



Opinion **Dynamics**

# NON-ENERGY IMPACTS FOR AMEREN ILLINOIS NONRESIDENTIAL PROGRAMS

Stakeholder Advisory Group Presentation



October 20, 2022



# Agenda

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- Introduction to NEIs
- Overview of research goals and tasks
- Sample design
- Analysis
- Results

# Non-residential Non-Energy Impacts (NEIs)

- Reflect changes to an organization's costs and revenues resulting from program participation apart from energy savings
- Can be used in program marketing/targeting to demonstrate full value of programs to customers and increase program participation
  - Can drive program participation, retain large customers, and help achieve deeper savings

Lower internal maintenance



Fewer contractor calls



Reduced waste disposal costs



Fewer parts and supplies



Health and safety impacts



Less food spoilage



Increased productivity / reduced downtime



# Research Overview

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- Goal: identify, characterize, and monetize the NEIs associated with select measures and customer segments relevant to the Ameren Illinois Company (AIC) Business Program
- Research activities:
  - Task 1: Lifecycle cost (LCC) engineering analysis (O&M NEIs)
  - Task 2: In-depth interviews (IDI) with prior participants (Non-O&M NEIs)
  - Leveraged NEIs to develop marketing cut-sheets and provide collateral for outreach materials

# Research Overview

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## Task 1: LCC analysis

- Estimate O&M NEIs for eleven measures by comparing the present value of annual O&M costs for EE measures to non-EE measures, considering:
  - Annual maintenance
  - Periodic repair
  - Equipment replacement

## Task 2: IDIs with prior program participants

- Conducted ten case-study interviews across four segments of interest to collect data on non-O&M NEIs such as:
  - Revenues (rent, sales)
  - Production/ loss prevention
  - Health/safety
- Captured up to two end uses per interview

Segment-specific marketing collateral and cut sheets for program outreach

# Task 1: LCC Analysis - Measure Sample

## Task 1 - O&M LCC analysis

- Prioritized measures with first-year customer benefit-cost ratios <1
- Selected measures for which there is robust published cost data
- Prioritized measures most likely to produce positive O&M cost savings

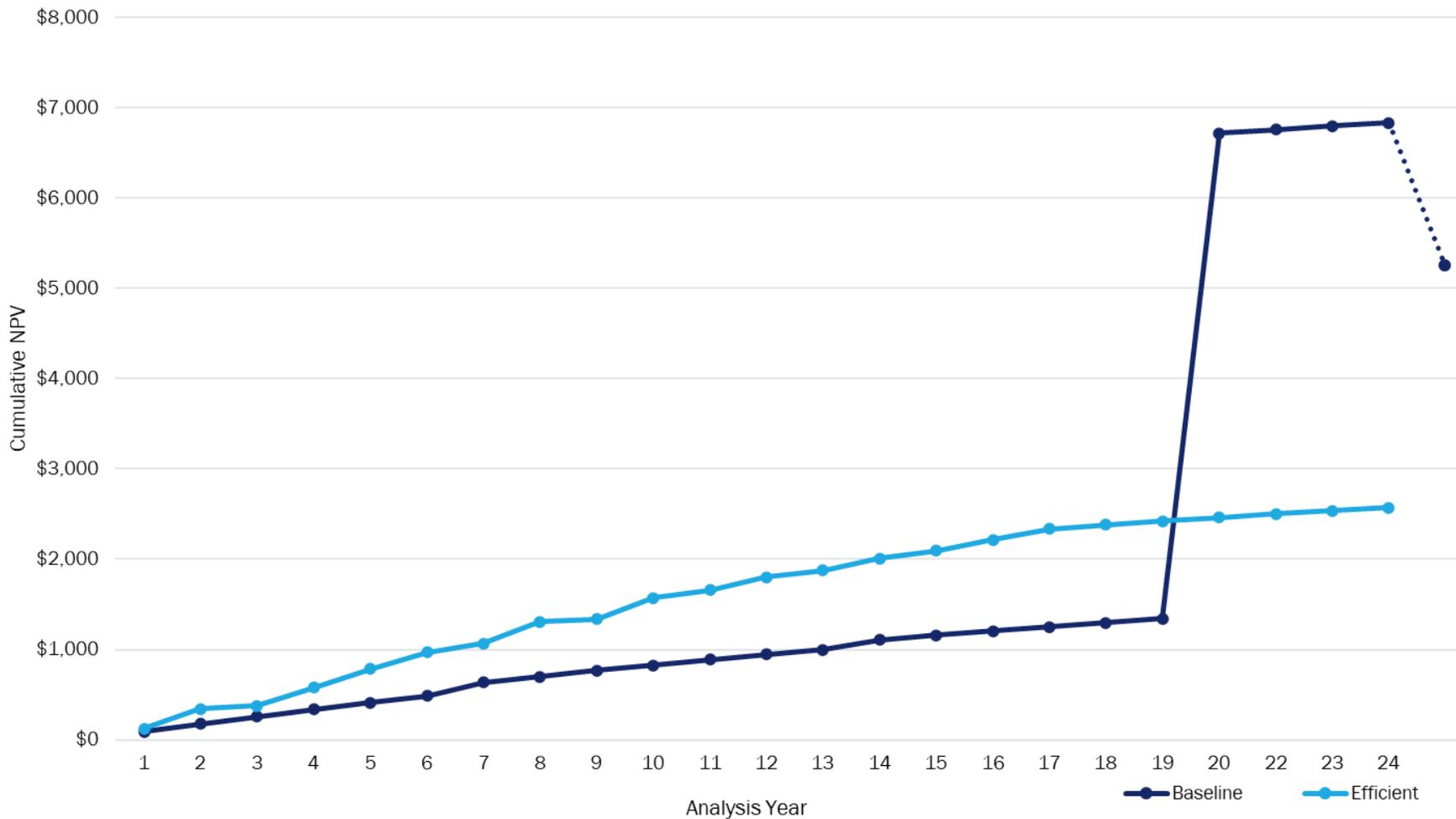
| Enduse         | IL-TRM Section | Efficient Measure Category                     | Baseline Measure Category                       |
|----------------|----------------|--|---|
| HVAC           | 4.4.17         | VSD on Chilled Water Pump                      | Chilled Water Pump without a VSD                |
|                | 4.4.17         | VSD on Hot Water Pump                          | Hot Water Pump without a VSD                    |
|                | 4.2.26         | VSD on HVAC pump or fan                        | No control or bypass damper on HVAC pump or fan |
|                | 4.4.26         | HVAC supply / return fan motor with a VSD      | HVAC supply / return fan motor without a VSD    |
| Lighting       | 4.5.4          | Low output mogul fixture                       | 113.6W metal halide                             |
| Compressed Air | 4.7.1          | Compressor ≤ 40 hp with variable speed control | Modulating compressor with blow down ≤ 40 hp    |

# Task 1: Example Analysis Inputs

- Determine periodic maintenance, anticipated repair, and anticipated replacements activities and associated cost
  - Labor hours and labor cost (Union vs non-union labor rates)
  - Required equipment and duration of use
  - Frequency of action

| City                        | Component   | Labor Hours | Material Cost | Equip Hours | Equip Type  | Freq | Period (years) |
|-----------------------------|---|-------------|---------------|-------------|-------------|------|----------------|
| <b>Repair1</b>              |   |             |               |             |             |      |                |
| Springfield, IL             | Circulation Pump, Chiller & Condenser Water, 25.000 HP          | 1.14        | \$68.05       | 0           | None        | 1    | 7              |
| Springfield, IL             | Circulation Pump with VFD, Chiller & Condenser Water, 25.000 HP | 1.14        | \$68.05       | 0           | None        | 1    | 8.4            |
| <b>Repair2 (VFD repair)</b> |   |             |               |             |             |      |                |
| Springfield, IL             | Circulation Pump, Chiller & Condenser Water, 25.000 HP          |             |               |             |             |      |                |
| Springfield, IL             | Circulation Pump with VFD, Chiller & Condenser Water, 25.000 HP | 1.5         | \$42.25       | 0           | None        | 1    | 5              |
| <b>Repalce1</b>             |   |             |               |             |             |      |                |
| Springfield, IL             | Circulation Pump, Chiller & Condenser Water, 25.000 HP          | 8           | \$11,797.50   | 4           | 2T Forklift | 1    | 20             |
| Springfield, IL             | Circulation Pump with VFD, Chiller & Condenser Water, 25.000 HP | 8           | \$11,797.50   | 4           | 2T Forklift | 1    | 24             |

# Task 1: Example Analysis



- Key Assumptions
  - Analysis length
  - Treatment of residual costs
  - Discount rate
- NPV cost streams and amortize

# Task 1: Results of LCC – Manufacturing Segment

| Measure                             | Average Incentive Amount | Value of Average Annual Energy Savings | Value of Average Annual O&M Impacts | Payback Period (Years)* |
|-------------------------------------|--------------------------|--|-------------------------------------|-------------------------|
| LED Fixture                         | \$30                     | \$32                                   | \$12                                | 1.20                    |
| Efficient Air Compressor            | \$3,125                  | \$2,463                                | \$460                               | 0.93                    |
| VFD on 20 HP Chilled Water Pump     | \$2,447                  | \$475                                  | \$157                               | 1.01                    |
| VFD on 15 HP HVAC Supply/Return Fan | \$1,875                  | \$2,344                                | \$10                                | 0.63                    |
| VFD on 25 HP HVAC Supply/Return Fan | \$3,125                  | \$13,671                               | \$85                                | 0.09                    |
| VFD on 40 HP HVAC Process Fan       | \$5,000                  | \$6,119                                | \$382                               | 1.88                    |
| VFD on 40 HP HVAC Process Pump      | \$5,000                  | \$3,888                                | \$282                               | 0.71                    |

\*Includes value of incentive, energy savings, and O&M non-energy impacts (NEIs)

# Task 2: In-depth Interviews - Segments

- Task 2- Non-O&M IDIs
  - Focused on segments likely important to AIC from a savings or customer experience perspective
  - Identified customers with a relatively low participation rate in 2020 Standard Initiative and that may present an opportunity to increase participation
  - Added LLCs as a carve-out

| Respondent | Segment                                 | Measure Category 1 | Measure Category 2         |
|------------|---|--------------------|----------------------------|
| 1          | Manufacturing/<br>Industrial (Discrete) | Compressed Air     | Lighting                   |
| 2          |   | Lighting           | Advanced lighting controls |
| 3          | Manufacturing/<br>Industrial (Process)  | Lighting           | Advanced lighting controls |
| 4          |   | Lighting           | Advanced lighting controls |
| 5          | Health Care                             | HVAC               | Advanced lighting controls |
| 6          |   | Lighting           | N/A                        |
| 7          |   | HVAC               | Advanced lighting controls |
| 8          |   | Lighting           | Advanced lighting controls |
| 9          |   | HVAC               | Advanced lighting controls |
| 10         | Retail                                  | Lighting           | HVAC                       |

# Task 2: Marketing Cut Sheets

- A construction aggregate producer said the LEDs do not require the 30 minutes of warm-up that their old fixtures required, resulting in approximately \$3,400 in annual labor savings
- An industrial pipe manufacturer said they catch 15%–20% more product defects, potentially saving thousands of dollars in sales and product replacement since upgrading to LEDs. They also said increased exterior lighting quality and visibility resulted in a 10% reduction in product damages in the yard.

*“By eliminating the glass lenses in the fixtures or the light tubes themselves, I’ve improved the plant safety from a food safety standpoint and a personnel safety standpoint, because no one’s going to get hurt by the cut glass or anything like that.”*

## AIC NONRESIDENTIAL NEIs CASE STUDY RESULTS



### MANUFACTURING/ INDUSTRIAL



#### LED LIGHTING

Customers said upgrading to LEDs increased overall lighting quality and brightness, resulting in improved facility safety, product quality, and worker happiness, as well as decreased administration, waste disposal, and maintenance costs associated with replacing burned-out bulbs.

#### OPERATIONS AND MAINTENANCE

- Participants commonly reported decreased administration costs associated with ordering new bulbs and changing out old ones. Cost savings ranged between \$200 and \$2,145 annually.
- One process manufacturer said they went from a dozen bulb replacements per week in office settings to none.

#### WORKSPACE COMFORT

- Participants frequently noted increased positivity in the workspace and said the LED lighting was brighter and more natural. One participant said they originally completed the project primarily for the energy savings, but the improvements in worker attitudes and feeling in the space were the most valuable changes.

*“Workers feel like the owner is investing in their space.”*

#### VISIBILITY

- An industrial pipe manufacturer said they catch 15%–20% more product defects, potentially saving thousands of dollars in sales and product replacement since upgrading to LEDs. They also said increased exterior lighting quality and visibility resulted in a 10% reduction in product damages in the yard.
- A truck body manufacturer shared employees can see better to weld, resulting in fewer errors and saved worker time.

*“Good lighting means you can see what you’re working with much better. So, if you want to assess quality out on the floor, if you’ve got good lighting you now can assess the quality of the product that you’re producing more easily.”*

#### REDUCED DOWNTIME

- A truck body manufacturer reported saving \$500,000 in avoided annual facility downtime costs. Before their upgrade a bump in power meant they had to wait for the metal halides to cool before re-igniting, causing a halt in production.
- A construction aggregate producer said the LEDs do not require the 30 minutes of warm-up that their old fixtures required, resulting in approximately \$3,400 in annual labor savings.

#### SAFETY

- Participants said the lighting upgrade improved exterior facility safety due to increased brightness and bulbs burning out less frequently.

*“By eliminating the glass lenses in the fixtures or the light tubes themselves, I’ve improved the plant safety from a food safety standpoint and a personnel safety standpoint, because no one’s going to get hurt by the cut glass or anything like that.”*



#### COMPRESSED AIR

##### OPERATIONS AND MAINTENANCE

- A truck body manufacturer reported reduced administration costs associated with ordering replacement parts, valued at approximately \$1,200 per year.

*“The longevity of the machines [is improved], because we can cycle now between the three instead of having all three run all the time; we can run two at a time and save on another machine.”*

#### OPERATIONS AND MAINTENANCE COST SAVINGS

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Opinion **Dynamics**

Zach Ross

Director

[zross@opiniondynamics.com](mailto:zross@opiniondynamics.com)

Jayden Wilson

Associate Director

[jwilson@opiniondynamics.com](mailto:jwilson@opiniondynamics.com)

