Decrease in Gas Consumption (therms)	Decrease in Gas Consumption (kWh)	Net Change in Electricity Consumption (kWh)	Ex Ante Gross Savings (kWh)	Program Gross Realization Rate	Verified Gross Savings (kWh)	Program Net-to-Gross Ratio (NTG)	Verified Net Savings (kWh)	EUL	Total Cost	Total Utility Cost	Average Cost	Average Utility Cost
Retail/Online	Appliance Rebates	FALSE	Appliances	MR Heat Pump Dryer EEE	32	-2,295	-72	41	1	12,051	14,346	12,007	1.19	14,346	0.80	11,477	16.0	\$5,481	\$2,961	\$171	\$93
Retail/Online	Appliance Rebates	FALSE	Appliances	MR Induction Cooktop EEE DAC	23	2,875	125	23	1	6,808	3,933	265	14.83	3,933	1.00	3,933	16.0	\$18,114	\$8,773	\$788	\$381
Retail/Online	Appliance Rebates	FALSE	Appliances	MR Induction Cooktop EEE	79	9,875	125	80	1	23,385	13,510	911	14.83	13,510	0.80	10,808	16.0	\$62,218	\$30,132	\$788	\$381
Retail/Online	Appliance Rebates	TRUE	Appliances	IE Heat Pump EEE DAC	1	-71	-71	1	1	373	444	370	1.20	443	1.00	443	16.0	\$171	\$92	\$171	\$92
Retail/Online	Appliance Rebates	TRUE	Appliances	IE Heat Pump EEE	4	-284	-71	5	1	1,490	1,774	1,481	1.20	1,774	1.00	1,774	16.0	\$684	\$369	\$171	\$92
Retail/Online	Appliance Rebates	TRUE	Appliances	IE Induction Cooktop EEE DAC	1	125	125	1	1	296	171	12	14.83	171	1.00	171	16.0	\$788	\$381	\$788	\$381
Retail/Online	Appliance Rebates	TRUE	Appliances	IE Induction Cooktop EEE	10	1,250	125	10	1	2,960	1,710	115	14.83	1,710	1.00	1,710	16.0	\$7,876	\$3,814	\$788	\$381
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	HVAC	Air Source Heat Pump - Electrification	23	259,999	11,304	21,345	928	625,625	365,627	366,663	1.00	365,627	1.00	365,627	16.0	\$533,046	\$637,676	\$23,176	\$27,725
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	Appliances	Clothes Dryer - Electrification	24	14,801	617	659	27	19,311	4,510	4,507	1.00	4,510	1.00	4,510	16.0	\$21,380	\$28,994	\$891	\$1,208
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	Appliances	Cooktop - Electrification	23	2,592	113	177	8	5,202	2,610	2,608	1.00	2,610	1.00	2,610	16.0	\$17,926	\$24,702	\$779	\$1,074
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	HVAC	Ductless Heat Pump - Electrification	2	14,156	7,078	1,754	877	51,405	37,249	37,185	1.00	37,249	1.00	37,249	15.0	\$29,832	\$30,105	\$14,916	\$15,053
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	HVAC	Heat Pump Water Heater - Electrification	24	19,520	813	4,471	186	131,033	111,513	111,454	1.00	111,513	1.00	111,513	15.0	\$118,332	\$131,489	\$4,930	\$5,479
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	HVAC	Air Source Heat Pump - Electrification - DAC	40	456,403	11,410	39,067	977	1,145,051	688,648	690,600	1.00	688,648	1.00	688,648	16.0	\$968,586	\$1,150,551	\$24,215	\$28,764
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	Appliances	Clothes Dryer - Electrification - DAC	34	22,265	655	925	27	27,104	4,839	4,836	1.00	4,839	1.00	4,839	16.0	\$29,073	\$39,859	\$855	\$1,172
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	Appliances	Cooktop - Electrification - DAC	46	5,252	114	362	8	10,610	5,358	5,354	1.00	5,358	1.00	5,358	16.0	\$35,960	\$49,512	\$782	\$1,076
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	Hot Water	Electric Water Heater - Electrification - DAC	2	1,240	620	307	153	8,986	7,746	7,726	1.00	7,746	1.00	7,746	13.0	\$8,125	\$9,004	\$4,063	\$4,502
Single-Family Upgrades	IE WHE - Resource Innovations	TRUE	HVAC	Heat Pump Water Heater - Electrification - DAC	37	35,460	958	6,905	187	202,400	166,940	166,852	1.00	166,940	1.00	166,940	15.0	\$178,524	\$198,809	\$4,825	\$5,373
Single-Family Upgrades	IE WHE - Elevate	TRUE	Appliances	Stove Replacement - Induction Cooktop - Electrification	47	5,858	125	474	10	13,902	8,044	8,039	1.00	8,044	1.00	8,044	16.0	\$38,758	\$52,604	\$825	\$1,119
Single-Family Upgrades	IE WHE - Elevate	TRUE	Appliances	Dryer Replacement - Electric/HP Clothes Dryer - Electrification	44	0	0	295	7	8,637	8,637	8,631	1.00	8,637	1.00	8,637	16.0	\$39,487	\$53,446	\$897	\$1,215
Single-Family Upgrades	IE WHE - Elevate	TRUE	HVAC	Air Source Heat Pump Installation - Electrification	37	448,241	12,115	37,535	1,014	1,100,158	651,917	653,765	1.00	651,917	1.00	651,917	16.0	\$907,686	\$1,076,004	\$24,532	\$29,081
Single-Family Upgrades	IE WHE - Elevate	TRUE	HVAC	DHW Heater Replacement - Heat Pump - Electrification	29	22,175	765	5,189	179	152,088	129,914	129,845	1.00	129,914	1.00	129,914	15.0	\$170,217	\$199,354	\$5,870	\$6,874
<b>Total</b>	-	-	-	-	<b>3,913</b>	<b>18,770,293</b>	<b>303,895</b>	<b>1,952,691</b>	<b>30,475</b>	<b>65,815,079</b>	<b>47,044,786</b>	<b>46,768,822</b>	<b>1.00</b>	<b>46,999,491</b>	<b>0.85</b>	<b>39,922,402</b>	<b>15.6</b>	<b>\$19,232,139</b>	<b>\$15,645,664</b>	<b>\$4,915</b>	<b>\$3,999</b>

Source: Guidehouse analysis

### 3.1 Incremental and Actual Measure Costs

The guidance from the IL TRM and Illinois Energy Efficiency Policy Manual indicates that it is appropriate to use actual measure-specific costs in the analysis. As a result, Guidehouse compiled the actual cost information from the implementer invoices and the program tracking data provided by ComEd and identified any missing information. The team sourced incremental measure costs from IL TRM v11.0 and different workpapers provided by the implementation contractor.

While conducting the cost review, Guidehouse found instances where the program tracking data and the incremental cost value from the reference sources do not align due to differing definitions of program unit and then made appropriate assumptions to account for these differences. Guidehouse also included O&M costs when there was a difference between the efficient measure and the baseline measure based on the guidance provided in IL TRM v11.0. Where the efficient measure has a significantly shorter or longer life than the relevant baseline measure (e.g., LEDs versus halogens), Guidehouse used the avoided baseline replacement measure costs in the TRC analysis. The incremental cost input in the TRC analysis was not reduced by the amount of any incentives. Some of the methodologies used to estimate the measure costs for different programs are listed below:

- **Custom, Industrial Systems, and Retro-Commissioning:** Guidehouse analyzed a sample of all the projects to determine if the actual measure cost or an incremental cost should be used for each project. Based on this analysis, the team developed a \$/kWh value that was applied to the entire population of measures installed as a part of this program.
- **Prescriptive Programs (Small Business, Standard, Single Family Upgrades, etc.):** Guidehouse researched the incremental measure cost data from IL TRM v11.0, tracking data, and program invoices. For joint programs, only the ComEd portion of the costs were included.
- **Contractor/Midstream Rebates:** The early replacement HVAC measures installed as a part of this program were treated based on the guidance provided in IL TRM v11.0. The full installation cost subtracted by the NPV deferred future replacement costs was calculated for the analysis.
- **Product Distribution Program (and other similar programs):** Guidehouse used the per measure cost in each kit to perform the analysis.
- **New Construction – IE:** Guidehouse researched the incremental measure cost data from IL TRM v11.0 and cost data from TRM's in surrounding jurisdictions.
- **Non-Residential New Construction:** Guidehouse calculated the measure cost based on ASHRAE Standard 90.1 2019-Illinois<sup>10</sup> assuming similar cost to one code cycle improvement.

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<sup>10</sup> [https://www.energycodes.gov/sites/default/files/2021-07/Cost-effectiveness\\_of\\_ASHRAE\\_Standard\\_90-1-2019-Illinois.pdf](https://www.energycodes.gov/sites/default/files/2021-07/Cost-effectiveness_of_ASHRAE_Standard_90-1-2019-Illinois.pdf)

## 3.2 Data Sources and Assumptions

The analysis used the following sources to compile the relevant data:

- **Program tracking data and evaluation reports** to compile measure-level savings, quantity, and realization rate values
- **IL TRM v11.0** to compile measure life and incremental cost data
- **Project invoices** to compile actual cost data (if available)
- **Project-level costs**, including utility incentives and non-incentive costs provided by ComEd

Table 3-4 provides the sources and assumptions for the measure costs by program.

**Table 3-4. CY2023 Program Cost Data Sources and Assumptions**

Program	Component	Data Source	Note
Assessments	Facility Assessments	Not Applicable	ComEd does not track the measure costs for this program. Guidehouse assumed that the implementation contractor and marketing costs are the only costs associated with this program and there is no measure cost.
Behavior Bus/Pub	Strategic Energy Management	Tracking Data	Guidehouse assumed measure cost equals incentives.
Incentives	Custom	ComEd Project Files	Sample of project files, total \$/kWh
Incentives	Standard	RI resource workpapers	The workpapers provided reference for incremental measure cost. Guidehouse made assumptions regarding unit definition based on program data.
Midstream/Upstream	CFSE	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Midstream/Upstream	Instant Discounts	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
New Construction – Bus/Pub	Non-Residential New Construction	CY2023 Data	Guidehouse used the same value as CY2022 as it was understood ComEd did not change the incremental cost between CY2022 and CY2023.
Small Business	-	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs.
Targeted Systems	Industrial Systems	Tracking Data	Sample of project files, total \$/kWh
Targeted Systems	Retro-Commissioning (RCx)	ComEd Project Files	Sample of project files, total \$/kWh
Targeted Systems	Virtual Commissioning (VCx)	ComEd Project Files	Sample of project files, total \$/kWh
ENERGY STAR Retail Products Platform	ESRPP	IL TRM v11.0	An average of the deemed values provided in the IL TRM v11.0 for each measure was used in the analysis; each measure had different costs based on type.
Heat Pump Water Heater Pilot	Heat Pump Water Heater Pilot	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Industrial Energy Management Information Systems	EMIS	Industrial Systems	Used total \$/kWh of Industrial Systems
ASI kWh Purchase	ASI kWh Purchase	ComEd Electrification Cost Data	Used total IMC \$/kWh of ASI from ComEd Electrification Cost data sheet
Behavior - Res/IE	Behavior - Res-IE	NA	There are no incentives or measure costs, only program administration costs.

Program	Component	Data Source	Note
Contractor / Midstream Rebates	Midstream	IL TRM v11.0 & ComEd Electrification Cost Data	IL TRM v11.0 deemed values and cost from ComEd Electrification Cost data were used for the analysis.
Electric Homes New Construction	EHNC	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Multifamily Upgrades	IHWAP	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Multifamily Upgrades	MCA	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Multifamily Upgrades	MFLI	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Multifamily Upgrades	Public Housing	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs.
Multifamily Upgrades	Whole Home Electrification	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
New Construction – IE	Affordable Housing New Construction	ComEd	Guidehouse used an average of the Incremental Capital Cost per project.
Product Distribution	Elementary Ed	Tracking Data and Project Invoices	Implementer invoices were used to obtain the ComEd allocated costs of joint measures, which were then applied against the percent breakout of utility kits.
Product Distribution	Food Bank	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs.
Product Distribution	IE Kits	Tracking Data and Project Invoices	Implementer invoices were used to obtain the ComEd allocated costs of joint measures, which were then applied against the percent breakout of utility kits.
Retail/Online	Appliance Rebates	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Retail/Online	Appliance Recycling	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Retail/Online	ComEd Marketplace	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Retail/Online	Efficient Choice	IL TRM v11.0, Michigan Energy Measure Database 2023, Measure Documentation	IL TRM v11.0 deemed values were used for the analysis. Measures not in the TRM used an assortment of supporting measure documentation.
Retail/Online	Lighting Discounts	IL TRM v11.0	Incremental costs deemed in the TRM were used for the analysis.
Retail/Online	MR Lighting	IL TRM v11.0	IL TRM v11.0 deemed values were used for the analysis.
Single-Family Upgrades	HEA IE	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.

Program	Component	Data Source	Note
Single-Family Upgrades	HEA MR	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Single-Family Upgrades	IE Whole Home Electrification - Elevate	ComEd Provided Data Files	Guidehouse assumed the Total EEE Incentive Cost should equal the measure costs. Guidehouse brought out specific costs of measures grouped together using a percentage of savings.
Single-Family Upgrades	IE Whole Home Electrification - Resource Innovations	ComEd Provided Data Files	Guidehouse assumed the Total EEE Incentive Cost should equal the measure costs. Guidehouse brought out specific costs of measures grouped together using a percentage of savings.
Single-Family Upgrades	IHWAP-SF	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Single-Family Upgrades	SAP	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Single-Family Upgrades	SFLI	Tracking Data	Guidehouse assumed the program tracking data incentive amounts should equal measure costs. Guidehouse found these incentive amounts accounted for the ComEd allocated costs of joint measures.
Voltage Optimization	VO	Project Files	Total costs obtained from ComEd provided documentation.

Source: Guidehouse analysis

### 3.3 Findings

Guidehouse performed a bottom-up analysis for each program in ComEd's CY2023 portfolio and offers the following findings:

- Finding 1.** Compared with CY2022, the TRC values for CY2023 are slightly lower for the portfolio. This decrease is due to reduced benefits realized in CY2023, largely concentrated within the Voltage Optimization program. Another contributing factor was the addition of the heating penalty, which introduced \$28 million in new costs. Although portfolio-level cost test results are lower than in CY2022, the TRC and UCT remain well above 1.0.
- Finding 2.** Income-Eligible components contributed to an overall increase in portfolio TRC scores. The portfolio without NEIs achieved a TRC of 1.60 when excluding IE, compared to a 2.05 with IE components. NEIs increased this effect further, showing a 2.23 without IE and 2.90 with IE.
- Finding 3.** Most Residential and Business programs have TRC values greater than 1.0; only the Assessments, Multifamily Upgrades, and New Construction – Bus/Pub programs resulted in a TRC below 1.0 when excluding Societal NEIs. Within each of these programs, participant incremental costs were the main cost driver.

Program	TRC with Societal NEIs	TRC without Societal NEIs
Assessments	0.43	0.26
New Construction – Bus/Pub	1.26	0.87
Multifamily Upgrades	1.28	0.90

Source: Guidehouse analysis

- Finding 4.** Two of the pilot programs have TRCs less than 1.0 when excluding Societal NEIs.

Program	TRC with Societal NEIs	TRC without Societal NEIs
Heat Pump Water Heater Pilot	0.55	0.50
Industrial EMIS	1.21	0.73

Source: Guidehouse analysis

- Finding 5.** Within high-scoring programs such as Retail/Online and Product Distribution, low-cost measures such as LEDs, Air Sealing, and Weatherstripping continue to drive high TRCs.