Uncovering the Energy Savings Potential for Existing Buildings

Midwest Building Energy Codes Conference

November 10, 2022

MEEA

MIDWEST ENERGY EFFICIENCY ALLIANCE

Housekeeping

- Enter all questions you have for speakers in the Q&A feature
- Enter any other questions or comments in the chat
- Slides and recordings will be made available to participants after the conference
- Continuing Education Credits are available to participants – information will be shared at the end of the presentation
- Email Corie Anderson, Building Policy Associate, at canderson@mwalliance.org with questions

Agenda

- Mentimeter Poll
- Introductions
- Presentations
- Q&A Session

Mentimeter Poll

Open link in browser

Speakers

Katarina Michalova

Program Manager

City of St. Louis, Office of Building Performance

Malachi Rein

Director

Building Energy Exchange, St. Louis

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Speakers

Isaac Evans

Project Coordinator

City of Minneapolis, Green Cost Share Program

Isaac Smith

Senior Manager of Market Transformation Products

Center for Energy and the Environment

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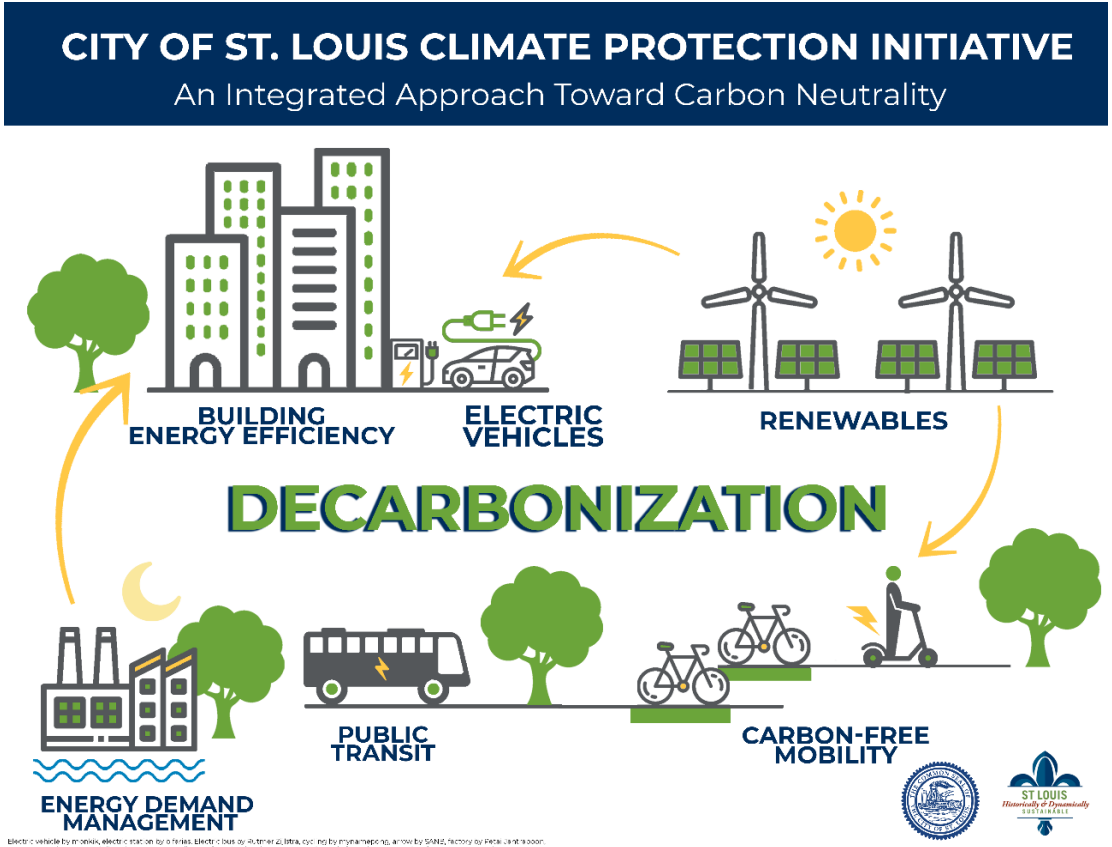
Updates & Progress on St. Louis' Building Energy Performance Standard (BEPS)

November 10, 2022
Midwest Building Energy Codes Conference

Katarina Michalova, Program Manager
Office of Building Performance
City of St. Louis Building Division

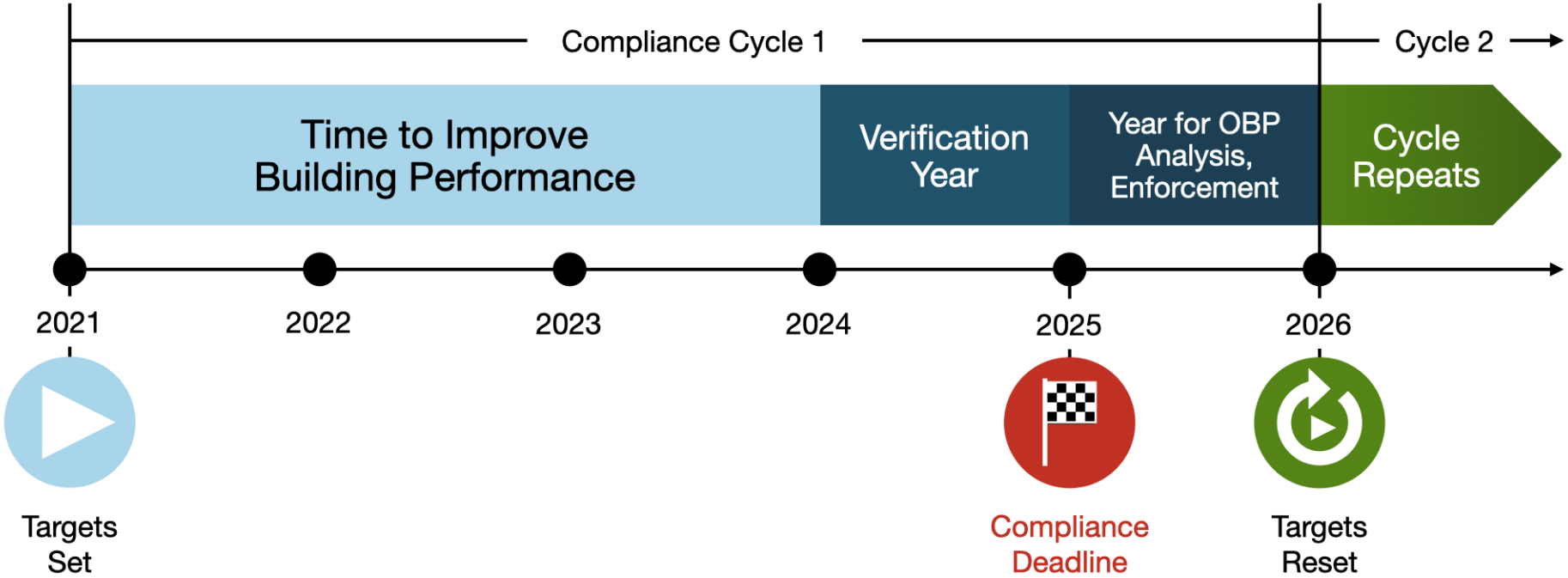
Benchmarking & BEPS = Key Components of our Climate Protection Initiative



BEPS: The Basics

- Performance metric: Site Energy Use Intensity (EUI)
- Based on local benchmarking data
- Calculated so that at least 65% of buildings have to improve their energy performance.
- Standards finalized in May 2021
- All commercial, institutional, multi-family and municipal buildings that are 50,000 square feet and above must comply.

BEPS: Compliance Timeline



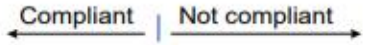
BEPS: Timeline

- **Most buildings** have 4 years to meet the standard – compliance due in May 2025 with 2024 benchmarking data
- **Affordable housing and houses of worship** have 6 years to meet the standard – compliance due 2027 with 2026 data

BEPS: EUI Targets by Property Type

BEPS by Property Type

In this chart, each dot represents a building. Blue lines represent BEPS. Wastewater treatment and data centers are omitted due to data limitations. To the left of the blue line, buildings are in compliance; to the right, they are not in compliance. Example:



Property Type Group	BEPS	Distribution of Site EUI Values Relative to BEPS
College/university	113.8	
Dormitory	64.5	
Education	80.1	
Food service	181.9	
Grocery store	256.5	
Hospital	259.9	
Hotel	89.4	
K−12 school	63.5	
Laboratory	219.2	
Library	57.0	
Manufacturing/industrial	38.9	
Multifamily housing	42.5	

BEPS: EUI Targets by Property Type

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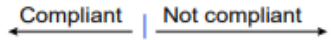
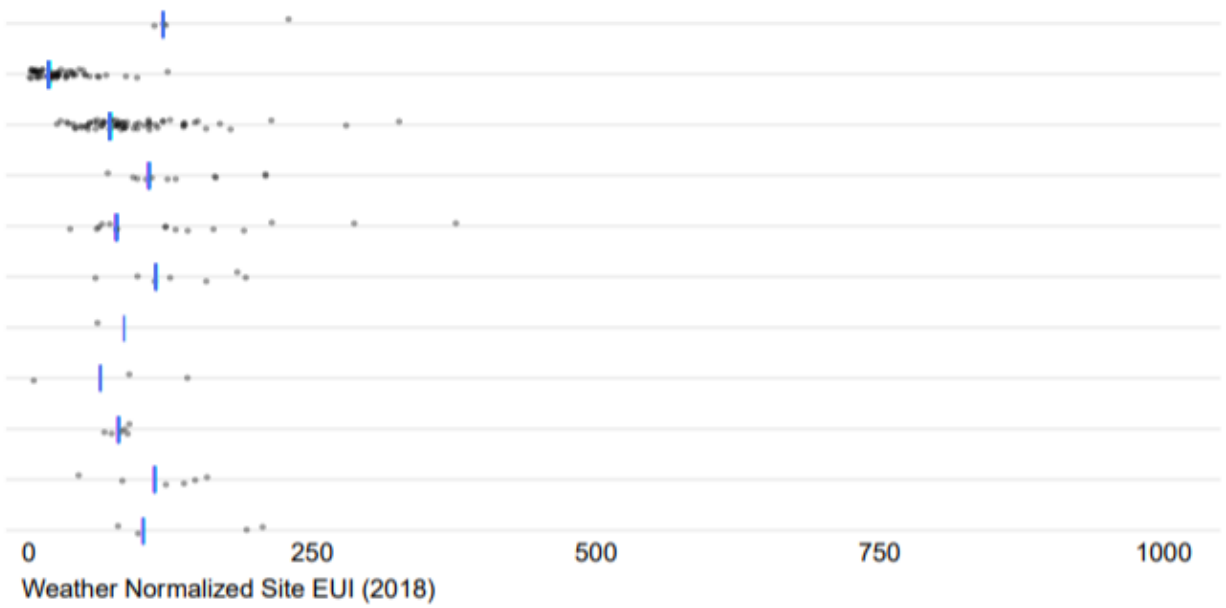


Property Type Group	BEPS
Museum	118.4
Nonrefrigerated warehouse	17.6
Office	71.7
Outpatient healthcare	105.9
Public assembly	77.3
Public order and safety	112.3
Refrigerated warehouse	84.1
Religious worship	63.4
Retail/service	79.3
Senior care/residential care	111.3
Strip shopping mall	101.1

Distribution of Site EUI Values Relative to BEPS



BEPS: Preferred Compliance Pathways

1) Performance: Meet the standard for your building type within the 4 year or 6 year compliance cycle

2) Early Adopters: Meet or below EUI target for Property Type and

- Reduce EUI by 20% or more from 2018 baseline, compliant for cycles 1 & 2
- Reduce EUI by 50% or more from 2018 baseline, compliant for cycles 1, 2 & 3

BEPS: Compliance Pathways

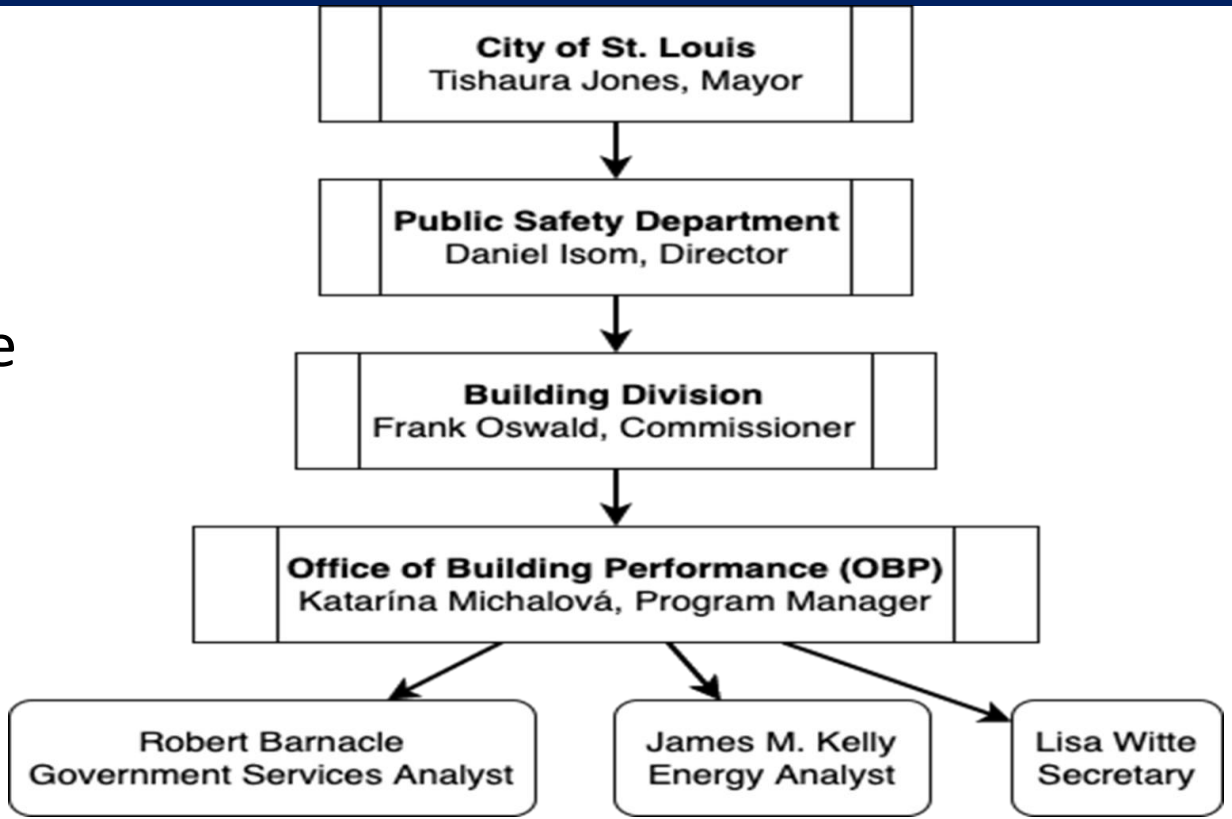
3) Narrow the Gap: Reduce EUI by 50% of the difference between 2018 baseline performance and the BEPS Target

4) Custom Alternative Compliance Pathway: Only for buildings that cannot meet first three paths due to unique limitations

- Requires ASHRAE Level 2 Audit or Retrocommissioning
- Must develop a plan that enacts Energy Efficiency Measures recommended by Audit

BEPS: What's New?

Ordinance Required build out of Office of Building Performance (OBP) – we're fully staffed up!



BEPS: What's New?

Released BEPS Handbook in September 2022

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Building Energy Performance Standards (BEPS) Handbook

Office of Building Performance – City of St. Louis

ST LOUIS
Historically & Dynamically
SUSTAINABLE

SEPTEMBER 2022

BEPS: What's New?

More Staff allows for:

- Offering one-on-one consultations for owners and stakeholders with OBP staff
- Further developing Custom Alternative Compliance Path (application, review process, etc.)
- Doubling down on non-compliant benchmarking

BEPS Insights & Challenges

- Unique buildings & situations:
  - Museums, trade schools with high energy use (i.e. welding), multiple buildings with shared meters, etc.
- Mixed use buildings: Exploring weighted targets
- Affordable Housing:
  - Lack of data to identify affordable housing
  - Challenges with financing and timing
- New Construction – designers worry about risk of not meeting target once building is in operation

Thank You!

Katarina Michalova, Program Manager
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573-416-0296

building energy exchange
St. Louis

be ex building energy exchange St. Louis

What is an energy efficiency hub?

BE-Ex STL Launch – March 2021 @ the Missouri History Museum

building performance par+nership

MISSION STATEMENT

To advance building energy performance by mobilizing the professional expertise, funding, and technical resources the real estate industry needs to address affordability, improve the health and comfort of residents, and position St. Louis as a resilient and carbon neutral region.

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Energy Efficiency for the Region

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An aside about buildings

How do we engage in constructive conversation?

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The power of synergies

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How else do we work to drive implementation?

Provide and Share Resources


tech primer

Roof Insulation

High-performance roof insulation upgrades that improve the building envelope.

be ex STL

Learn more at be-exstl.org

APRIL 2022


Rebate

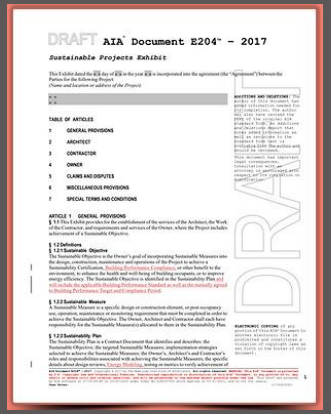
Ameren Missouri / Spire: CommunitySavers Multifamily

Multifamily rebates apply to properties 3 units and larger. Opportunities include HVAC upgrades, EnergyStar Appliances, LED Lighting, Building Insulation. No-cost energy assessment and low or no-cost energy upgrades will be identified.

Building Sector:
Multifamily residential

Energy Type:
Electric, Natural Gas

LEARN MORE >>


DRAFT AIA® Document E204™ – 2017

Sustainable Projects Exhibit

TABLE OF ARTICLES

1 GENERAL PROVISIONS
2 ARCHITECT
3 CONTRACTOR
4 OWNER
5 CLAIMS AND DISPUTES
6 MISCELLANEOUS PROVISIONS
7 SPECIAL TERMS AND CONDITIONS

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Definitions

§ 1.2 Sustainable Objective

§ 1.2.1 Sustainable Measure

§ 1.2.2 Sustainability Plan

Support and Host Educational Events

Thank you!

For more information contact us at

info@be-exstl.org

or visit www.be-exstl.org

be ex building energy exchange St. Louis

CITY OF MINNEAPOLIS

Energy Efficiency and Housing in Minneapolis

Isaac Evans:
Sustainability Program Coordinator – Green Cost Share
Isaac.Evans@minneapolismn.gov

Minneapolis
City of Lakes

green cost share

November 14, 2022

Minneapolis
Health Department

green cost share

Presentation Outline

1. Green Cost Share Program
   - Program Overview
   - Eligibility & Incentives
2. 4d Affordable Housing Incentives
   - Program Overview
   - Program Eligibility & Incentives
   - Results

CITY OF MINNEAPOLIS

Green Cost Share Program

Minneapolis
City of Lakes

Green Cost Share Program

- Funding for energy efficiency, solar, and air pollution reduction projects.
- Started with air pollution reduction.
- Focused on improving health and reducing greenhouse gas emissions.

green cost share

Minneapolis
Health Department

Primary Funding Sources

Recurring Source: Utility Franchise Fee (2018-Present)

A 0.5% utility franchise fee increase in the City. Funding recommendations come through our Energy Vision Advisory Committee.

Recurring Source: Pollution Control Annual Registration Fee

Registration fee for various types of polluting equipment in commercial, business, or multifamily properties (>4 units).

Other Source: American Rescue Plan Act (2020-Present)

One-time allocations from the City's allocation of American Rescue Plan Act funds.

Other Source: General Fund (2020 2021)

One-off budget change items. Most notably in 2020 and 2021 to assist businesses impacted by the civil unrest over the summer of 2020.

Green Cost Share Program – Eligibility

Solar

- Property Types
  - Business/ Commercial
  - Industrial
  - Multifamily (3+ units)
  - Non-profit
  - Any 4d property
- Need electricity production estimate to apply.
  (Solar company gives you this)

Solar – Group Buy

- Property Types
  - Business/ Commercial
  - Industrial
  - Multifamily
  - Non-profit
  - Single Family
- Minimum 5 properties in app.
- 20% of properties must qualify for EJ incentive rate.

Energy Efficiency

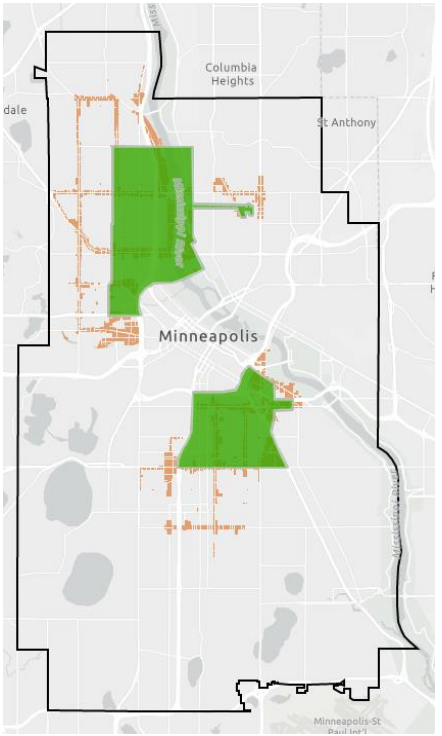
- Property Types
  - Business/ Commercial
  - Industrial
  - Multifamily (3+ units)
  - Non-profit
- Projects must be utility rebate eligible or electrify gas equipment.
- Energy savings estimates required.

4d Energy Efficiency

- Property Types
  - Any 4d property
- Project Types
  - Utility rebate eligible
  - Electrify gas equipment
  - Meet minimum program efficiency standards
- Energy savings estimates required.

Green Cost Share Program – 2022 Incentives

Incentive Category	Energy Efficiency	Solar Energy	Automotive Pollution Reduction	Innovative Pollution Reduction	4d Energy Efficiency
Minneapolis Forward	40% Match up to $40,000	$0.40 per kWh up to $50,000	75% match up to $50,000	45% match up to $100,000	Utility Rebates + City Match = 70% match up to $50,000
Environmental Justice Rate	30% Match up to $30,000	$0.35 per kWh up to $50,000			
Base Rate	20% Match up to $20,000	$0.20 per kWh up to $50,000			



[Click here to go to the Green Cost Share Environmental Justice Page]

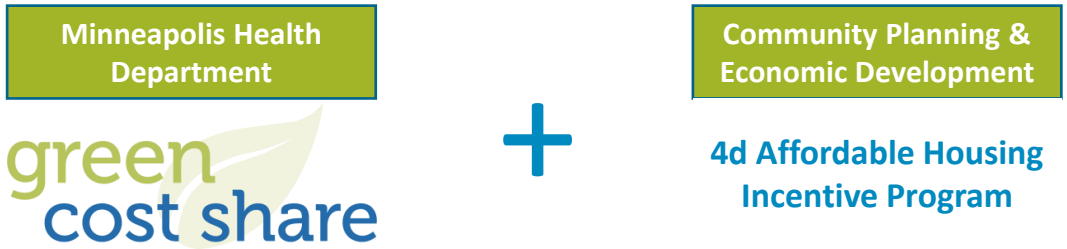
CITY OF MINNEAPOLIS

4d Affordable Housing Incentive Program & Energy Efficiency

Minneapolis
City of Lakes

4d Program Overview – Goals

1. Combine housing and energy efficiency incentives:



2. Program Objectives:
   - Preserve Naturally Occurring Affordable Housing (NOAH).
   - Support greenhouse gas & environmental justice goals.
   - Overcome split incentives.

4d Program Summary Diagram

CPED

4d Housing Incentive Program

Health Dept + External Partners

cee Center for Energy and Environment

green cost share

4d Energy Efficiency Program

4d Program Summary Diagram

CPED

4d Housing Incentive Program

- Housing program.
- Qualifies properties for 4d tax classification with the State.
- Ongoing compliance and follow up.
- State housing program technical assistance.

Health Dept + External Partners

cee Center for Energy and Environment

green cost share

4d Energy Efficiency Program

4d Affordable Housing Incentive Program

- Trades tax reductions for affordability commitments
  - Up to 40% reduction in property taxes.
  - At least 20% of units rent is ≤ 60% AMI.
  - 10-year restrictive covenant.
  - $100 incentive per unit up to $1,000.
  - Must accept section 8 vouchers.

https://www2.minneapolismn.gov/government/programs-initiatives/homes-development-assistance/4d-affordable-housing/

4d Affordable Housing Incentive Program

- Ongoing compliance
  - Annual compliance form due January 31.
  - Re-submit information to State to maintain tax status.
  - New renters must have incomes less than 60% AMI.
  - City staff look for:
    - Rent increases > 6%.
    - Rent > 60% AMI.
    - Subleasing without income verification.
    - Violations of covenant (i.e., housing code violations).
  - Non-Compliance means
    - Loss of tax status.
    - $500 fine per unit.

4d Program Summary Diagram

CPED

4d Housing Incentive Program

- Housing Side of Program.
- Qualifies properties for 4d tax classification with the State.
- Ongoing compliance and follow up
- State housing program technical assistance

Health Dept + External Partners

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4d Energy Efficiency Program

- Energy Efficiency Side of Program.
- Outreach 4d housing program participants.
- Technical Assistance.
- Energy Audits.
- Contractor/Bid Management.
- Utility Rebate Specialists.

2021 Incentives & Qualifications

4d Energy Efficiency	**Rebates + City Match = 70% of Project Cost**	**Up to $50,000**

Project Eligibility

1. **Enrolled in the 4d Affordable Housing Program.**
2. **Project cannot already be completed before applying.**
3. **Projects must qualify for a utility rebate or be an "Energy Efficiency Enabling Project" (i.e., Knob and Tube Wiring).**
4. **Projects must have the highest energy efficiency available and/or recommended.**

4d Energy Efficiency Timeline

- Join 4d Affordable Housing Incentive Program
  - Nov 1 - Jan 11
- Work with CEE on an energy audit, scope, and potential rebates.
- Submit a 4d Energy Efficiency Application.
  - Deadlines: Feb 1, Apr 1, June 1, Aug 1
- Finalize bids and sign agreement with City.
- Submit proof of work and invoice documents to City.

4d Program Results 2018-2022

CPED

4d Housing Incentive Program

- 2,044 units enrolled
- 541 properties
- Average property = 5 units
- 285 different property owners

Health Department

4d Energy Efficiency Program

- 336 units
- 88 properties
- ~176,000 kWh Saved
- > 73,000 therms saved
- 1 million mt of CO_2 reduced

Courtesy of Meet Minneapolis

Program Results: Green Cost Share

2012-2021 Green Cost Share Results Dashboard

Minneapolis City of Lakes

Click the buttons to navigate between pages

Program summary | **Climate & energy impacts** | **Environmental justice**

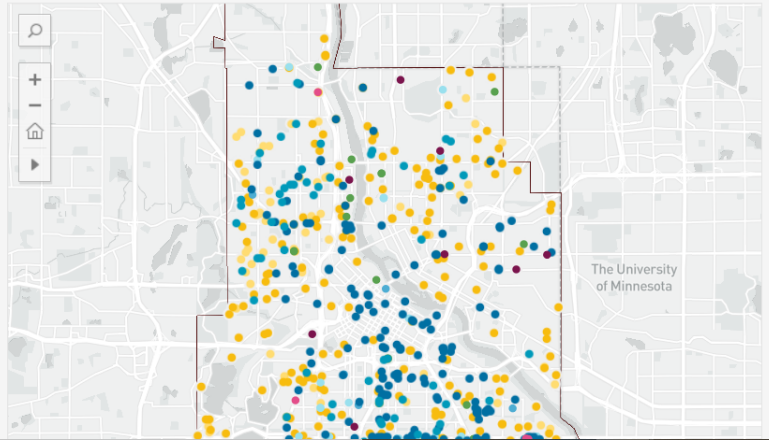
The Green Cost Share Program funds projects that save energy, reduce air pollution, and cut carbon dioxide emissions. The program supports the City's climate change, health, and environmental justice goals. Explore this dashboard for more information on the program, its impact on energy use, climate change, and environmental justice.

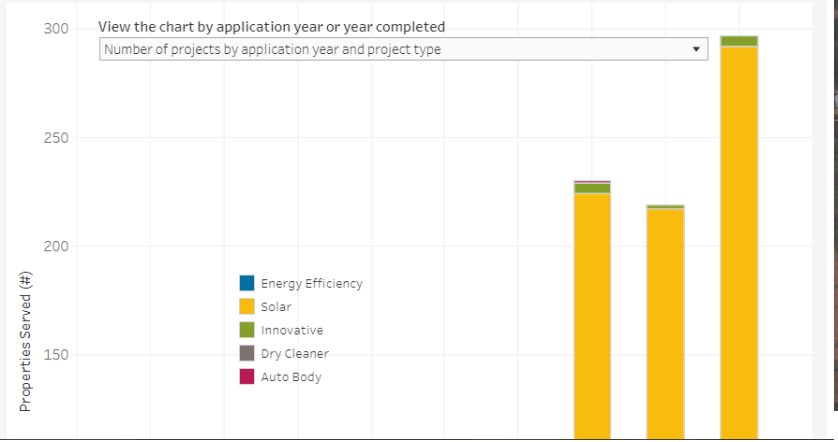
High level program results

Projects completed (#)	Solar installed (MW-DC)	Income qualfied housing units served
859	16.52	3,161

Financial results

Total dollars leveraged ($)	Estimated lifetime energy bill savings ($)
$57,700,000	$106,890,000





Courtesy of Meet Minnea

Minneapolis City of Lakes

Green Cost Share Program – Contacts

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612.244.2475

Thank you!

Time of Sale Energy Disclosure

Center for Energy and Environment

Agenda

- Why energy disclosure policy
- Integrating energy disclosure into time of sale inspections
- The report
- Programming
- Results from the Minneapolis Impact Report

Disclosure is all around us

Nutrition Facts

Serving Size 1 cup (228g)
Servings per Container 2

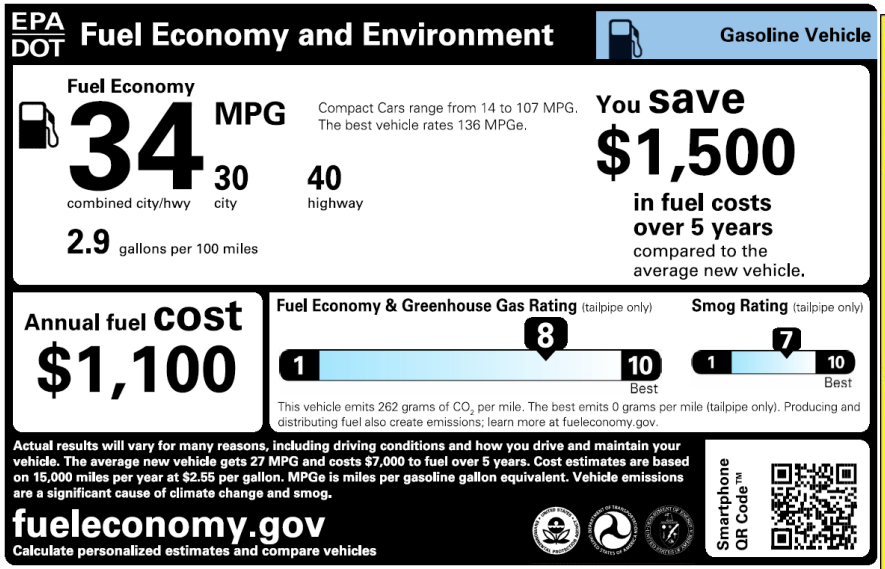
Amount Per Serving

Calories 280	**Calories from Fat** 120
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 5g	25%
Trans Fat 2g	
Cholesterol 2mg	10%
Sodium 660mg	28%
Total Carbohydrate 31g	10%
Dietary Fiber 3g	0%
Sugars 5g	
Protein 5g	
Vitamin A 4% •	Vitamin C 2%
Calcium 15% •	Iron 4%

*Percent Daily Values are based on a 2,000-calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4



EPA DOT **Fuel Economy and Environment** — Gasoline Vehicle

Fuel Economy
34 MPG
combined city/hwy
30 city
40 highway
2.9 gallons per 100 miles

Compact Cars range from 14 to 107 MPG.
The best vehicle rates 136 MPGe.

You **save** **$1,500** in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost **$1,100**

Fuel Economy & Greenhouse Gas Rating (tailpipe only): 8 (1 — 10 Best)

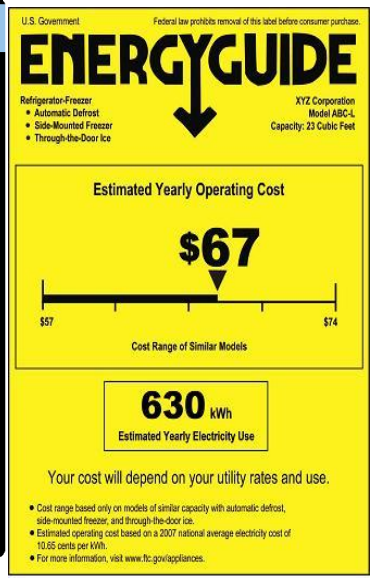
Smog Rating (tailpipe only): 7 (1 — 10 Best)

This vehicle emits 262 grams of CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs $7,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.55 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code™



U.S. Government — Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Refrigerator-Freezer
- Automatic Defrost
- Side-Mounted Freezer
- Through-the-Door Ice

XYZ Corporation
Model ABC-L
Capacity: 23 Cubic Feet

Estimated Yearly Operating Cost
$67
$57 — $74
Cost Range of Similar Models

630 kWh
Estimated Yearly Electricity Use

Your cost will depend on your utility rates and use.

- Cost range based only on models of similar capacity with automatic defrost, side-mounted freezer, and through-the-door ice.
- Estimated operating cost based on a 2007 national average electricity cost of 10.65 cents per kWh.
- For more information, visit www.ftc.gov/appliances.

cee
Center for Energy and Environment

The goals of energy disclosure

- Better inform the real estate market
- Reward energy improvements
- Address climate goals
- Increase the value of energy efficiency in the real estate market

Center for Energy and Environment

The City of Bloomington's Path

Energy Action Plan

The City of Bloomington enacted their Energy Action Plan in May 2018 with a goal to reduce greenhouse gas emissions **by 75% by 2035**

Center for Energy and Environment

Housing stock

There are 21,234 single-family houses in Bloomington.

Nearly 90% were built before energy code adoption.

Over 50% have inadequate insulation.

Center for Energy and Environment

Residential energy use

Residential units contribute **30%** of city's greenhouse gas emissions and account for **44%** of the city's natural gas use.

Bloomington residents would save **$1,800,000** in annual energy bills if the housing stock was adequately insulated.

Center for Energy and Environment

Result

The City of Bloomington passed their Time-of-Sale Energy Disclosure policy in February 2022 and implemented it in April 2022.

Center for Energy and Environment

How Time-of-Sale Energy Disclosure Works

Why asset ratings instead of energy bills?

Asset ratings evaluate lasting attributes of the home

Energy bill reporting is significantly influenced by behavior.

Asset ratings allow for specific energy improvements to be recommended.

Center for Energy and Environment

About time-of-sale inspections in Minnesota

Why implemented: Consumer protection

What inspected: Basic health and safety items

When completed: Before a home is listed for sale

Where implemented: Bloomington, Maplewood, Minneapolis, New Hope, Richfield, Robbinsdale, St. Louis Park, St. Paul, South St. Paul

Center for Energy and Environment

The process

1. Time-of-sale evaluators collect energy data points

2. CEE software generates an Energy Disclosure Report from the energy data

3. The Energy Disclosure Report is included with the full TISH report for the market

Center for Energy and Environment

Layering on existing time-of-sale items

	Already inspected	Energy additions
Attic insulation	• Attic type • Insulation type • Inches	• Additional attic areas
Heating system	• Heating system type • Venting evaluated	• Venting type • Age
Windows	• Window operation	• Number of single-pane windows without storms
Walls	• Wall structural condition	• Insulation type • Depth of insulation

Center for Energy and Environment

Minneapolis
City of Lakes

Energy Disclosure Report

Home Profile

Location:
1234 Sample Street
Minneapolis, MN 55409

Year built: 1920

House sq. ft.: 2,000

Number of stories: 2

Visit Date: 7/3/19

How it Works

The energy score for your home is similar to MPG for a car, but it evaluates the energy performance of the home. The higher the home scores, the lower your energy bills will be.

Improve your score by completing the energy improvements below. Homes with the highest scores typically sell for 2-6% more.**

When you are ready to begin, contact an Energy Advisor at 651-328-6225. They can answer questions and connect you to helpful resources.

Financing and rebates are available from the City of Minneapolis and CenterPoint Energy to help you complete these energy improvements.

Energy Score

Home Energy Summary

Your home is not energy efficient. This results in a lot of wasted energy when trying to heat and cool your home, which leads to higher energy bills. You have significant opportunities to increase your home's comfort and make cost-effective energy improvements. To learn more visit **mncee.org/TISH** or contact an Energy Advisor.

	Energy Improvements *(by priority)*	Improvement Points	Typical Cost	Utility Rebate	Yearly Bill Savings
Wall Insulation	Insulate your exterior walls	26	$3,100–$3,550	Up to $500	$200–$400
Attic Insulation	Air seal and insulate your attic	15	$3,000–$3,650	Up to $500	$150–$300
Heating System	Upgrade your furnace	12	$3,500–$6,000	Up to $500	$150–$300
Storm Windows	All single-pane windows have storm windows.	———	———	———	———

Contact an Energy Advisor: **651-328-6225** | **energydisclosure@mncee.org** | **mncee.org/TISH**

cee Center for Energy and Environment

Next Step:

Contact an Energy Advisor


Mike


Kat

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An Energy Advisor can help:


Answer your questions


Connect you to financing and utility rebates


Refer you to trusted contractors

The energy advisor service is provided by CEE with funding from CenterPoint Energy.

Prioritized Energy Improvements

Wall Insulation — 26 improvement points

Current wall insulation depth: 0 inches

Recommended wall insulation depth: 3.5 inches

Insulate your walls. Walls with little insulation are cold and drafty. Dense packing your walls with insulation will reduce home drafts and improve home comfort. This will also reduce energy waste and save money. Contact an Energy Advisor to learn more and get help with next steps.

Typical Cost:* $3,100–$3,550
Yearly Bill Savings:* $200–$400
Rebate Available: Up to $500

Attic Insulation — 15 improvement points

Current attic insulation depth: No access

Recommended attic insulation depth: 16 inches

Air seal and insulate your attic to improve the comfort of your home. I was not able to fully inspect your attic. However, research indicates that homes of a similar age and construction typically are not properly insulated or air-sealed. This can be especially true with half story homes like yours. Do this work to prevent ice dams, lower energy bills and increase your home's comfort and durability. Contact an Energy Advisor to learn more and get help with next steps.

Typical Cost:* $3,000–$3,650
Yearly Bill Savings:* $150–$300
Rebate Available: Up to $500

Heating System — 12 improvement points

Current efficiency: 80-84%

Recommended efficiency: 96% or better

Upgrade your furnace. Your furnace is near the end of its useful life (20 years). The best solution is to replace your furnace now, so it doesn't stop working when you need it most. We recommend a model that has an efficiency (AFUE) of at least 96% and an electronically commutated motor (ECM). This upgrade will modernize your heating system, properly remove combusted gases from your home, and maximize your energy savings.

Typical Cost:* $3,500–$6,000
Yearly Bill Savings:* $150–$300
Rebate Available: Up to $500

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Summary of the Energy Disclosure Report

Recommendations

Simple display of improvements

Information on cost and savings

Resources

Lists of available utility rebates

Contact for Energy Advisors

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Homeowner impact

- Adds 15 – 30 minutes to time-of-sale inspection
- Adds ~$60 to time-of-sale inspection fee

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Takeaway

Get the most impactful energy data that takes the least extra effort.

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Programming

Market engagement

Increasing the visibility and value of energy efficiency in the real estate transaction.

Stakeholders:

- Home sellers and buyers
- Real estate professionals

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Engaging with home buyers and sellers

What: Mailers and digital ads

To whom: Targeted and general lists

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Engaging with real estate professionals

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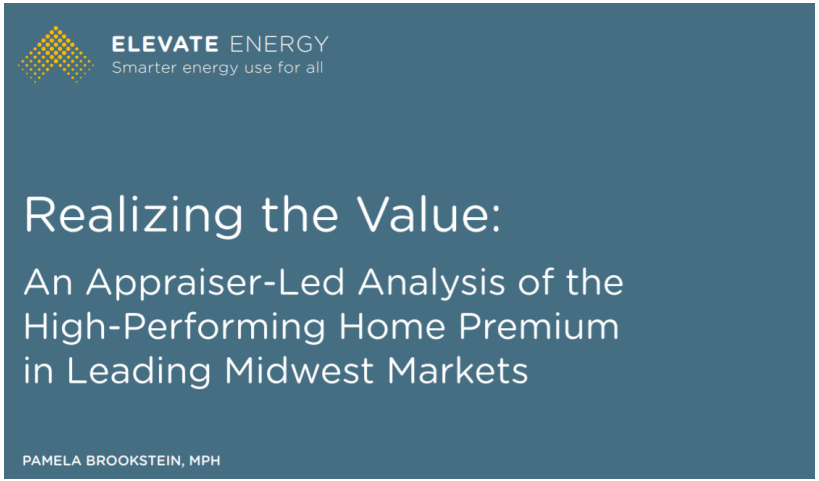
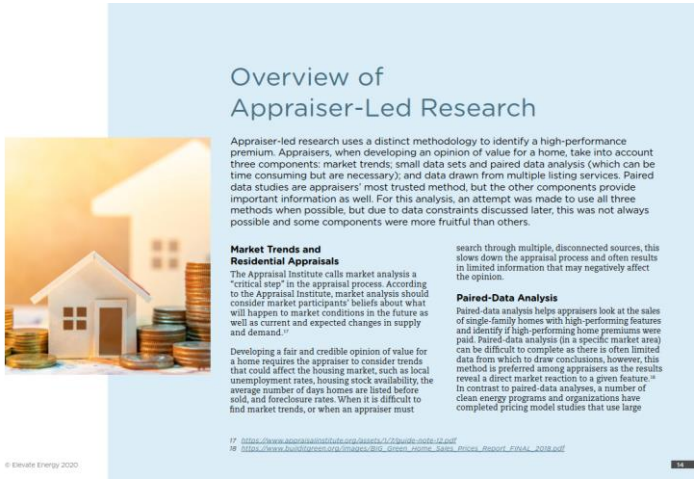
Showing market interest through resale values





Overview of Appraiser-Led Research

Appraiser-led research uses a distinct methodology to identify a high-performance premium. Appraisers, when developing an opinion of value for a home, take into account three components: market trends; small data sets and paired data analysis (which can be time consuming but are necessary); and data drawn from multiple listing services. Paired data studies are appraisers' most trusted method, but the other components provide important information as well. For this analysis, an attempt was made to use all three methods when possible, but due to data constraints discussed later, this was not always possible and some components were more fruitful than others.

Market Trends and Residential Appraisals

The Appraisal Institute calls market analysis a "critical step" in the appraisal process. According to the Appraisal Institute, market analysis should consider market participants' beliefs about what will happen to market conditions in the future as well as current and expected changes in supply and demand.[17]

Developing a fair and credible opinion of value for a home requires the appraiser to consider trends that could affect the housing market, such as local unemployment rates, housing stock availability, the average number of days homes are listed before sold, and foreclosure rates. When it is difficult to find market trends, or when an appraiser must search through multiple, disconnected sources, this slows down the appraisal process and often results in limited information that may negatively affect the opinion.

Paired-Data Analysis

Paired-data analysis helps appraisers look at the sales of single-family homes with high-performing features and identify if high-performing home premiums were paid. Paired-data analysis (in a specific market area) can be difficult to complete as there is often limited data from which to draw conclusions, however, this method is preferred among appraisers as the results reveal a direct market reaction to a given feature.[18] In contrast to paired-data analyses, a number of clean energy programs and organizations have completed pricing model studies that use large

17 https://www.appraisalinstitute.org/assets/1/7/guide-note-12.pdf
18 https://www.buildingreen.org/images/BIG_Green_Home_Sales_Prices_Report_FINAL_2018.pdf

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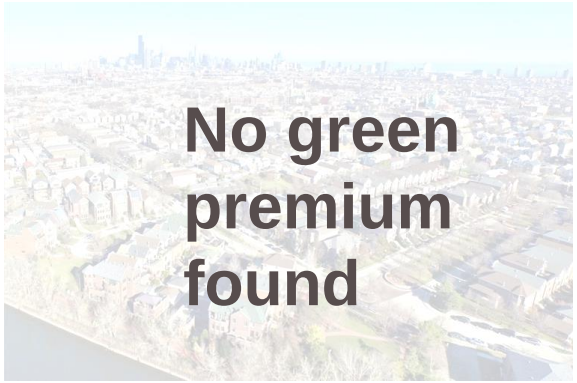
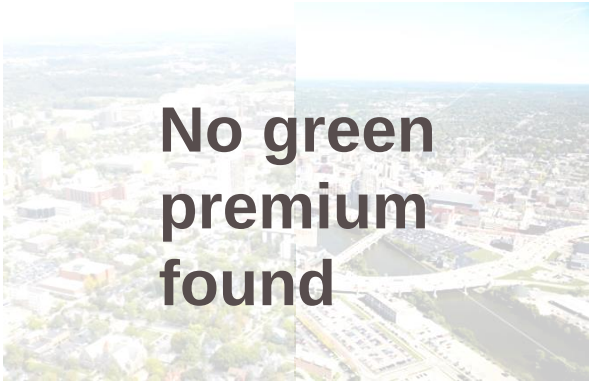
Appraiser-led studies in Midwest metros



Chicago metro



Ann Arbor and Grand Rapids metro

Minneapolis – St. Paul metro

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Realtor engagement tactics

- Framing energy efficiency in relevant terms
- Presentations and continuing education courses
- Building relationships

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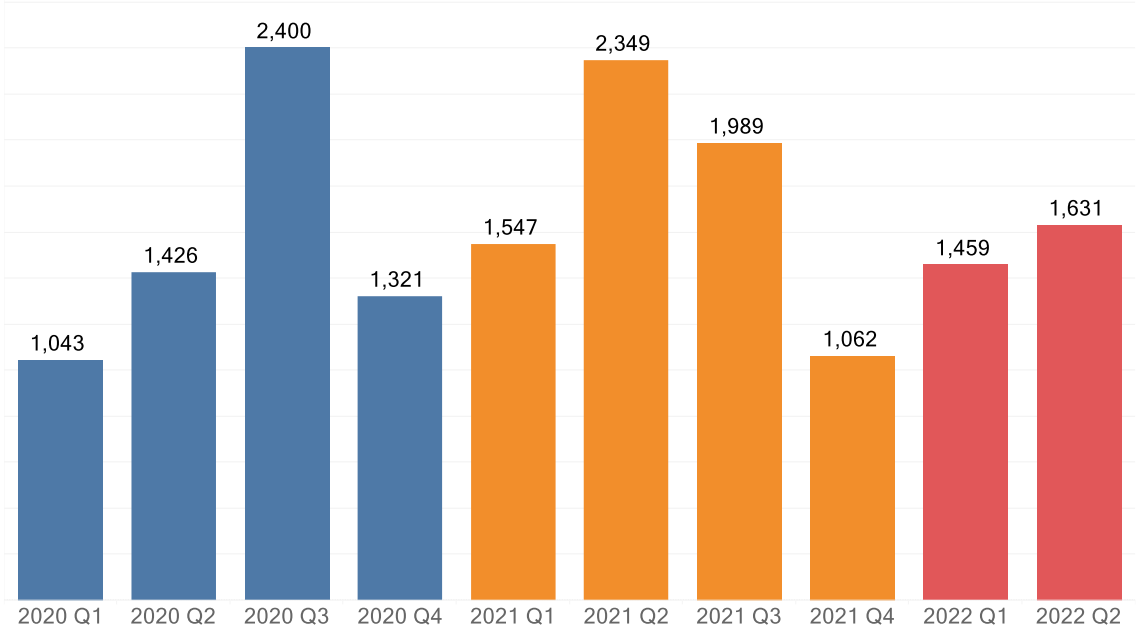
Impact in Minneapolis

Scale of reach

Over 16,000 homes have received an Energy Disclosure Report



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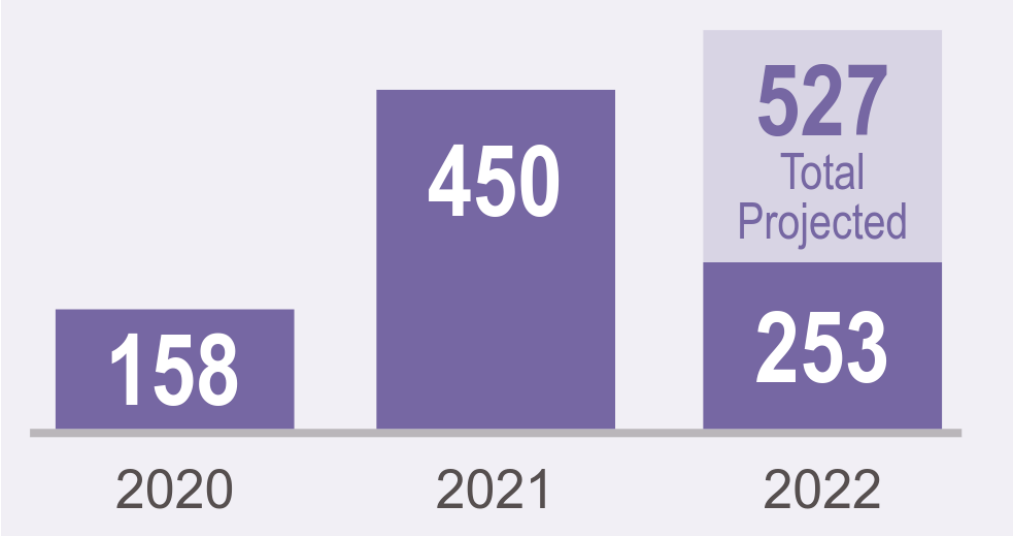
Projects Completed

- Over 800 residences completed an energy improvement to-date



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Savings

Current savings

- **$150,000** energy bill savings to residents
- Nearly **18,000** dekatherms energy saving
- Over **950** metric ton reduction of CO_2 equivalent

Estimated savings through 2030

- **$985,000** energy bill savings to residents
- **112,000** dekatherms energy savings
- Over **5,800** metric ton reduction of CO_2 equivalent

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THANK YOU!

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Upcoming MEEA Events

Early Bird Registration Now Open!

January 31 - February 2, 2023

Chicago, IL

www.meeaconference.org