

# Section 03 Buildings + Energy

Currently in Edina:



**56.2%**

Of City-Wide GHG emissions  
in 2019



**533,242,000**

kWh of electricity in 2019



**39,964,578**

therms of natural gas in 2019



**+11.9%**

Change in residential natural  
gas consumption since 2013



**+13.8%**

Change in commercial natural  
gas consumption since 2013



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# Buildings and Energy

Building energy use is a major contributor to greenhouse gas (GHG) emissions. The Building Energy sector includes all residential, commercial, and industrial buildings. Greenhouse gas emissions from this sector come from **direct emissions** – from fossil fuels burned *on-site* for heating or cooking needs – as well as **indirect emissions** – from fossil fuels burned *off-site* in order to supply that building with electricity. Building design plays a large role in determining the future efficiency and comfort of facilities. Increasing energy efficiency can help reduce GHG emissions and result in significant cost savings for both homes and businesses. The Edina community can also achieve environmental, social, and economic benefits through enhancements to the built environment.

## Edina Residential Energy Use Profile

According to 2019 community wide data from Xcel Energy, the residential sector in Edina consumes nearly 194.5 million kWh annually. This is equal to 8,719 kWh per household. The sector also consumes over 20.4 million therms of natural gas annually. As outlined in the City’s 2019 GHG Inventory report, residential electricity consumption per household has been steadily declining since 2013 while residential natural gas consumption per household has increased 12% since 2013, compared to the Statewide average increase of 3.3% over the same timeframe.<sup>15</sup>

## Edina Commercial and Industrial Energy Use Profile

According to Xcel Energy, the Edina commercial and industrial sector in 2019 consumed nearly 334.2 million kWh, equal to 7,885 kWh per job. These sectors also consume over 19.5 million therms of natural gas annually. As outlined in the City’s 2019 GHG Inventory report, commercial and industrial electricity consumption per job decreased significantly between 2013 and 2016 but increased nearly just as much again between 2016 and 2019. Commercial and industrial natural gas consumption per job has followed the same curve as residential natural gas consumption increasing since 2016.

## Sector Goals

	Citywide Renewable Energy	Citywide Electricity Consumption	Citywide Natural Gas Consumption	Population in Energy Poverty
Today <sup>9</sup>	6% 	533GWH 	39.9MTherms 	29% 
2030 Targets	22%	453GWH	33.9MTherms	12%

## Equity Considerations

- Often, families that live in properties that are not energy efficient are also those that can least afford high-cost utility bills. These households may lack the ability to pay for energy efficiency improvements or access renewable energy options.
- Renters of both single family homes as well as multi-family housing usually do not have the ability to implement energy efficiency measures to the buildings they live in to gain the benefits of energy efficiency.
- Families with fewer resources must dedicate a disproportionately larger share of their income towards energy costs, which exacerbates other vulnerabilities including exposure to heatwaves and other climate vulnerabilities. These same families are sometimes forced to forego basic access to service altogether - an estimated 162 households in Edina go without heating fuel of any type.<sup>14</sup>



The strategies on the following pages guide our path in meeting our climate goals for the Buildings and Energy sector. Each strategy is supported by a series of detailed actions to be explored and undertaken in order to carry out the vision and goals.

See Section 10 Implementation for all supporting actions

# Buildings and Energy

Strategy  
BE 1

**Improve total community wide residential, commercial, educational, and industrial building energy efficiency by 15% for electricity and 15% for Natural Gas by 2030.**

According to the US Energy Information Administration, homes built between 2000 and 2009 used 15% less energy per square foot than homes built in the 1980s, and 40% less energy than homes built before 1950<sup>1</sup>. Consequently, this means that retrofitting older homes with some of these technologies provides ample opportunity to improve energy efficiency throughout the community. The maps to the right illustrate the distribution of owner occupied and renter occupied homes built before 1980 throughout Edina<sup>2</sup>. Totalling 78% of owner occupied homes and 65% of renter occupied homes, the improved energy efficiency potential of housing stock built before 1980 alone represents a significant opportunity for reducing community-wide energy consumption—particularly within natural gas use.

See Section 10 Implementation for supporting actions.

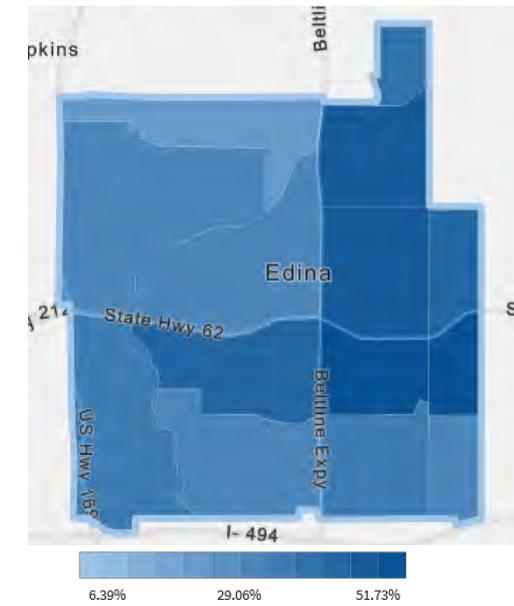
Edina Owner Occupied Homes Built Before 1980



% Owner Occupied Housing Units Built before 1980

**Share of Owner Occupied Homes Built Before 1980: 78%**

Edina Renter Occupied Homes Built Before 1980



% Renter Occupied Housing Units Built before 1980

**Share of Renter Occupied Homes Built Before 1980: 65%**

Residential Energy Use Trends

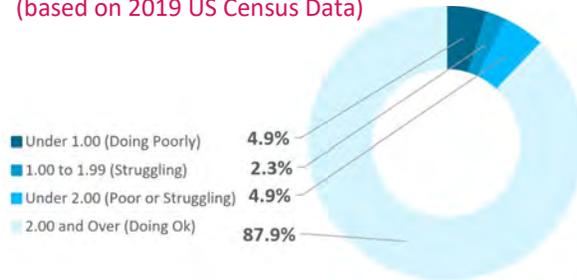


# Buildings and Energy

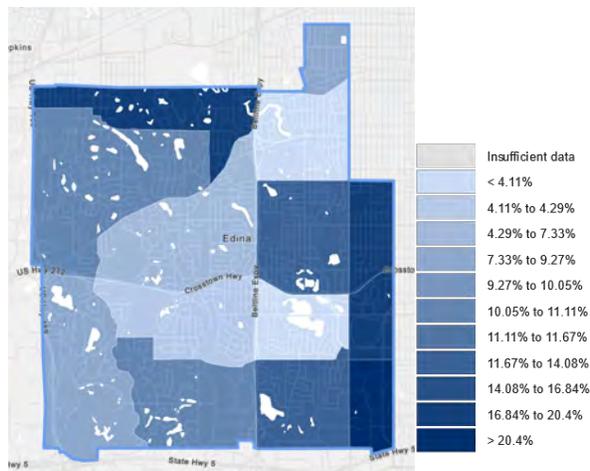
## Three Year New Building Construction Permit History in Edina

Housing Building Permits:	<b>231</b>
Housing Units:	<b>1,032</b> (4.8% of citywide housing stock)
Commercial Building Permits:	<b>10</b> (2.2% of commercial building stock)
Commercial Renovation Permits:	<b>611</b>

## Income Distribution of Households In Edina (based on 2019 US Census Data)



## Low Income Households In Edina (based on 2019 US Census Data)



### Strategy BE 2

## Increase adoption of high-performance building construction technology, achieving 5% Net Zero households and 1% Net Zero commercial properties community wide by 2030.

High-performance buildings are those which deliver a higher level of energy-efficiency performance—typically 30% better than buildings designed to meet code—while Net Zero buildings are high-performance buildings which also generate as much energy on-site as they consume<sup>3,4</sup>. Based on the City’s recent new building permit history (shown to the left), as much as 16% of the city’s housing stock and 7-10% of the city’s commercial building stock may be renovated or replaced over a 10 year timeframe. This means that a significant portion of the city’s building infrastructure could be positively influenced through climate action strategies that guide increased adoption of cost effective high-performance and Net Zero energy building practices.

See Section 10 Implementation for supporting actions.

### Strategy BE 3

## Reduce share of population living in high energy poverty from 29% to 12% by 2030.

A household’s energy burden—the percentage of household income spent on energy bills—provides an indication of energy affordability. Researchers define households with a 6% energy burden or higher to experience a high burden<sup>5</sup>. People experiencing energy poverty have increased vulnerability to health issues, particularly those associated with indoor temperature extremes<sup>6</sup>. As the frequency and severity of extreme weather events in Edina escalates due to climate change, those living with energy poverty will be increasingly vulnerable to climate change. Energy efficiency and renewable energy can lower energy bills for low-income households while also improving health and climate adaptation outcomes by improving indoor air quality, safety, and resilience.

In the United States, however, adoption of energy sector climate actions can increase energy inequity. Studies have indicated energy efficiency projects in low-income neighborhoods can cost up to twice what they do in more affluent neighborhoods<sup>7</sup>. In addition, some of the mechanisms used to advance renewable technology such as tax subsidies can increase energy inequity<sup>8</sup>. Nearly 1 in 8 households in Edina are low income, meaning that increasing equitable access to energy efficiency and renewable energy can not only reduce energy poverty in the community but it also represents a notable portion of the emissions reduction potential in the City.

See Section 10 Implementation for supporting actions.

# Buildings and Energy

Strategy  
BE 4

**Achieve 10% residential and commercial and industrial building "fuel switching" from on-site fossil fuel combustion to less carbon intensive, or carbon neutral sources by 2030.**

Within Edina, approximately 78% of residential heating is provided by natural gas, 17.7% by electricity, 1.5% by propane gas, 1.5% by "other", and 0.5% by fuel oil<sup>2</sup>. As Edina's electric grid nears carbon neutrality, building heating fuel will become an increasingly important target for emission reductions. Reduction, and ultimately the elimination of all fossil fuel heating (oil, propane, natural gas) will be required in order to achieve community wide carbon reductions<sup>9</sup>.

See Section 10 Implementation for supporting actions.

Strategy  
BE 5

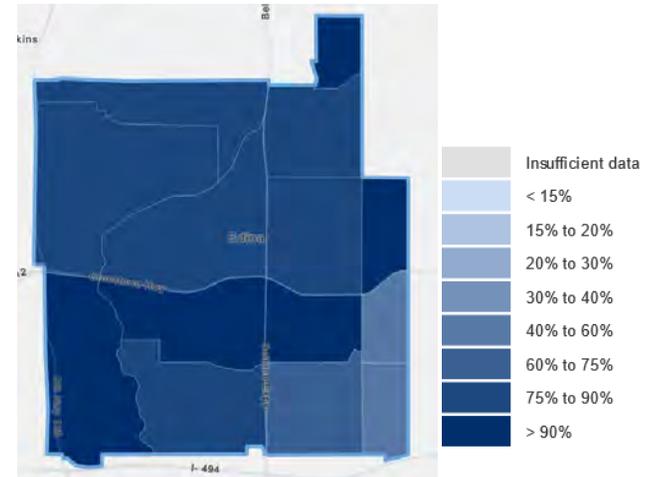
**Increase renewable energy (distributed and purchased) from 2% to 17% of citywide residential and commercial electric use by 2030.**

The GHG emissions associated with grid provided electricity use is anticipated to continue to reduce over the years<sup>10</sup>. Including a focus on consumer driven renewable energy purchases, however, is still a critical need to meet our GHG reduction goals. For residents and businesses that are unable to install on-site solar, purchase of renewable energy through Xcel Energy provides those property owners an opportunity to achieve Net Zero electricity use while supporting an important mechanism in cleaning the State's electric grid<sup>11,12</sup>. Meanwhile, for owners of properties well suited for solar, increasing utilization of on-site renewable energy has multiple benefits for a community beyond GHG emissions reductions. The range of community benefits of increased on-site renewable energy include energy cost savings and increased energy resilience potential. As of 2019 there were 1,250 households and 10 businesses purchasing renewable energy through Xcel and 91 households and businesses with on-site solar.

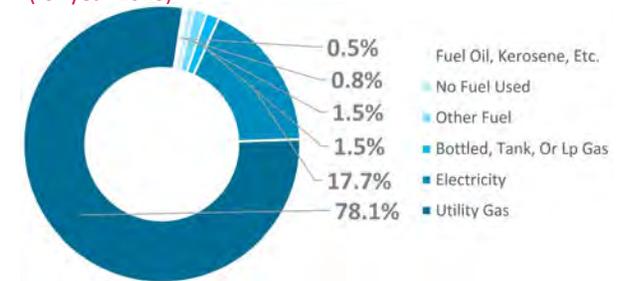
See Section 10 Implementation for supporting actions.

City of Edina's Solar Share Based on 2021 Data:	State	Edina	Edina's Share
Population	5,640,000	51,746	<b>0.92%</b>
Number of Solar Installations	7,544	91	<b>1.21%</b>
Solar Installations /1,000 households	1.35	4.17	<b>308.98%</b>
Solar Generating Capacity (MW)	1,507.93	1.74	<b>0.12%</b>
Average Array Size (KW)	199.88	19.09	<b>10%</b>
Solar Industry Businesses	146	3	<b>2.05%</b>

Edina Homes with Utility Gas Heat  
(for year 2018)



Edina Residential Heat Fuel Used by Type  
(for year 2018)



City of Edina's Solar Impact  
Based on 2019 Data:

On-Site Solar Share of Electricity Used	<b>0.5%</b>
Renewable Energy Purchases Share of Electricity Used	<b>1.2%</b>
Households purchasing renewable electricity through utility	<b>1,250</b>
Businesses purchasing renewable electricity through utility	<b>10</b>

# Buildings and Energy

Strategy  
**BE 6**



**Improve total municipal building energy efficiency by 15% for electricity and 15% for natural gas by 2030.** Based on facility energy use intensity comparisons with similar municipal facilities, the City of Edina facilities may have as much as 22,641,000 kBTU in annual energy savings potential.<sup>13</sup> Cost effective energy efficiency upgrades will provide both GHG reduction as well as annual operating cost savings benefit. *See Section 10 Implementation for supporting actions.*

Strategy  
**BE 7**



**Achieve 25% municipal building thermal “fuel switching” from on-site fossil fuel combustion to less carbon intensive, or carbon neutral sources by 2030.** On-site natural gas combustion represents over 23% of all City of Edina municipal operations GHG emissions annually<sup>9</sup>. As Edina’s electric grid nears carbon neutrality, building heating fuel will become an increasingly important target for emission reductions. Reduction, and ultimately the elimination of all fossil fuel heating (oil, propane, natural gas) will be required in order to achieve community wide carbon reductions.<sup>9</sup> Initiating a fuel switching program for City facilities is an important priority to achieve significant City operations emissions reductions. *See Section 10 Implementation for supporting actions.*

Strategy  
**BE 8**



**Increase municipal renewable electricity utilization from 0.2% to 100% of city operations electricity consumption by 2030.** The City has 676.8 KW of installed solar on City facilities, including 664 KW of community solar in which the electricity produced is consumed by multiple subscribers. Identifying additional solar installation potential, including ground mounted arrays, "carport" arrays, and remaining cost effective rooftop array locations can increase the City's renewable energy portfolio. On-site renewable installations also provide the City an opportunity to explore the development of micro-grid, energy storage, and other strategies to increase the energy resilience of City facilities. *See Section 10 Implementation for supporting actions.*



# Buildings and Energy

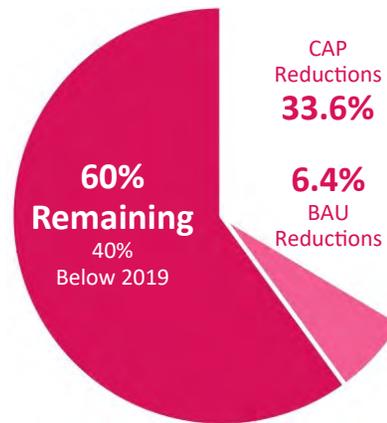
## Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the Climate Action Plan are projected to reduce the city's annual GHG emissions by 134,997 metric tons (MT) annually by 2030 - a 33.6% reduction over 2019 levels. Changes in business-as-usual impacts over the same period are anticipated to reduce an additional 25,710 metric tons. The result is a total community wide Buildings and Energy sector reduction of 40% over 2019 levels.

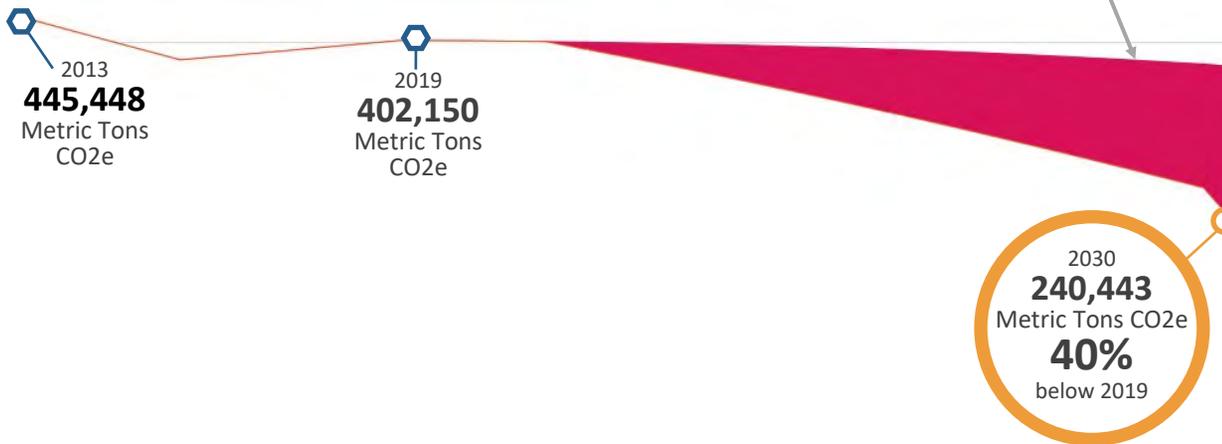
When compared to 2019 emissions, this is equivalent to eliminating 29,359 cars from the road, or **2.6 billion** cubic feet of man-made greenhouse gas atmosphere annually by 2030

## Sector Emissions Reduction below 2019 by 2030

The total change to sector emissions include CAP Plan reductions and business-as-usual (BAU) emission changes as follows:



## Buildings and Energy Carbon Reduction Pathway



## Estimated Cumulative Economic Savings

Implementing many of the measures in this plan, such as increased energy efficiency and renewable energy, can save money for the community. The estimated community savings of the goals for this section include:

Residential Energy Efficiency and Renewable Energy Savings  
**\$3,780,838** +  
**\$170**  
 per household

Commercial/Industrial Energy Efficiency and Renewable Energy Savings  
**\$18,197,595** =  
**\$429**  
 per job

Estimated Cumulative Savings Potential\*  
**\$21,978,433\***  
**\$416**  
 per capita

\* Allowances for expenses for energy efficiency upgrades are included in calculations. (see Appendix for more)