

May 8th, 2023

# ELECTRIFY EVERYTHING

Replacing fossil fuel technologies with electricity

**Gerardo Roca**

Bilingual Outreach Specialist

¡Hablo Español!



Center for Energy and Environment

# CEE's nonprofit mission

The Center for Energy and Environment promotes energy efficiency to strengthen the economy while improving the environment.

We provide practical energy solutions for homes, businesses, and communities.

## WE STAND FOR

- ✓ Collaboration
- ✓ Expertise
- ✓ Science
- ✓ Community
- ✓ Integrity
- ✓ Equity

# At our core



## PROGRAMS

We cut energy waste while improving comfort in homes, commercial buildings, and communities.



## CONSULTING

We help building owners and entire communities achieve long-term, energy-saving solutions.

## RESEARCH

We identify and explore cost-effective, efficient technologies and ideas through field analysis, modeling, and stakeholder engagement.



## POLICY

We strive for high-impact, pragmatic solutions guided by a public interest ethic.



## LENDING

We empower people to make upgrades on energy efficiency and comfort in homes or businesses.



## Discussion Goals

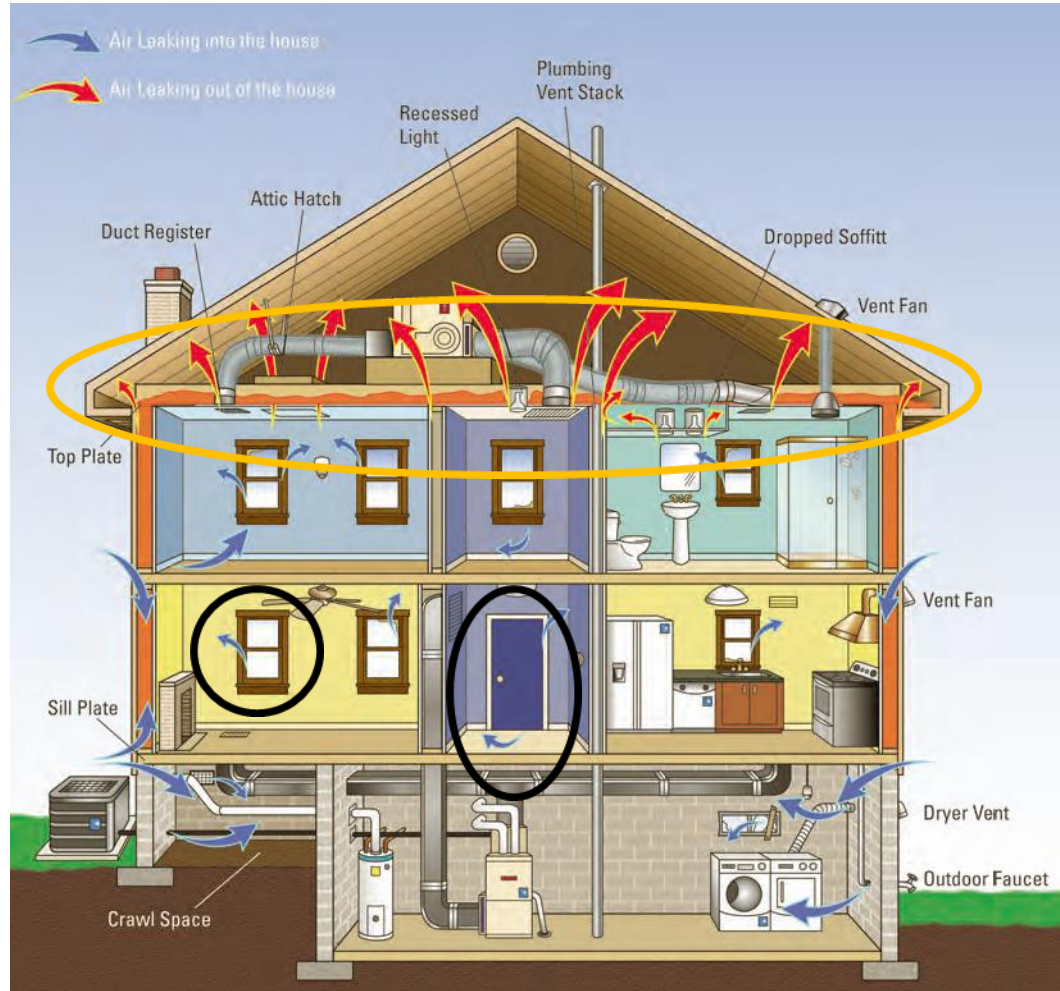
- First steps before electrifying
- Unpack rising potential for electrification through heat pumps
- Benefits and considerations of using cold climate ASHPs
- Other uses for heat pumps, (water heaters, driers)
- Take advantage of IRA and other rebates



# BEFORE YOU ELECTRIFY

**Weatherization and sealing your home envelope**

# ❖ Is Your Home Losing Energy?

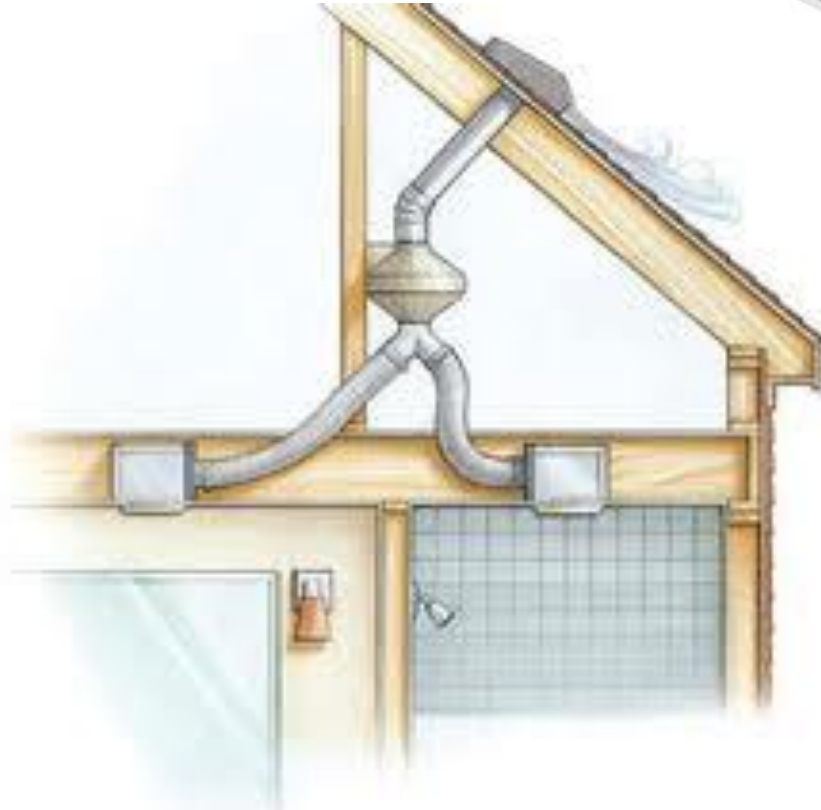


# ❖ Signs of air leakage



Dry, itchy skin, static electricity, frequent humidifier use

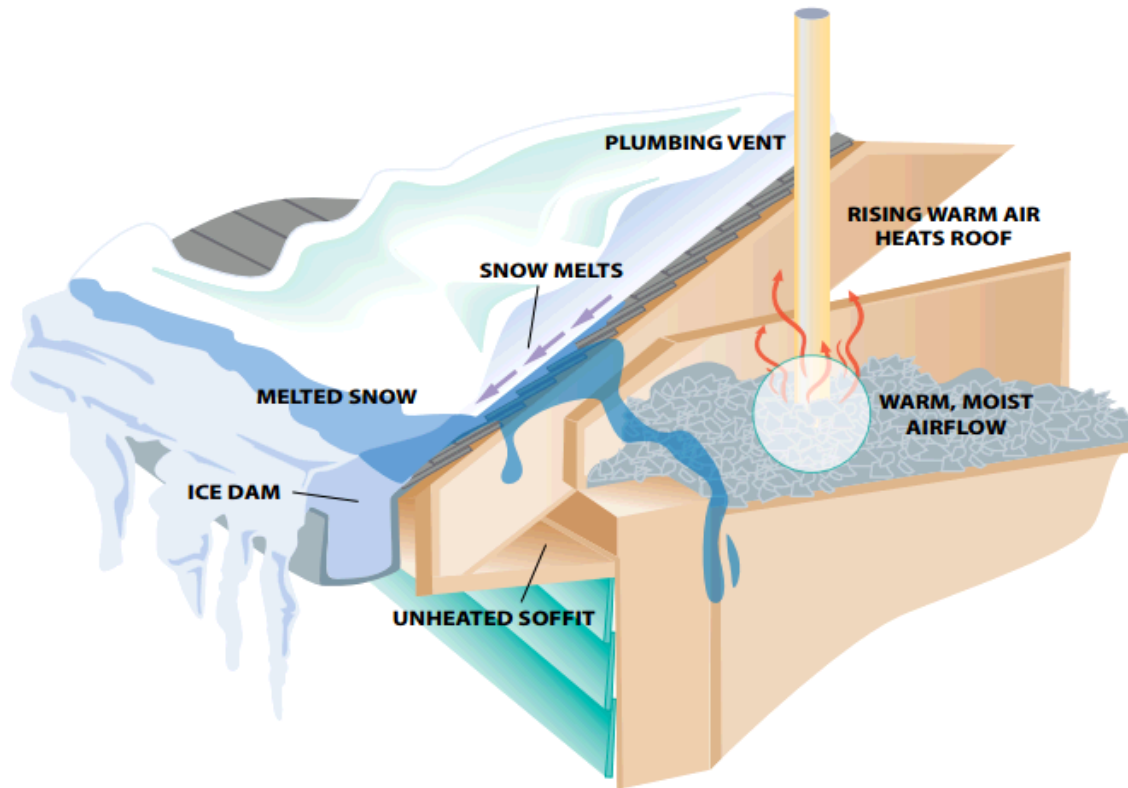
# •• Ventilation



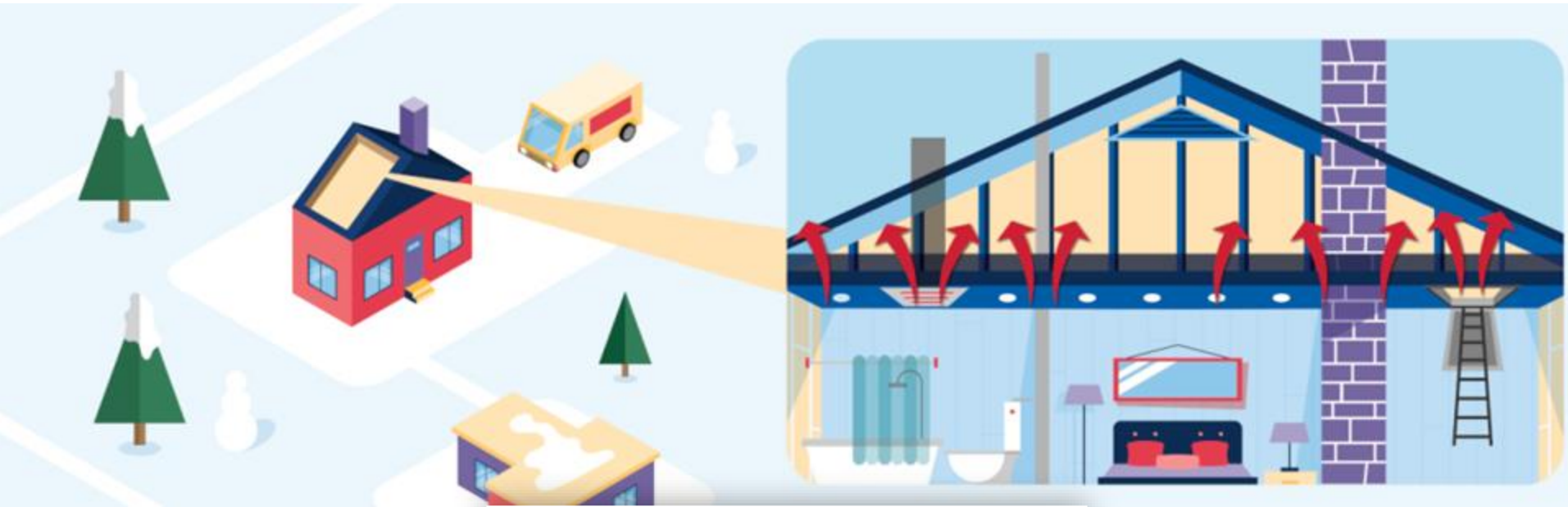
- Manage indoor moisture and odors
- Helps maintain a healthy home



# ❖ Ice Dams



# ❖ Air Sealing



## •• Attic Insulation

- Most common recommendation
- Insulate and air seal your attic to R-50
- Work with a rebate eligible contractor



# ❖ Before and After



# ❖ Empty Wall Cavity

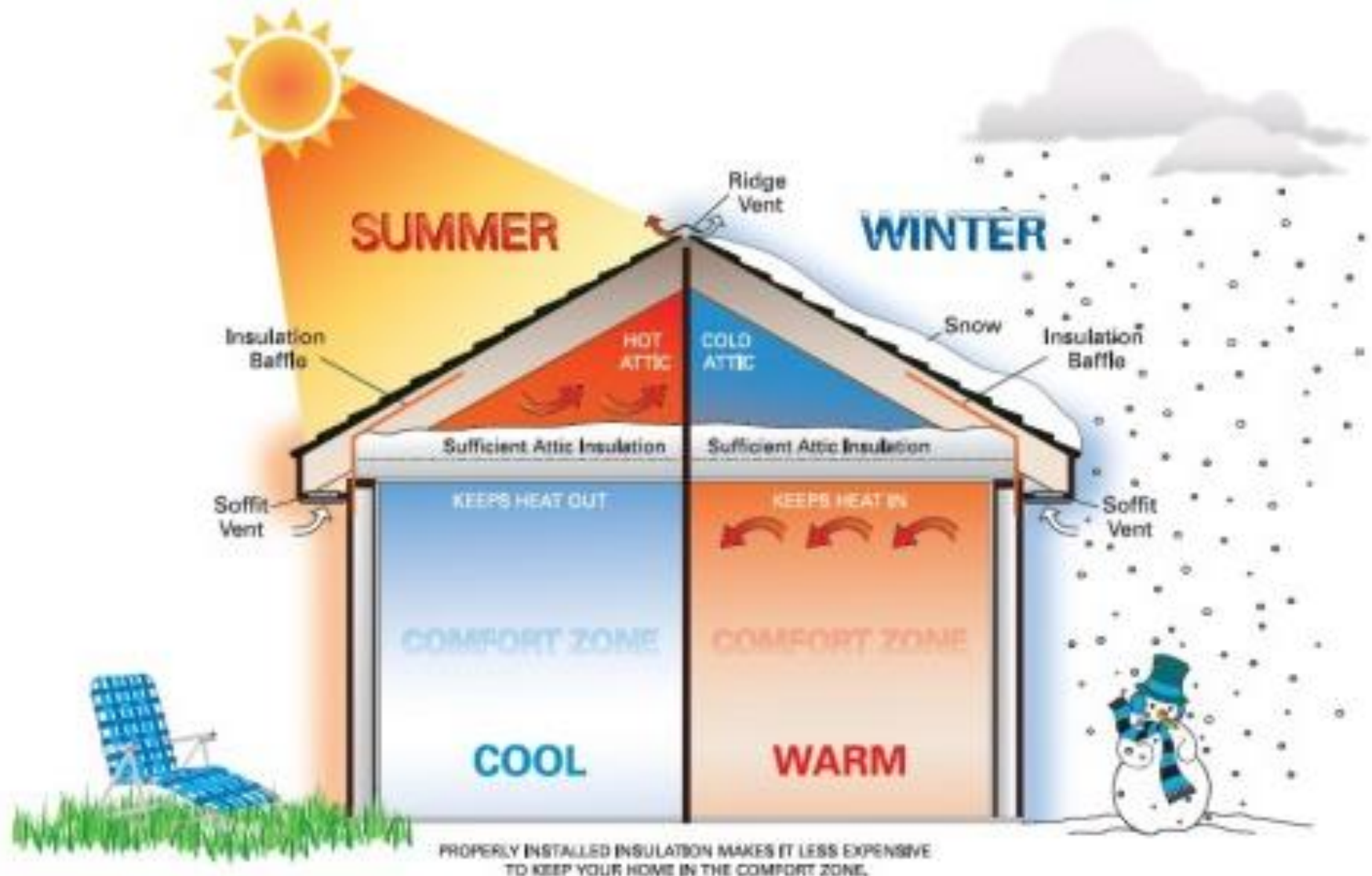


# •• Wall Insulation

- Insulate to at least R-11
- Goal is to fill your wall cavity

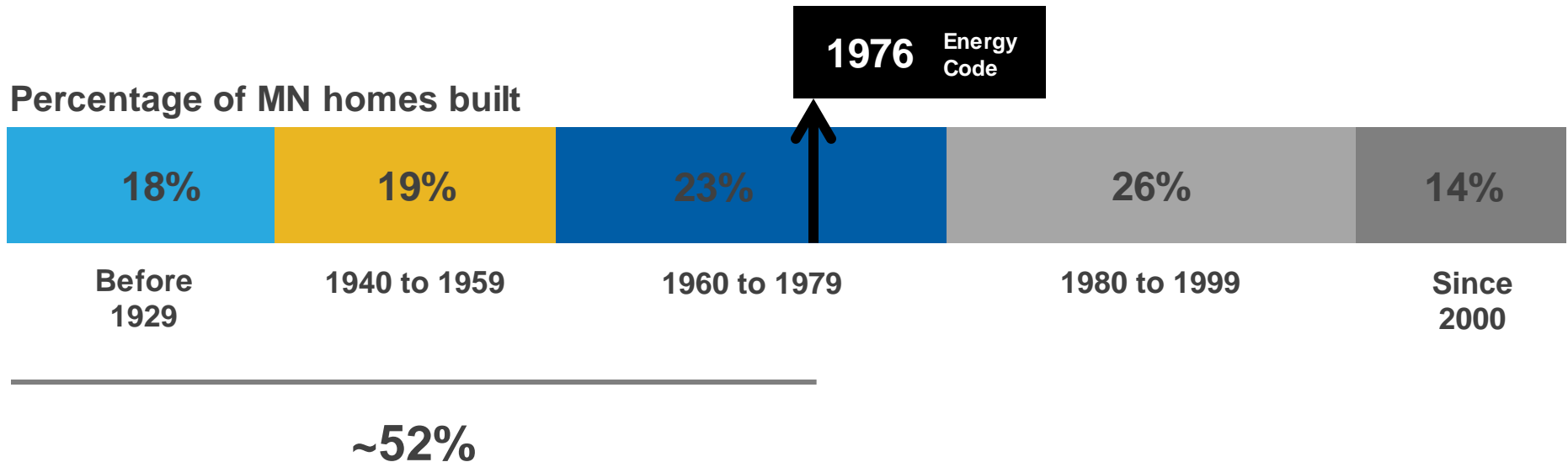


# Home Envelope Works All Year Around





# 400,000+ Minnesota homes have inadequate insulation





# CEE is a Resource for Each Step Towards Sustainability



# HEAT PUMPS

**Air Sourced HPs, Water Heaters and Driers**

# •• Heat Pumps

- Technology like a refrigerator, that extracts heat from a source such as air, and redirect.
- Think of it as a fridge or air conditioner that can run in reverse
- This technology can be used to create heat for all different uses such as: heating air, heating water, or drying clothes.
- IRA Federal tax credit covers 30% of the cost and up to \$2,000 for any combination of heat pumps annually



## Why are you considering a heat pump?

- Decarbonize Home
- Equipment is at/near end of its life
- Sweet, sweet Inflation Reduction Act money is coming!
- Other reasons?

# •• Heat pump water heaters

- Evaporator draws in heat
- Condenser coils heat water up to 140°F
- No Carbon emissions
- Saves about \$300 a year over standard electric heater
- Works best in non-conditioned spaces
- Can run a duct from cold air return to outside





# Heat pump water heater considerations

- Dehumidifies air around it, so air will become colder
- Condensation needs drainage, or condensate pump
- Long recharge time, up to a few hours
- 40gal water heater starts at around \$1500
- Can connect to a split system and to avoid unwanted cold air
- Recommend replacing if current standard water heater is at end of life

## • Heat pump dryers

- Works by removing moisture from air, rather than blowing heat
- Uses 28% less energy than standard dryers
- Does not require ventilation
- Works at lower temperatures, so its gentler on clothes
- Does require drainage, since it works by removing moisture
- Longer drying time because of lower temperatures



# •• Air sourced heat pumps

- Works like an air conditioner in reverse
- Draws heat from the exterior air and pumps it indoors
- No combustion or carbon emissions
- Work in temperatures as low as -25°F
- ASHPs offer resiliency against volatility in fuel prices

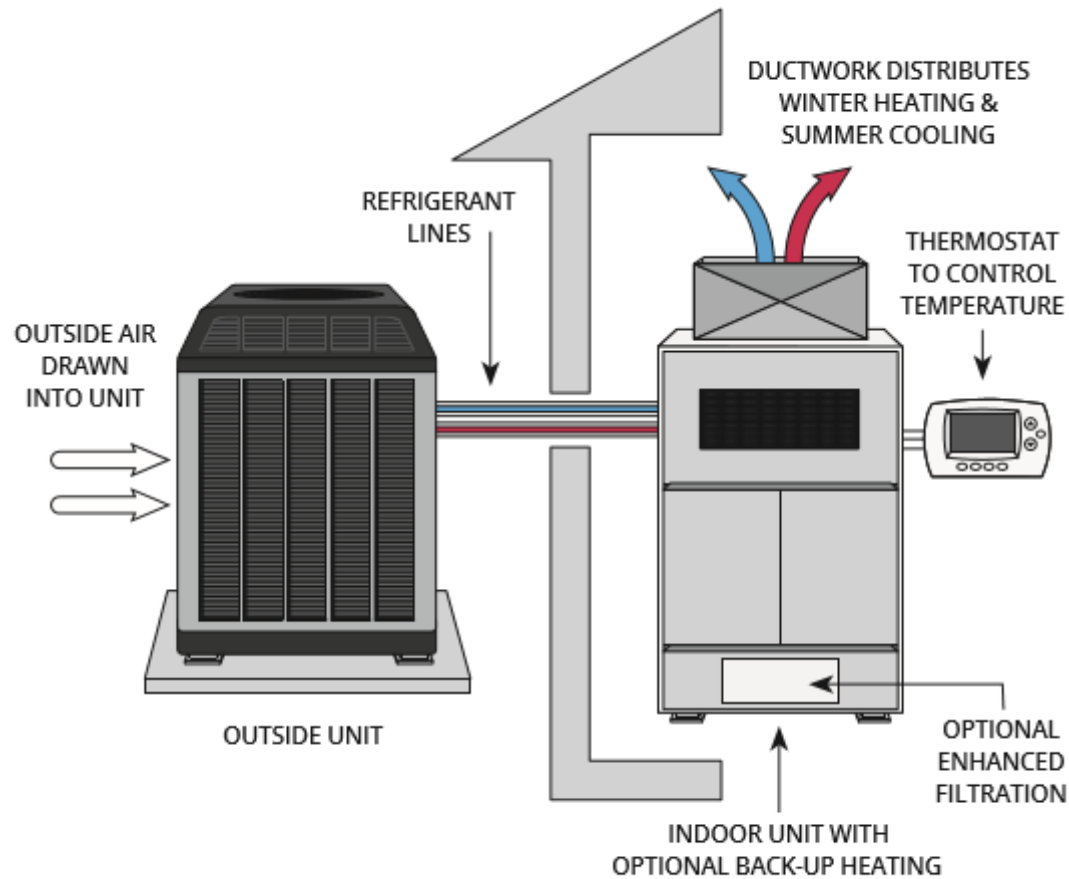




## •• Ducted vs Mini-split

- Ducted ASHP uses existing ducting from a central air conditioning system
- If you currently do not have a central AC system, a mini-split system works best. Mini splits connect directly to its accompanying exterior unit

# •• Ducted ASHP



# •• Mini-split or ductless ASHP



# ❖ Cold climate heat pumps at a glance



Heating and cooling  
all in one system



Fuel choice flexibility



Utility Rebates



Heating and cooling  
operational cost savings



Improved Comfort



Reduced carbon  
emissions



## Growing Potential

- Utilities rebate data shows the market is growing
- ECO Act will create new fuel switching rebates in 2024
- Tax credits and rebates in the IRA to increase demand
- Better equipment in the horizon through DOE Cold Climate Heat Pump Challenge



## • Do ASHPs work in cold climates?

- Variable capacity advancements have expanded cold climate performance
- CEE field research studies observed systems delivering heat in temps as cold as  $-25^{\circ}\text{F}$
- CEE field research is validated by other national-level studies

# OTHER OPPORTUNITIES FOR ELECTRIFICATION

# •• Non-heat pump electric appliances

- Electric stoves/ranges
- Induction stoves







# REBATES AND TAX CREDITS

**Inflation Reduction Act and Utilities**

## •• IRA HOMES Program tax credits

- Beginning now in 2023 through 2032 the total limit for an efficiency tax credit in one year is \$3,200
- Up to \$1,200 yearly for home envelope improvements (windows, insulation, electrical)
- 30% of cost and up to \$2,000 for any combination of Heat Pumps.



# IRA HOMES Program tax credits

Equipment Type	Tax Credit for 2023-2032
Solar Electricity	30% of cost
Battery Storage	
Heat Pumps	30% of cost, up to 2,000 per year
Heat Pump Water Heaters	
Electric Panel upgrades	30% of cost, up to \$600
Insulation materials	30% of cost
Home Energy Audits	30% of cost, up to \$150

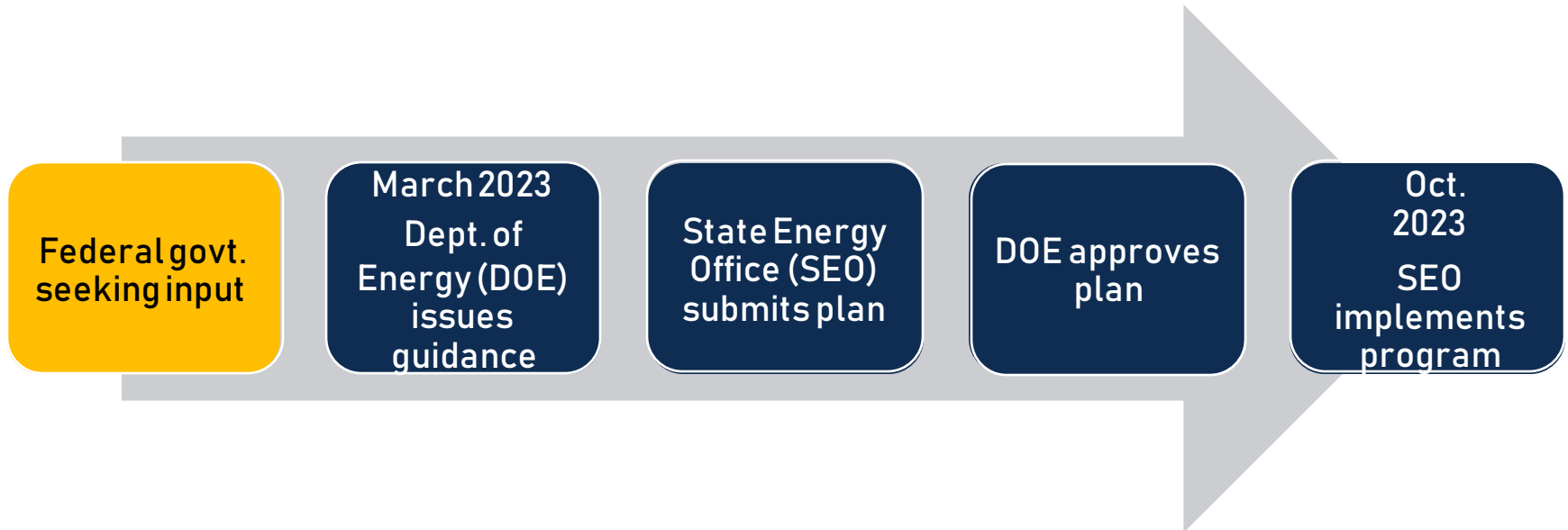
\*file a form 5695 when submitting your 2023-2032 taxes

# •• Electric Vehicles

- Tax credit up to \$7,500 if you buy a new qualified plug-in EV. Income may not exceed:
  - \$300,000 for married couples
  - \$225,000 for heads of households
  - \$150,000 for all other filers
- You may qualify for a used clean vehicle credit, up to \$4,000 for qualified, previously owned vehicles.

# • Inflation Reduction Act (IRA) Rebates

- \$2,000 Tax Credit for qualifying ASHPs (25C) through 2032
- Statewide home energy rebates (HOMES and HEEHRA)



# IRA HOMES Program rebates

Electric load service center upgrades/breaker box	\$4,000
Electric stove, cooktop, range, and/or oven	\$840
Electric wiring	\$2,500
Heat pump clothes dryers	\$840
Heat pump heating/cooling	\$8,000
Heat pump water heaters	\$1,750
Weatherization (insulation, air sealing, ventilation)	\$1,600

Rebates are available to household earning less than 150% of the area median income

- Below 80% of the AMI you can claim 100% of upgrades up to \$14,000
- From 80% to 150% of AMI, you can claim 50% of costs up to \$14,000

# Income Guidelines

## 2022 Area Median Income Guidelines - Minneapolis - St. Paul - Bloomington

Effective May 2nd, 2022

### Household Size

AMI %	1	2	3	4	5	6	7	8
30%	\$ 24,650	\$ 28,200	\$ 31,700	\$ 35,200	\$ 38,050	\$ 40,850	\$ 43,650	\$ 46,630
50%	\$ 41,100	\$ 46,950	\$ 52,800	\$ 58,650	\$ 63,350	\$ 68,050	\$ 72,750	\$ 77,450
60%	\$ 49,280	\$ 56,320	\$ 63,360	\$ 70,400	\$ 76,032	\$ 81,664	\$ 87,296	\$ 92,928
80%	\$ 62,600	\$ 71,550	\$ 80,500	\$ 89,400	\$ 96,600	\$ 103,750	\$ 110,900	\$ 118,050
100%	\$ 82,740	\$ 94,560	\$ 106,390	\$ 118,200	\$ 127,656	\$ 137,112	\$ 146,568	\$ 156,024
120%	\$ 100,150	\$ 114,450	\$ 128,745	\$ 143,050	\$ 154,494	\$ 165,938	\$ 177,382	\$ 188,829



# Energy Conservation and Optimization (ECO) Act

Bipartisan effort will expand heat pump opportunities and grow the market

- By June, Minnesota's energy utilities will file 2024-2026 ECO triennial plans
- Will create new rebates for efficient fuel switching

<https://www.mncee.org/cip-eco>

<https://www.mncee.org/minnesota-energy-dockets>



# HOME ENERGY SQUAD



## Home Energy Squad is provided by CenterPoint Energy and Xcel Energy and delivered by Center for Energy and Environment



- Available to CenterPoint Energy and Xcel Energy customers in 1–4 unit homes
- Homeowners and renters
- In-home visit includes installation of energy saving products and customized report with recommendations on improving comfort and efficiency in your home.

# •• Products Installed to Save Immediately



- High efficiency aerators and showerheads
- LED bulbs
- Attic hatch and door weatherstripping
- Programmable or smart thermostat

Xcel Energy electric customers with central AC are eligible for a free smart thermostat with AC Rewards enrollment.



# • Diagnostic Tests



- Blower door test checks for air leakage and helps to determine if there is adequate ventilation in the home.
- Infrared camera shows areas to improve insulation.
- Combustion safety check on heating system and water heater



# ENERGY FITNESS PLAN



The Home Energy Squad is provided by [CenterPoint Energy](#) and delivered by the [Center for Energy and Environment](#), a Minnesota nonprofit.

This Energy Fitness Plan report summarizes findings and prioritizes the recommendations made by the energy expert(s) during your visit.



Contact your Energy Advisor at CEE with questions or for any help.

612-244-2484 or [energyadvisor@mncee.org](mailto:energyadvisor@mncee.org)



## TODAY'S STEP

**1** energy efficiency installs

## TOP RECOMMENDATIONS

See report for details

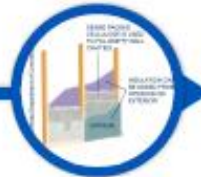
CUSTOMER:

ADDRESS

1234 Summit  
Minneapolis, MN 55448

VISIT DATE

Oct 17, 2019



**INSULATE YOUR EXTERIOR WALLS**



**AIR SEAL AND INSULATE YOUR ATTIC**

## ENERGY EXPENSE

### WALL INSULATION

3 points

#### SIDEWALL

You have 3 inches of insulation in your walls for a total of 9.3 out of a required R11.

#### UPON REMODELING, CONSIDER ADDITIONAL WALL INSULATION

Additional wall insulation can generally not be based on energy alone. However, consider additional upgrades as part of remodeling projects.

### AIR SEAL AND INSULATE ATTIC HATCH

A common weak point in the home's thermal boundary is attic access. Your access hatch lets warm air from your home escape into your attic. To prevent this, an insulation contractor can air seal and insulate your hatch using rigid foam insulation board, caulking, or other materials to create a tight seal.

### INSULATE YOUR EXTERIOR WALLS

It appears that there is little insulation present in the walls. Notice how the wood framing is actually warmer than the surrounding wall cavity? An insulation contractor can insulate exterior walls by blowing in dense-packed cellulose. Doing so can greatly reduce heat loss, improve indoor comfort levels, and lower your monthly energy bills. Insulated walls often mean that your home is quieter too.

## REBATES



Your Energy Advisor is here to help you earn the [Whole Home Efficiency Rebate](#) from Xcel Energy. Complete at least one Comprehensive Insulation project and two other rebate projects. Contact your Advisor with questions by phone or by email: 612-244-2484 or [energyadvisor@mncee.org](mailto:energyadvisor@mncee.org).



**STEP 1**  
Complete at least one comprehensive insulation project.

**STEP 2**  
Complete at least two other qualifying projects.

**STEP 3**  
Contact your Energy Advisor to schedule your free inspection.



See Xcel Energy's [website](#) for details. Be sure to use a [rebate-eligible](#) contractor for this work.

**LIMITED TIME BONUS: Complete your projects and your free inspection by November 30, 2019 and Xcel Energy will increase your entire Whole Home Efficiency Rebate by 25%!**

REBATE	AMOUNT	NOTES
Comprehensive Attic Air Sealing and Insulation	30% of project cost, up to \$300	
Comprehensive Wall Insulation (at least 75% of exterior walls)	30% of project cost, up to \$300	
Air Leakage Reduction (25-29%) Air Leakage Reduction (30% and above)	\$150 \$200	
Boilers 95%, 90% or 84%	\$400, \$300 or \$125	
15+ SEER / 11+ EER / 9+ HSPF Ductless Mini-split Heat Pump	\$200	
0.90 EF Tankless / 0.70 EF Storage / 0.67 EF Storage Gas Water Heater	\$250, \$175 or \$100	

#### CUSTOMER:

Jennifer Staples

#### ADDRESS

123 Main Street  
St. Paul, MN 55101

#### VISIT DATE

Apr 12, 2019

#### ENERGY AUDIT

Bruce Langston



# ❖ Insulation Quote



#### Homeowner Information

Fourth Ave Apartments  
187 Sesame St, Minneapolis, MN 55414  
612-222-2222



Technician: Stacy Camp      Yr. Built: 1947      Sq Ft: 2300      Cfm 50: 4000      Date:

INSULATION QUOTE			
	UNITS	QTY	COST
<b>Attic Insulation</b>			
Insulate & weatherstrip existing attic ceiling/wall access	each	1	
Seal all attic bypasses: flue/chimney/plumbing stack/top plates/elec./fans	total	1	
Seal below kneewall (rigid barrier)	lf	70	
Dense Pack under floor and blow insulation over floor to achieve R50	sf	450	
<b>total</b>			
Insulate kneewall/built-ins to R30 with fiberglass batts and house wrap -	sf	350	
Re-insulate areas after air sealing	sf	150	
Dense pack slants to capacity	sf	325	
Install new roof vent - grey	each	2	
Remove and reinstall existing vent -	each		
Install vent chutes	each	50	
		<b>Subtotal</b>	<b>\$3,645</b>
<b>Exterior Wall Insulation</b>			
Dense pack masonite sided walls from the exterior	sf	1142	
		<b>Subtotal</b>	<b>\$1,827</b>
<b>Additional Items (Required)</b>			
Exterior lead safe work - pre-1978 homes	each	1	\$235
Conduct water heater and/or furn/boiler spillage test when work is complete	each	1	\$35
Conduct house air leakage test when work is complete	each	1	\$80
		<b>Subtotal</b>	<b>\$350</b>
<b>Notices</b>			
<b>NOTES:</b> Estimate scheduled with contractor for wall insulation quote.			
		<b>Total</b>	<b>\$5,822</b>
		<b>Estimated CenterPoint Rebate*</b>	<b>\$500</b>
		<b>Total After Rebates</b>	<b>\$5,322</b>

# •• Energy Advisor Service

The Energy Advisor Service can be your guide to a more efficient home:

- Review your audit report
- Listen to your goals
- Identify the highest impact project plan
- Connect you to high quality contractors
- Ensure you earn the best rebate
- Connect you to low interest financing options

**[energyadvisors@mncee.org](mailto:energyadvisors@mncee.org) or 612-244-2484**





## • Signing up for a Home Energy Squad visit

Get \$30 off a Home Energy visit for attending this workshop!

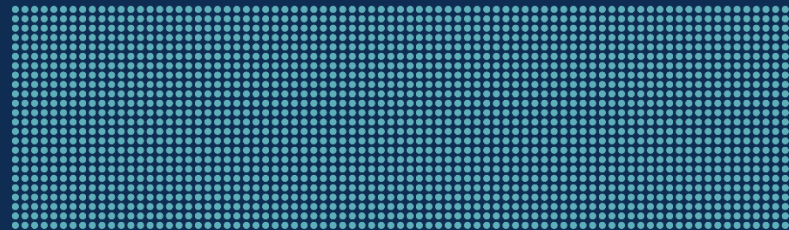


To schedule:  
Call 651-328-6220 or  
visit [mncee.org/hes](http://mncee.org/hes)

# Free Visits for Income Qualified Households

## 2023 Income Guidelines

Household Size	Three Month Maximum	Annual Income
1	\$8,809	\$35,237
2	\$11,520	\$46,080
3	\$14,230	\$56,922
4	\$16,941	\$67,765
5	\$19,651	\$78,607
6	\$22,362	\$ 89,450
7	\$22,870	\$ 91,483
8	\$23,378	\$ 93,515



# THANK YOU!

Gerardo Roca  
612-244-2429  
[groca@mncee.org](mailto:groca@mncee.org)