Denver Climate Action 2020 Recommendations Report

Developed by the

Denver Climate Action Task Force

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The **Bloomberg Philanthropies American Cities Climate Challenge** is an unprecedented opportunity for 25 ambitious cities to significantly deepen and accelerate their efforts to tackle climate change and promote a sustainable future for their residents. Denver was one of the first 25 cities selected to participate in this challenge, which aims to meet near-term carbon reduction goals. Under the umbrella of the Climate Challenge, **NRDC** and the **City and County of Denver** partnered with the **Civic Consulting Collaborative** to provide facilitation to the Climate Action Task Force. The collaborative also oversaw public engagement and helped craft this report. **Kapwa Consulting** partnered to support the Task Force process through equity training and review. Denver also engaged the services of **Group 14 Engineering** to assess the level of impact of identified strategies and the level of investment needed to implement them.

Denver Climate Action 2020 Executive Summary

Call to Action

Denver's Climate Action Task Force submits these recommendations with full consensus to Denver's Mayor, City Council, and City Government, urging immediate and decisive action to reduce our impact and prepare for climate change. We were charged by the Mayor and City Council to submit these recommendations and funding options to propel Denver forward in climate action equitably and with broad community input.

We are a diverse group, made up of representatives from across Denver's diverse community both in terms of identity and interests. Members of the task force identify with the African American, Asian American, Caucasian, Native American, Latino/a, Pacific Islander, or LGBTQIA (lesbian, gay, bisexual, transgender, queer or questioning, intersex, straight, and asexual) communities. Interests and representation vary from small business interests, real estate, Xcel Energy, the solar industry, the oil and gas industry, environmental groups, religious institutions, transportation organizations, youth led organizations, and, of course, community members. Furthermore, we engaged members of the public through three distinct processes around needs and opportunities, equity, and solutions. This included two rounds of Meetings in a Box, Stakeholder Advisory Groups, and broad public input through an on-line forum. We interfaced with thousands of Denverites and collected thousands of comments.

Despite this diversity, this recommendations report had full consensus from our group.

We launched in January of 2020, before a trifecta of acute and interrelated crises unfolded during the writing of this recommendations report: a health crisis due to the COVID-19 pandemic, the associated economic crisis, and the racial justice crisis further brought to light by the killing of George Floyd by a police officer.

After natural disasters, such as a flood, we rebuild our infrastructure back stronger. The goal here is not to get back to normal, but to emerge from such crises with a more just, equitable, healthy, and sustainable community. In the same way, climate action is inseparable from racial justice, community health, and economic resiliency. Climate action is a necessary part of building a better Denver.

For this reason, we've organized the report by centering climate action with equity, then discussing the cost of inaction, and how climate action can support economic recovery. Then we move into sector specific goals and recommendations for buildings and homes, transportation, electricity supply, consumption and waste, and adaptation and resiliency. Finally, we discuss how to best invest in climate action through a package of revenue recommendations.

The recommendations included in this report are likely to be challenging for some elected officials and departments, given potential resistance from residents and industry groups. We offer this guidance for those wrestling with how to move forward. Consider the 26 volunteers, including community and industry interests, who donated over 1,000 hours of their time and expertise for five months, integrating the advice of technical and process experts throughout that time. The good news is, we figured this out. We reached consensus. And now much of the work is done and is included as recommendations in this report. We know that does not make it easy to adopt some of the recommendations. But our choice and the path of integrity is clear. Either we can set up more processes to renegotiate these agreements and likely come to similar conclusions and recommendations after having lost precious time, or we can act now. We ask our elected officials and department leads to be brave; be courageous; be unequivocal; act

now. The report breaks up our recommendations into three phases over the next 10 years, with a stress on moving forward with phase one policies and incentives from now through 2022.

Our community, Colorado, and the nation have not dealt with the climate crisis sufficiently up to this point. So now it is up to our current leaders. We urge Denver to leverage whatever momentum we have created through the full consensus of our diverse task force membership, as well as recognition due to COVID-19 and the Black Lives Matter movement of the existing inequity in our society. We can only achieve this vision if we acknowledge the suffering and tremendous cost if we fail to act. In addition, there are tremendous cost savings by investing now.

We thank our elected officials and city government in advance for what we expect to be strong and swift action to help build Denver back better.

The Climate Crisis

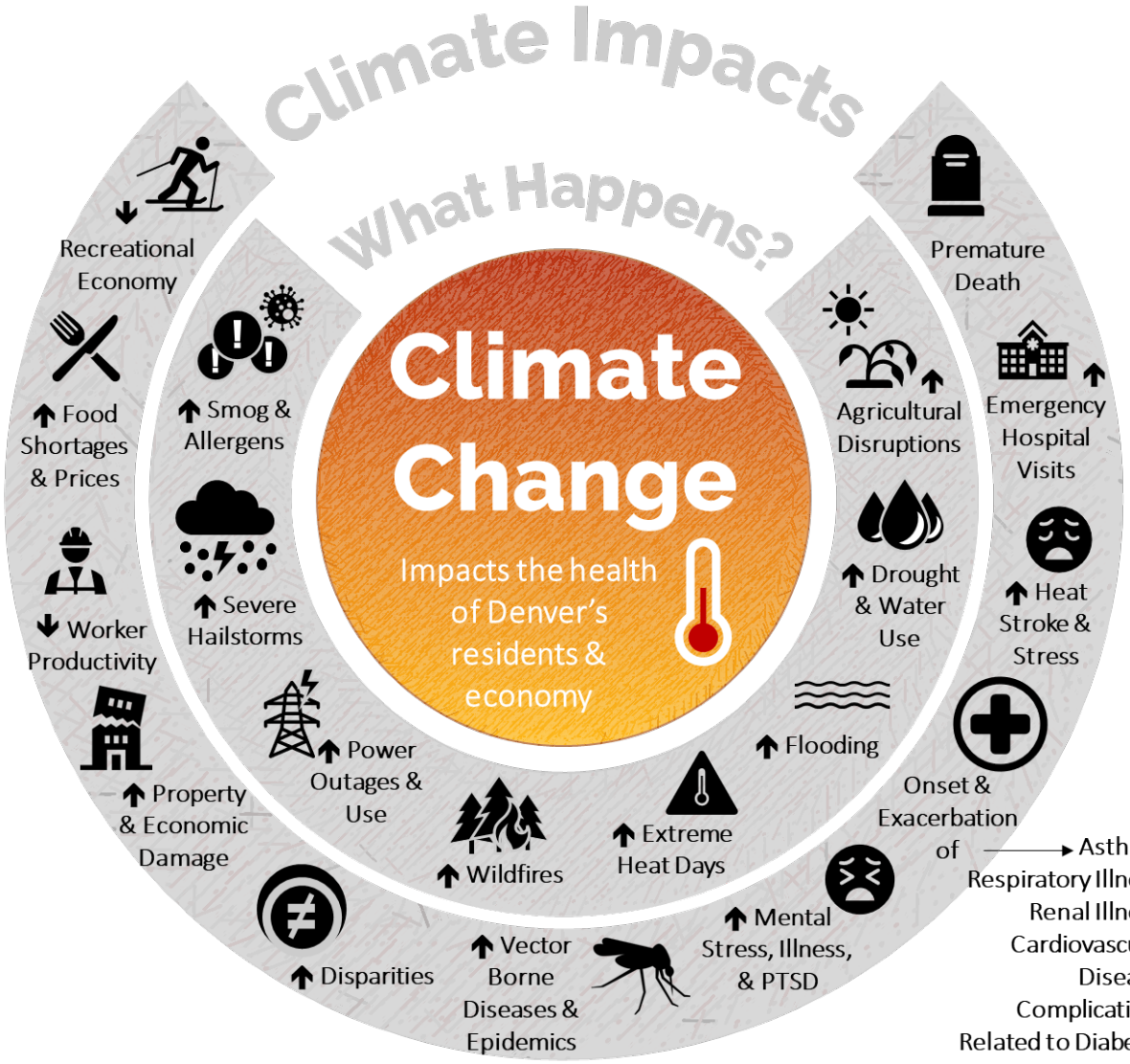


Figure ES 1. Climate change effects and impacts in Denver.

If we find ourselves in a severe climate crisis scenario, life as we know it will be impacted across all sectors. Figure ES 1 depicts some of the impacts to Denver's economy and our health. The stakes are high, and action is urgently needed, which is why the Denver 2020 Climate Action Task Force has laid out an aggressive policy and solutions agenda that is to be implemented as rapidly as possible over the next decade.

To avoid human suffering is sufficient motivation. In addition, we find that the return on investment underscores the soundness of action. We conducted a reconnaissance analysis to determine the cost of

Between averted impacts and savings, the minimum value of climate action investments are

$20.2 Billion

climate impacts to Denver as well as the potential savings that could result from enacting climate action initiatives. Even though there were several aspects for which we could not find good numbers, the result was a staggering combined total of $20.2 billion at a minimum, or nearly seven times the $3 billion investment needed. Even when the figure is not adjusted for population growth, the combined total is $13.8 billion. There are many impacts for which we do not have good numbers and these impacts will add billions more to this estimate.

Centering Climate Action in Equity

The Task Force is committed to making Denver a more equitable city, recognizing that broken systems have long contributed to racial, social, economic, and environmental injustice. As Mikka Macdonald writes, "78% of African Americans lived within 30 miles of a coal plant. 80% of Latino/Latinas live in counties that violate federal air-pollution law. In total, non-white populations breathe 38% more polluted air than their white counterparts. That's just the air. People of color are disproportionately affected by heat waves, wildfires, and storms" (Oct. 2019).

The Task Force participated in an equity training in Meeting 2 on January 30, 2020 and have used concepts learned in that training to craft the values and principles found throughout these recommendations.

Equity means addressing broken systems connected to racial injustice and historic inequity.

The pursuit of equity happens in several ways. Government has historically excluded people of color, Native Americans, and under-resourced communities from decision-making processes, so it is critical that processes to make decisions about policies and programs are inclusive and fair. In addition, the benefits or burdens of policies, programs or investments have not always been fair or shared equitably across our City. Looking closely at those impacts and making future corrections is critical. Finally, equity is also about understanding historical patterns of discriminatory action and correcting for those injustices today.

We know that people of color, Native Americans, and under-resourced communities will be disproportionately impacted by the climate crisis. Flood risk, lack of adequate infrastructure to handle hail, poor air quality, the most intense heat zones, and other factors will all impact these groups to a greater degree. These same groups of people have been hit hard by the current health and economic crisis associated with COVID-19. One of the most important lessons of this time is that we are all interconnected and that the significant inequalities in our society are costly and harmful, and also prevent our ability to effectively respond and bounce back from significant shocks. In this way, a global pandemic and the climate crisis are similar.

Supporting Recovery

At the time of writing this report, a recession related to the COVID-19 pandemic was declared. People in Denver are suffering, many out of work, and with prospects that are uncertain at best. The economic downturn and pending recovery have already proven to disproportionately impact people of color, further exacerbating and highlighting the racial justice crisis. We have an opportunity to build Denver back better by interlacing the recovery across our current economic, racial justice, and climate crises.

The following proposals were identified as top priority if stimulus funds were available to invest in climate projects.

1. Deploy an all-Denver retrofit of existing homes and buildings to support energy efficiency as well as health and wellness.

2. Invest in an affordable, expanded, and carbon-free bus system.
3. Invest in reconfiguring Denver's streets to be shared streets while vastly expanding the use of bicycles and e-bikes.
4. Invest in electric vehicle infrastructure, such as charging stations.

These solutions, which have more detail in the report, will help build Denver back more sustainably and equitably through job creation.

Overarching Goal

The Denver Climate Action Task Force adopted an aggressive overarching goal, interlacing equity and eliminating greenhouse gas emissions.

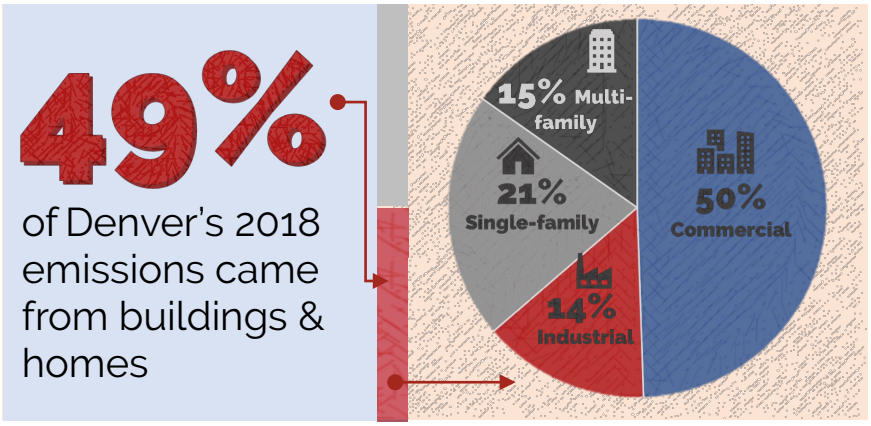
Denver will be a model for the nation and world by working urgently to create, pass, and implement bold policies that achieve 40% greenhouse gas emission decrease community-wide by 2025, 60% by 2030, and 100% by 2040, using a 2005 baseline. We will center policy design, programs, and investments in frontline communities, and inspire people in our city to embrace sustainability as a value.

Sector Specific Recommendations

Buildings and Homes

Greenhouse gas emissions in buildings and homes must be addressed to solve climate change in Denver as together they represent 49% of the 2018 emissions. Recommendation highlights are provided here for existing and new buildings and homes. In addition, we show how retrofits to existing buildings and homes can support health, wellbeing, and affordability for Denver's low-income households.

Figure ES 2. 2018 Buildings and Homes Emissions Breakdown



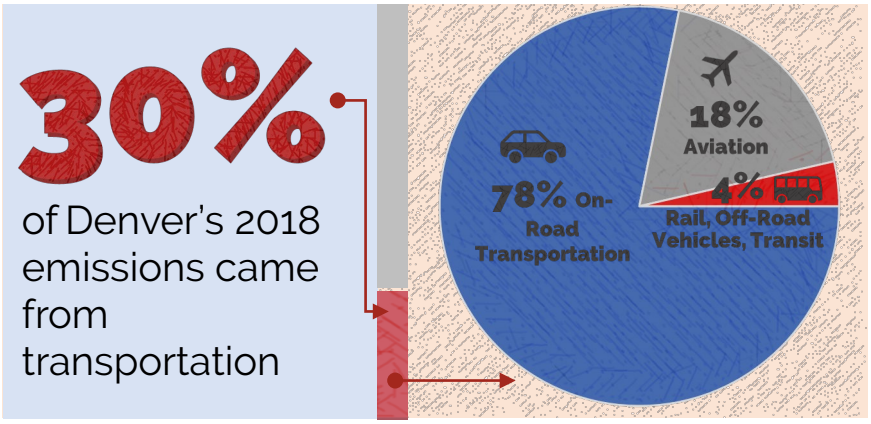
1. Existing buildings & homes:
   - Implement a building performance policy for existing buildings that supports COVID-19 recovery through jobs, healthy buildings, and limiting cost impact for tenants.
   - Requirements for electrification at the time of equipment replacement. Require that by 2040 all-natural gas equipment has been replaced where possible in existing buildings & homes.
2. New buildings & homes: Net-zero (highly efficient, all-electric, renewable energy, grid-flexible) new homes required in the 2024 base building code and in new buildings in the 2027 base building code.

3. **Affordable housing:** Connect and enhance low-income programs, include incentives that improve indoor air quality and health, and ensure that no requirements reduce the amount of affordable housing in existence or being built in Denver.

Transportation

In 2018, transportation was responsible for 30% of greenhouse gas emissions in Denver, the second largest source after buildings and homes. The majority of transportation emissions results from driving private vehicles and light trucks. Denver has one of the highest single occupancy vehicle commute rates in the nation (73%) compared to other large metropolitan cities. For instance, Seattle's single occupancy vehicle commute rate is 44%.

Figure ES 3. 2018 Transportation Emissions Breakdown



For this reason, several of our recommendations focus on making green transportation the easy and obvious choice:

1. **Prioritize transit.** Frequent, affordable citywide bus service and a Bus Rapid Transit system to move more people efficiently, paired with congestion mitigation and market-rate parking.
2. **Fewer polluting trips.** Citywide electric vehicle charging network and electric fleets paired with more telecommuting, developer and employer TDM plans and incentives, and density in housing.
3. **Smaller and smarter.** Citywide micromobility options paired with off peak freight delivery and smaller delivery vehicles.
4. **Completed, connected no-carbon networks.** Fully built out bike/ped and car-free street networks for next generation mobility devices paired with free citywide bikeshare and e-bike incentives.

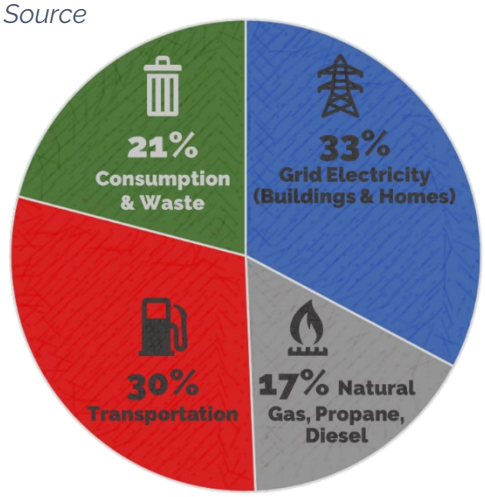
In addition, we have a suite of recommendations aimed at building electric vehicle infrastructure and moving Denverites toward using zero emission vehicles.

Electricity Supply

Denver's renewable electricity supply is essential to achieving Denver's decarbonization objectives. Grid electricity consumed in buildings and homes accounted for 33% of Denver's emissions in 2018 (Figure ES 4). In the coming decades, decarbonizing the electricity supply is foundational to achieving climate mitigation benefits through the electrification of vehicles and buildings.

1. **Carbon Free Denver:** By 2025 100% of Municipal buildings will be powered by renewable electricity. By 2030, renewable or carbon-free electricity will power all of Denver's electricity use.
2. **Community Solar:** Fund community solar (and rooftop solar) programs near-term to expand rebates and

Figure ES 4. 2018 Emissions in Denver by Source



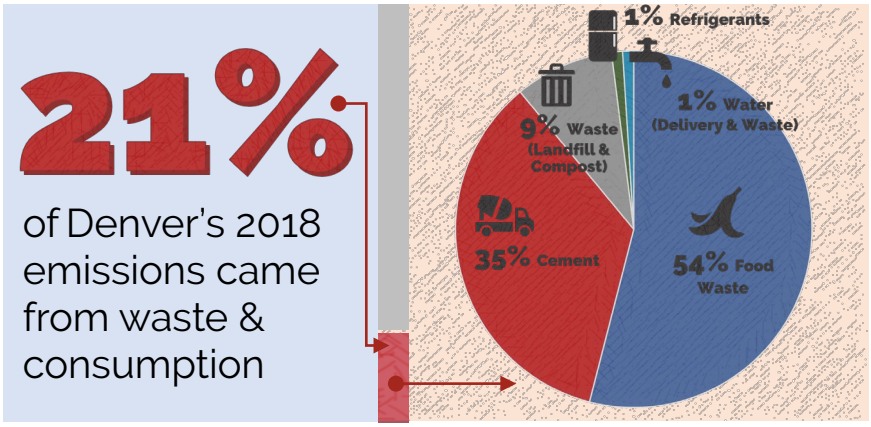
incentives beyond utility programs and encourage deployment of distributed generation technologies.

3. **Carbon-free Colorado:** Continued City-utility partnership and participation in state regulatory proceedings, especially with Denver intervention in and support during implementation of Xcel Energy's statutorily required Electric Resource Plan to achieve an 80% statewide reduction in carbon emissions by 2030, in addition to the 100% goal for Denver.

Consumption and Waste

In 2018, consumption and waste were responsible for 21% of Denver's total greenhouse gas emissions. Consumption refers to greenhouse gas emissions associated with the use of goods and services by the residents of the city. Note that this excludes emissions from visitor activities and those goods and services that are produced in the city and exported. It does include emissions from goods and services that are imported and ultimately used and consumed. The breakdown in Figure ES 5 is an estimate, as Denver has yet to conduct a consumption-based emissions inventory. Because of this, the current Greenhouse Gas Inventory conducted by Denver only captures a small percentage of total emissions associated with consumption. A study by C40, the leading global organization working with cities to advance climate action, estimates that consumption-based emissions from nearly 100 of the world's big cities already represent 10% of global greenhouse gas emissions. Without urgent action, those emissions will nearly double by 2050.

Figure ES 5. 2018 Consumption & Waste Breakdown



Below are some key recommendations to address Denver's consumption and waste.

1. **Residential:** Approve and implement volume-based pricing, aka Pay As You Throw policy (PAYT – high impact, high order policy, revenue generation), where compost and recycling are the standard waste service and trash is charged by the size of the trash cart chosen by the customer. This would include subsidies or exemptions for low income households.
2. **Commercial:** Require all multifamily buildings and businesses to recycle and compost.
3. **Construction:** Require minimum waste diversion rate for construction and demolition as part of building code for those products that have viable end markets, focusing on diverting low-hanging fruit, such as cardboard, clean wood, and metal.

Adaptation and Resiliency

While we know that mitigation efforts at whatever level will reduce the impacts to climate change in the future, there is still the need to adapt to and be resilient in the face of a range of climate related impacts, such as those outlined in Figure ES 1. Some of these are described below:

Climate Impacts to Denver

	Air quality: Denver residents already live with elevated pollution levels every day, and air quality is likely to degrade further from heat related ground-level ozone formation, increased allergens, and more frequent wildfires.
	Mental health: Exposure to climate related disasters, changes, and uncertainty can lead to increased anxiety, depression, and post-traumatic stress disorder.
	Emergency services: Emergency response can be overwhelmed or stressed by large scale or repeated disasters as well as the onset and exacerbation of a host of diseases ranging from asthma to kidney disease.
	Epidemics and vector borne diseases: Changing temperatures and land use patterns are expected to increase our risk of vector borne diseases and epidemics.
	Power outages due to severe weather: Severe weather in Denver, including hail, strong winds, and heavy snow can also lead to power outages.
	Hail damage: Hailstorms are predicted to be less frequent but more severe, causing significant damage.
	Heat waves: Heat wave days in Colorado are expected to jump from 10 per year to nearly 50 per year by 2050. Heat related mortality is likely to double by 2050, with low-income households and those vulnerable to heat, such as older adults, most at risk. In addition, heat waves reduce worker productivity, impacting Denver's economy.
	Flooding: Changing climate patterns and poorly planned development that limits permeable land (already at less than 50% of the surface area in Denver) increase the risk of flooding.
	Drought & Water Use: Colorado is one of the states most threatened by severe drought in the coming decades. Drought could impact water supplies both for use in Denver and also could impact food security for food grown in Colorado and for Denver's supply chain. In addition, increased heat means that plants need more water to survive. This drives up water use in Denver's outdoor spaces as well as for agriculture across the state.
	Wildfire: Climate change is also expected to increase the area burned and length of the fire season. Post-fire erosion can cause major problems for water supply and storage infrastructure. In addition, Denver can be impacted by poor air quality from fires.
	Climate impacted economy: Climate related disasters often disrupt the local economy, with direct damages to property, and loss of jobs and revenue. Tourism will also be impacted.
	Greater inequities: Further exploration indicates that people of color, Native Americans, under-resourced communities, low-income households, children, older adults, those with disabilities, outdoor workers, the unhoused, and other frontline communities will be hardest hit. Many of Denver's poorest neighborhoods have high ratios of impervious surfaces, lack shade, are in the 100-/500-year flood plain, have worse air quality, and have a high vulnerability to extreme heat. At the same time, there is great opportunity to improve the lives of those most impacted by the climate crisis. Because these communities are already exposed to increased risk, addressing these risks by ensuring the communities are more resilient and adapt to climate change can and should be transformative.

We also know that investing in solutions now to adapt and become more resilient in the face of climate change will have clear benefits, financial and otherwise, in addition to avoiding some of the worst risks outlined above. Below are some recommendation highlights:

1. **Risk Plan:** Plan for adaptation and resiliency with a comprehensive risk assessment and city-wide adaptation plan.
2. **Economic Resilience Fund:** Establish an economic resilience fund to ensure communities not covered by other insurance and social programs are able to recover quickly and equitably from climate related disruptions.
3. **Incorporate Local Knowledge into Resilience Planning:** Invest in community resilience through a number of resources, education, and various programs that recognize the importance of local knowledge and understanding of building climate resilience, such as engaging neighborhoods to embed resilience in community disaster response efforts.
4. **Expand Tree Canopy Equitably:** Expand tree canopy in under-resourced neighborhoods.
5. **Require Resiliency in Building Codes:** Update building codes for new buildings to require green infrastructure, and resilient design, including low-energy cooling techniques, battery storage, storm resistance, limited impervious surfaces, use of drought tolerant plants that provide pollinator habitat.

Revenue

Phase 1 of the work identified by Denver's Climate Action Task Force requires a significant investment. All-in, at $198 million annually, this is more than can be invested right now. Infrastructure investments, primarily in transportation, are $121 million. While these are critical, we've focused our funding package on policies and policy implementation, at least for Phase 1, with the hope that the city will primarily fund infrastructure in the near future using other funding mechanisms, such as through public-private partnerships, bond measures, green or public banking, or stimulus funds. That brings the minimum total needed to be raised to approximately $76 million annually. We recognize that this is a significant number, especially during an economic downturn. However, we believe investments now are critical to not only address the climate crisis, but also to support economic recovery. We've designed solutions to support recovery efforts, including job creation and supporting people most impacted by the health, economic, and racial justice crises we find ourselves in. This includes investing in retrofits that will reduce the monthly cost to low-income households. This will help make these funding solutions more equitable. Every dollar we spend in prevention and preparedness now will save many dollars in the future.

We recommend moving forward with the revenue options identified in Table ES 6.

Table ES 6. Phase 1 Revenue Package with Initial pre-COVID 19 revenue estimates.

Revenue Source	Pre COVID 19 Revenue $/yr (Phase 1 - 2021-2022)	Potential reduction due to COVID-19 in the short term
1. Sales Tax at 0.25%	$45 m	≅ $36 m
2. Vehicle Efficiency Fee	≅ $15 m	≅ $15 m
3. Parking Meter Increase	$16 m	≅ $13 m
4. Parking Permit Fee	$0.6 m	$0.6 m
5. Commercial Parking Lot and Garage Fee	≅ $10 m	≅ $8 m
6. Meter buy-out fee increase	$0.7 m	$0.6 m
TOTAL	**≅ $87.3 m**	**≅ $73.2 m**

Following are our specific recommendations for each of these revenue options. (Note: there is considerably more detail in the body of the document.)

- **Sales and Use Tax:** The Climate Action Task Force recommends that the City Council initiates a general sales tax referendum to appear on the November 2020 ballot at a rate of 0.25%.

The Task Force strongly believes that the City Council must put in place appropriate guardrails to ensure that the sales tax does not overly burden those in Denver most impacted by social injustices, including which products are exempt from sales tax and specificity about how the money will be spent in a way that will most benefit people of color and under-resourced communities.

- Vehicle Efficiency Fee at Time of Registration: The Task Force recommends a vehicle efficiency fee to be implemented in phase 1 to address emissions from transportation. It should be structured in such a way that it does not cause undue burden to low income individuals or households either in cost or administratively. It should also be structured to incentivize purchasing highly efficient or zero emission vehicles. The fee should support incentives and policies to improve public transportation, micromobility, and buy-back of low-efficiency vehicles.
- Parking Meter Fee Increase: The Task Force recommends incrementally increasing parking meter rates over the next three years for existing meters up to $3 based on demand, and ultimately invest in meters that allow for dynamic pricing, and fund stronger meter enforcement and staffing by 2023. This would allow better management of the curb. It could raise $16 million annually by 2022 for transportation related climate action, such as multimodal transportation. In some places, like our college and university campuses, considerations for the impact of those who frequent the area should be taken into account. The City should also explore the addition of new areas with meters to support funding Phase 2.
- Commercial Parking Lot and Garage Fee: The Task Force recommends DOTI institute a commercial parking lot and garage fee in an equitable and timely manner to support climate action as part of the Phase 1 revenue package.
- Parking Permit Fee: The Task Force recommends DOTI institute a parking permit fee in an equitable and timely manner to support climate action as part of the Phase 1 revenue package.
- Meter Buyout fee (bagging): Recommend DOTI increases the fee for meter buyouts for construction or commercial purposes (Bagging).

The investment level for Phase 2 and 3 increases; additional revenue options are indicated in the report for further study.

In Conclusion

Addressing climate change is urgent. Supporting the economic recovery from COVID-19 is urgent. Building Denver back as a more equitable and sustainable city is urgent. And, ensuring we are prepared for the next climate related crisis is urgent. We greatly appreciate the faith that Mayor Hancock and City Council entrusted in us to deliberate on these urgent matters. After several months of work, we have reached unanimous consensus. For this reason, we urge Denver City Council and Mayor Hancock to immediately begin the referral process for our recommended sales tax ballot initiative and to move forward the additional fee options for Phase 1.

In addition, we ask that the City and County of Denver immediately develop an implementation plan. This plan should include bringing high impact Phase 1 policies to City Council, Mayor Hancock, or the appropriate commission or department to be adopted immediately. In instances where funding is required, the adopted plans should be ready for full implementation once revenue sources become available, assuring that the policies are equitably and affordably implemented.

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Introduction

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Despite this diversity, all the recommendations included in this proposal passed our consensus minus 1 threshold.

We launched the task force in January of 2020, before a trifecta of acute and interrelated crises unfolded during the writing of this recommendations report: a health crisis due to the COVID-19 pandemic, the associated economic crisis, and the racial justice crisis further brought to light by the killing of George Floyd by a police officer.

Before these crises hit, we were concerned about the threat climate change could have on our health. This included epidemics. We discussed the need to ensure that our solutions would help build a more equitable Denver, rather than exacerbate inequalities. And, we discussed building a more resilient and sustainable economy here in Denver. When each of these crises unfolded before our eyes, we became even more acutely aware that the fourth crisis, the climate crisis, deeply intersects with social justice, economic health, and the health and wellbeing of us all.

This commitment to both greenhouse gas reduction and equity is demonstrated in our overarching goal, adopted on March 5, 2020:

> *Denver will be a model for the nation and world by working urgently to create, pass, and implement bold policies that achieve a 40% greenhouse gas emission decrease by 2025, 60% by 2030, and 100% by 2040, centering and investing in frontline communities, and inspiring people in our city to embrace sustainability as a value.*

After a natural disaster occurs, such as a flood, we don't rebuild the same structure. We rebuild better. The goal is not to get back to normal, but to emerge from such crises with a more just, equitable, healthy, and sustainable community. In the same way, climate action is inseparable from racial justice, community health, and economic resiliency. Climate action is a necessary part of building a better Denver.

For this reason, we've organized the report by centering climate action with equity, then discussing the cost of inaction, and how climate action can support economic recovery. Then we move into sector specific goals and recommendations for buildings and homes, transportation, energy supply,

consumption and waste, and adaptation and resiliency. Finally, we discuss how to best invest in climate action through a package of revenue recommendations.

We urge our elected officials and city government to take strong action, not only to address and prepare for climate change, but also to help build Denver back better.

Centering Climate Action in Equity

The Task Force is committed to making Denver a more equitable city, recognizing that broken systems have long contributed to racial, social, economic, and environmental injustice. As Mikka Macdonald writes, "78 percent of African Americans lived within 30 miles of a coal plant. 80 percent of Latinos live in counties that violate federal air-pollution law. In total, non-white populations breathe 38 percent more polluted air than their white counterparts. That's just the air. People of color are disproportionately affected by heat waves, wildfires, and storms" (Oct. 2019).

The Task Force participated in an equity training in Meeting 2 on January 30th and have used concepts learned in that training to craft the values and principles found throughout these recommendations, as well as to inform the solutions. This section describes the equity framework being used. Each of the subsequent sections of the report include equity principles and identify specific solutions that support the pursuit of equity in Denver.

Equity means addressing broken systems connected to racial injustice and historic inequity.

The pursuit of equity happens in several ways. Government has historically excluded people of color, Native Americans, and under-resourced communities from decision-making processes, so it is critical that processes to make decisions about policies and programs are inclusive and fair. In addition, the benefits or burdens of policies, programs or investments have not always been fair or shared equitably across our City. Looking closely at those impacts and making future corrections is critical. Finally, equity is also about understanding historical patterns of discriminatory action and intentionally correcting for those injustices today.

You can call it institutionalized racism or institutionalized inequality, but what I say is that any system that operates to maintain inequality is a corrupt system and must be addressed.

~ Robert D. Bullard, father of environmental justice.

We know that people of color, Native Americans, and under-resourced communities will be disproportionately impacted by climate crisis. Flood risk, lack of adequate infrastructure to handle hail, poor air quality, the most intense heat zones, and other factors will all impact these groups to a greater degree. These same groups of people have been hit hard by the current health and economic crisis associated with COVID-19. One of the most important lessons of this time is that we are all interconnected and that the significant inequalities in our society are costly and harmful, and also prevent our ability to effectively respond and bounce back from significant shocks. In this way, a global pandemic and climate crisis are similar.

Climate crisis has been described as a threat multiplier. It will make our existing problems worse, including racial, social, economic, and environmental injustice. Communities that are already experiencing

high heat due to the urban heat island effect and lack of parks and tree canopy will be hit harder by heat waves. Areas with poor air quality today, which are often communities of color located near highways, will experience greater impacts from climate change related air quality events. Current research is showing a connection between higher death rates from COVID-19 and increased air pollution exposure.[1] People of color are also more likely to die from COVID-19.[2] Outdoor workers in yard and construction industries will be exposed to high heat. Many of these workers are people of color. Other groups who will be more impacted by climate crisis than the general public include those with underlying health conditions, homeless people, and older adults. Faced with challenges, many of these communities have innovated around food security, renewable energy, air quality measures, and much more. However, additional work is needed, and efforts must first focus on supporting these frontline communities.

Part of our discussion recognized that some policies may have significant costs. Some communities and the small businesses owned by community members may not be able to bear the additional cost burden or have the capital to make significant new investments. This is why the design of these programs should put people of color, Native Americans, and under-resourced communities at the center. By centering on people who have the greatest barriers, we will achieve better outcomes for everyone For instance, if you build a bike lane that can safely be used by an 8-year old, then it will be safe for all its users. This is the concept of Targeted Universalism.

Programs designed using Targeted Universalism concepts will yield significant benefits to our community as a whole. These include better indoor air quality, mold and lead paint remediation, and, ideally, a decrease in monthly expenses. Decreasing single occupant vehicle trips and using clean fuel can significantly improve outdoor air quality. Because many of Denver's poorest neighborhoods are located alongside transportation corridors, this will help correct the disproportionate impacts borne by these communities, such as high levels of asthma.

People of color, Native Americans, and under-resourced communities know firsthand the real impacts of climate change. Many of their communities have worked on innovative solutions. Part of our work is to understand and ensure an inclusive process in building policies, programs, and services that work for these communities.

The Task Force therefore rejects the notion that we can either reduce greenhouse gas emissions or advance equity and racial justice. We can and must do both. That is why so many of the solutions are geared to support these communities first, with funding and support incentives that have low barriers for participating.

[1] https://www.hsph.harvard.edu/news/hsph-in-the-news/air-pollution-linked-with-higher-covid-19-death-rates/
[2] https://news.yale.edu/2020/05/19/new-analysis-quantifies-risk-covid-19-racial-ethnic-minorities

Impact and Benefits

Impact Analysis

If we find ourselves in a severe climate change scenario, life as we know it will be impacted across all sectors. Figure 1 depicts some of the impacts to the health of Denver's people and economy. The stakes are high, and action is urgently needed, which is why the Denver 2020 Climate Action Task Force has laid out an aggressive policy and solutions agenda that is to be implemented as rapidly as possible over the next decade.

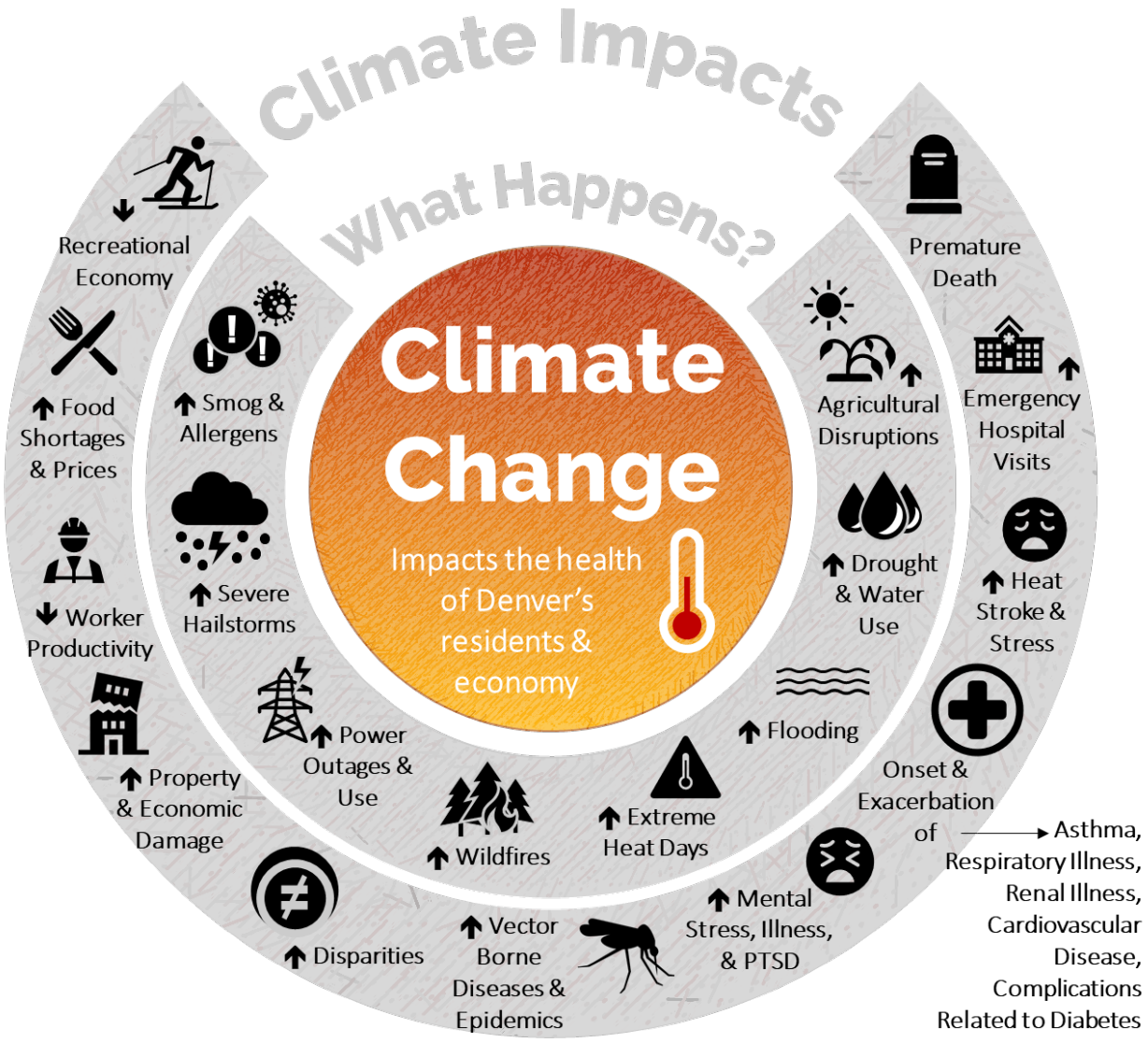


Figure 1. Climate change effects and impacts. (Inspired and informed by Colorado Health Initiative figure on health impacts due to increased temperatures as one example.)

To reach the overarching goal, solutions will touch our daily lives: our residential and commercial spaces, our modes of transportation, how we consume and waste food and materials, and the very energy supply that underlies contemporary life. Fortunately, these changes not only reduce greenhouse emissions, but

they will also make Denver a more resilient and healthy community. And if done right, it will make Denver a more affordable and equitable community.

We estimate that by 2030, 68% of Denver's greenhouse emissions could be eliminated by adopting the policies and solutions included in this document. Assuming these policies and solutions continue to gain traction, then by 2050 more than 80% of emissions will be eliminated (Figure 2). While the Task Force recognizes that these solutions do not get us all the way to our overarching goal, we know that we will learn from policy implementation, discover new methods and technologies, and adjust to a changing society.

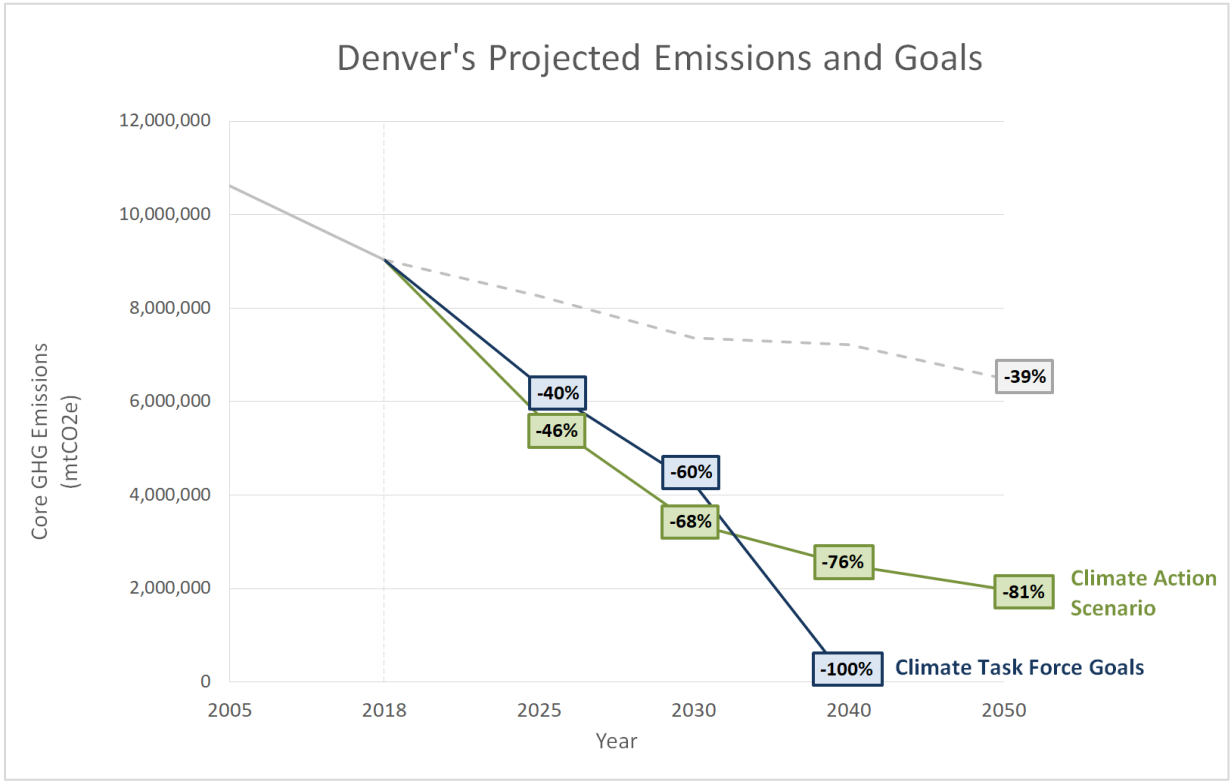


Figure 2. Denver's Projected Emissions and Goals compared to the Status Quo.

The status quo scenario sees a 39% reduction in greenhouse gas emissions due to Xcel Energy's electricity commitments. While other climate action efforts, such as benchmarking and efficiency policies, are currently underway, continued action and funding is required to gain estimated savings. For this reason, they are included in the climate action scenario and not the status quo.

Figure 3. Indicates the extent to which each emissions source will be reduced in 2030 and 2050 for the status quo and climate action scenarios respectively. The remainder of emissions in 2050 include natural gas, gasoline and diesel, and energy production. Electricity emissions are down to zero by 2050.

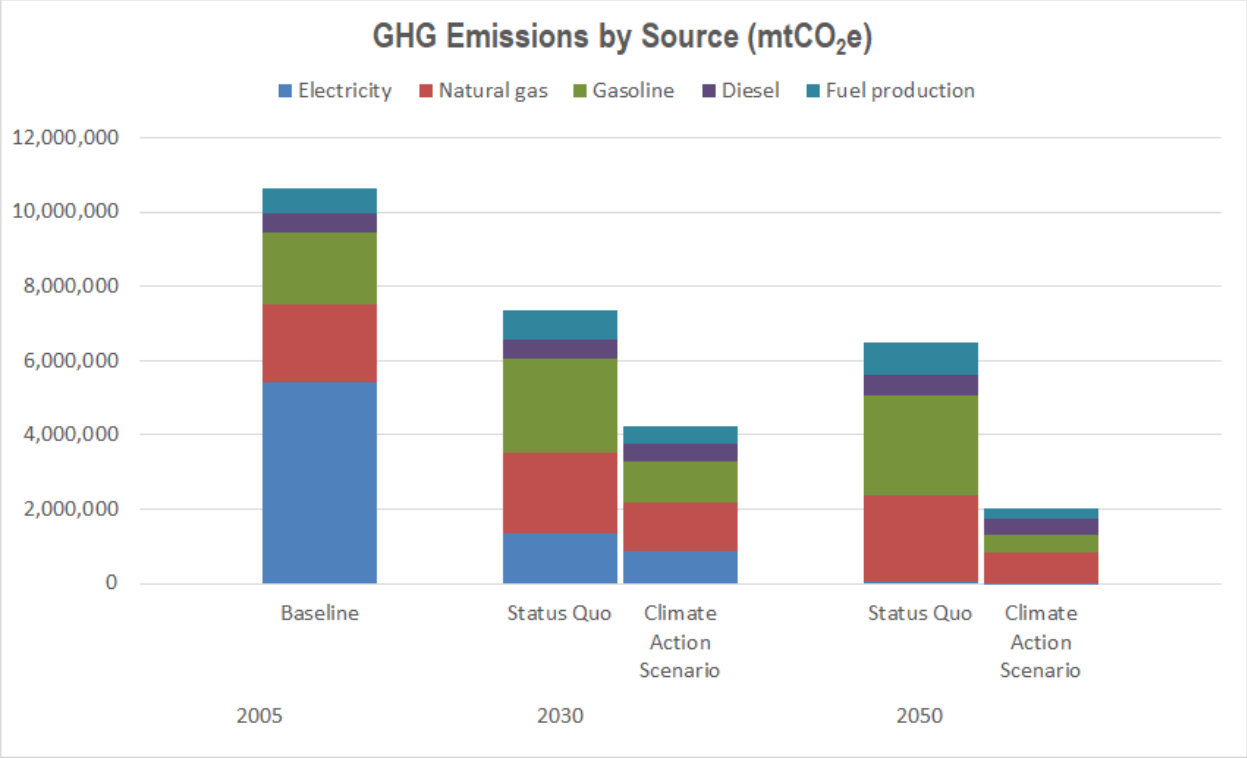
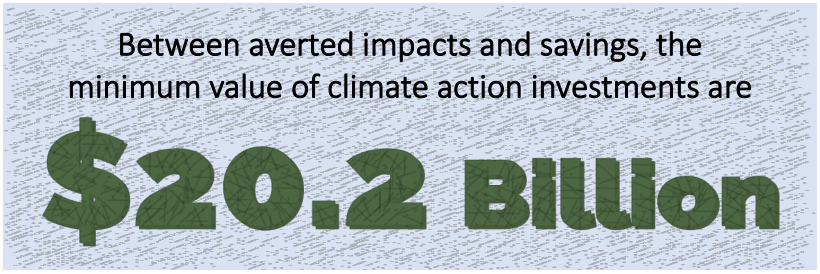


Figure 3. Climate Action Scenario compared to the baseline and status quo scenario.

Cost of Inaction / Return on Climate Investments



We conducted a reconnaissance analysis to determine the cost of climate impacts to Denver, as well as the potential savings that could result from enacting climate action initiatives. Even though there were several aspects for which we could not find good numbers, the result was a staggering combined total of $20.2 billion at a minimum, or nearly seven times the level of investment needed. Even when the figure is not adjusted for population growth, the combined total is $13.8 billion. This does not include the human costs to quality of life, and even death, due to climate related incidents.

Climate Impact Costs

The impacts of climate change are many and the costs are to the health and wellbeing of those who live in Denver and to the economy as a whole. Figure 1 demonstrates a subset of the potential impacts. These impacts are difficult to quantify, much less downscale to Denver, as Denver is intricately interconnected with the rest of the metro region, the state, the country, and the world.

That said, using existing literature, a reconnaissance analysis was conducted to understand the total economic impact of climate change to Denver based on some of the impacts for which we could find economic measures (see Table 1.)

Table 1. Net annual and cumulative 2050 climate impact cost calculations.

Climate Change Impact		Annual Net 2050 $ w/o population ↑	Annual Net 2050 $ w/ population ↑	Sources and Notes
	Current air pollution cost of inaction for asthma	$62,722,514	$92,103,545	NRDC – Climate Change and Health: Air Quality. Net savings.
	↑ Increase in severe hailstorms	$38,640,000	$56,740,088	Rocky Mountain Insurance Association Hail article estimates Colorado faced $5B in damages. Estimate 23% accrued in Denver. Brimelow et. al in *Nature Climate Change* estimate 40% increase in damage. Calculated net cost for Denver.
	↑ Increase in flooding	$33,290,000	$48,883,994	Colorado Future Avoided Cost Explorer (FACE)
	Direct impact of wildfires	$62,400	$91,630	FACE
	Health impact due to heat waves health	$124,850,000	$183,333,333	National Climate Assessment: Chapter 25: Southwest
	↓ Decrease in labor productivity due to heat waves	$5,906,698	$8,673,565	UN Development Program: Climate Change and Labor Report estimates 1.38 of lost labor on average for US under 3° increase scenario.
	Proportion of Denver's tourism economy dependent on visitors for snow sports and rafting	$155,921,280	$228,959,295	Total Denver Travel Spending * 20% ski resort dependent * 10.2% loss due to climate. Sources: FACE tech report for loss of ski resort revenue. Colorado Tourism Office Travel Spending Report estimates total travel spending to Denver. Denver Post estimates proportion dependent on ski resorts is 25%.
	↑ Increase in drought	$376,700	$553,157	FACE
	↑ Increase in energy costs	$4,037,964	$5,929,463	NRDC: The Cost of Climate Change indicates net future energy costs associated with electricity, heating oil, natural gas, and the addition of AC units. Which states are included in which category is unclear. We used the West Midwest estimate, but it could be 63 times higher if Denver is considered in the SW.
Total Annual 2050 Cost		**$425,807,557**	**$625,268,071**	
Total Cumulative Cost by 2050		**$6,600,017,127**	**$9,691,655,106**	

There are large gaps in this analysis. Not included are the cost of climate related epidemics and vector borne diseases, health impacts due to wildfires and degraded air quality, mental health costs, increased cost of food and food shortages, exacerbated social disparities, an increase in other related health impacts and emergency department visits, and of course the cost of the lives lost due to the climate crisis. These represent additional impact costs in the billions but could not be calculated for Denver.

For instance, as we've seen in the COVID-19 crisis, epidemics can have a chilling effect on health and economy. We have seen with the COVID-19 crisis that those countries that invested in their public health infrastructure, education, community awareness, and resilience were able to avoid the worst effects of the pandemic on human lives and the economy. As we write this report, the City of Denver is facing at least a $226 million-dollar loss just to city revenues due to COVID-19, with the true cost in human lives and economic impact being much, much greater. With climate crisis, as with the pandemic, we must invest now to protect our residents and make our community stronger and more resilient. The costs of these preventative investments are little in comparison with the costs of inaction.

Climate crisis in Denver will affect residents' everyday lives, making life harder for many, threatening their health, and even their lives. While Denver may struggle with its own changes, we may also welcome climate migrants from other parts of the world and the country where climate change has made life unlivable.

Even with the limitations and large gaps in our analysis the total calculated cost to Denver accumulates to a net economic impact of $9.7 billion by mid-century. Loss of tourism, health impacts due to heat waves, and asthma top the list of greatest economic impact to Denver.

While Denver would need to be joined by other cities, the nation, and the world to ameliorate all climate change impacts, every reduction in greenhouse gas emissions will reduce impacts and the resulting costs of these impacts.

Return on Investment

In addition, climate investments save money in the long run. For instance, it cost $200,000 more to purchase an electric bus compared to a diesel one. However, over the useful life of the vehicle (about 12 years), maintenance and fuel costs in the Denver region will generate a net savings of $572,000, which more than makes up for the initial investment. The same is the case for electric heat pump heating and cooling systems, heat pump water heaters, energy efficiency investments, and electric vehicles. Altogether, these net savings accumulate to $10.5 billion in savings for Denver by mid-century, as described in Table 2.

Table 2. Annual and cumulative 2050 net savings for Denver due to Climate Action.

Savings Category	Annual Net 2050 $ w/o population ↑	Annual Net 2050 $ w/ population ↑	Sources and Notes
Heat Pump Heating & Cooling	$95,694,000	$140,519,824	American Council for an Energy Efficient Economy. Estimates $400 net savings. Additional calcs based on no. of Denver Households.
Electric Vehicles (passenger)	$296,764,325	$435,777,276	Vox: Colorado Electric Vehicle Savings. Estimates average of $618 net savings. Additional calcs based off no. Denver Vehicles.
Bus fuel (diesel compared to electric)	$6,788,628	$9,968,617	American Public Power Association: Electric Busses for Mass Transit Seen as Cost Effective estimates $0.31 net savings / mile. Additional calcs based off number of RTD gallons consumed, and estimated no. RTD Bus Miles.
Bus maintenance (diesel compared to electric)	$21,460,824	$31,513,692	Same as above. Estimates $0.98 net savings / mile.
Energy Efficiency	$7,128,000	$7,128,000	Estimate $2 in savings for every $1 spent. Multiple sources (1, 2, 3, 4). Multiplied by Task Force incentive dollar recommendation for energy efficiency
Heat Pump Water Heater	$35,885,250	$52,694,934	Energy+Environmental Economics: Residential Building Electrification in California estimates $150 in savings annually. Additional calcs based off no. Denver Households
Total Annual 2050 Savings	**$463,721,027**	**$677,602,342**	
Total Cumulative Savings by 2050	**$7,187,675,919**	**$10,502,836,303**	

Supporting Recovery

At the time of writing this report, a recession related to the COVID-19 pandemic was declared. People in Denver are suffering, many out of work, with prospects that are uncertain at best. The economic downturn, and pending recovery, is already proven to disproportionately impact people of color. We have an opportunity to build Denver back better by interlacing recovery efforts across our current economic, racial justice, and climate crises.

Based off lessons learned during the recovery associated with the great recession of 2008-2009, the following principles should be used when identifying recovery efforts that also support climate action:

1. Solutions that work across sectors: In times of crisis, we need to layer outcomes. For instance, a solution could mitigate climate, support economic recovery, and help improve health and safety.
2. Center around equity: We need to keep equity at the center of recovery investments. Some past recoveries, such as from hurricanes, have exacerbated inequity in economic recovery.
3. Economic opportunity: Create economic opportunity for those who need it most, investing in strategies that get dollars to people quickly.
4. Focus on jobs and not job training: In the past recovery, people conflated the idea of training people with people actually getting work. We need to first create demand for jobs and then work to overcome barriers to getting people into those created jobs.
5. Infrastructure investments: Investing in infrastructure often supports recovery efforts because the money stays local. Integrating climate principles in infrastructure that will be built in the future is a good strategy. This could also include procurement adjustments and targeted hiring of businesses owned by women and people of color businesses.
6. Adaptive approach: We have to have an adaptive approach. We don't know what the new normal will be nor do we fully understand the current crisis. Getting stuck on a particular idea that cannot be shifted in the future can lead to wasted time and investment that does not support recovery.

The following proposals were identified as top priorities if stimulus funds were available to invest in climate projects.

5. Deploy an all-Denver retrofit of existing homes and buildings to support energy efficiency as well as health and wellness: Institute a large-scale program that first focuses on the most vulnerable and impacted populations to ensure all homes and buildings are green and healthy. This would include hiring people from local neighborhoods to support their neighbors in their retrofits, including making these changes at no cost or low cost for those that need it and removing barriers for participation. It would also be paired with policy requirements to drive these changes. Retrofits would include energy efficiency (windows, weather stripping, insulation, light fixtures, electrification, etc.) and installing solar where appropriate. These climate related changes would be paired with health and safety measures (such as mold, carbon monoxide, radon, and lead paint remediation), ensuring that existing homes and buildings are green and healthy. In addition, the plan would also include water conservation measures. Since approximately 1/2 of Denver's carbon emissions are generated from homes and buildings, the impact is expected to be substantial while also generating jobs and supporting the most vulnerable and impacted communities.
6. Invest in an affordable, expanded, and carbon-free bus system: The bus system had a shortage of drivers prior to the pandemic and is now the RTD budget is in worse shape due to COVID 19 and the related economic crisis. Investing in the system would include increased compensation for bus drivers, ensuring bus transportation is affordable for all, expanding frequency and bus transportation routes, and transitioning to electric buses. The proposal ensures that people who cannot afford a vehicle have access to clean and reliable transportation. It also provides good paying jobs while eliminating emissions from buses.
7. Invest in reconfiguring Denver's streets to be shared streets while vastly expanding the use of bicycles and e-bikes: This proposal envisions that some of Denver's residential and commercially oriented streets would be converted to being car-lite or car-free zones. In commercial areas, streets would be opened up to food vendors. This would expand jobs for construction of street reconfiguration and the food and beverage industry. Paired with these efforts, a large-scale investment in vouchers for e-bikes, support for bike sharing, increased commercial deliveries via

cargo e-bikes, infrastructure for safe biking and bike taxis (pedicab) would lead to expanded use of bikes and more carbo-free trips. Expanding the use of bicycles and e-bikes paired with reconfiguring Denver's streets would support those most impacted by the current economic crisis with more jobs and better access to a carbon-free mode of reliable transportation while making walking and biking a safer, more enjoyable, and more convenient option.

8. **Invest in electric vehicle infrastructure, such as charging stations:** Investing in electric vehicle charging stations is an important first step to facilitate adoption of electric vehicles and will help lay the groundwork for policies and incentives that lead to an increased number of people using electric vehicles. This investment should employ the local workforce to install the stations.

Goals and Policy Recommendations

Overarching Goal

Denver will be a model for the nation and world by working urgently to create, pass, and implement bold policies that achieve 40% greenhouse gas emission decrease community-wide by 2025, 60% by 2030, and 100% by 2040, using a 2005 baseline. We will center policy design, programs, and investments in frontline communities, and inspire people in our city to embrace sustainability as a value.

Types of Recommendations

The following icons are used to denote different types of solutions. When the icons are in red, it indicates the highest impact policies or other solutions.

Equity enhancement: Although equity was taken into account throughout all the recommendations, those with a specific impact to supporting people of color, Native Americans, or under-resourced communities are highlighted with this icon.

Policy, code, or zoning recommendation: If a recommendation needs to be adopted as a policy either through action by City Council, the Mayor, planning and zoning commission, or rulemaking, it is connoted with this icon.

Infrastructure: Recommendations for building infrastructure are indicated with this symbol.

Implementation: In some cases, strategies needed to support implementation of a policy or solution are indicated with this symbol. This includes program development, education, marketing, and outreach, partnership efforts, as well as various other strategies.

Planning: Planning can be an essential first step for understanding the next step needed or the impact level of a recommendation. This is indicated several times throughout the document.

Evaluation: Items labeled for evaluation are recommended assessments, studies for how to implement an action, or solutions that have not achieved consensus in the Task Force but should be further studied and explored.

Overarching Recommendations

The climate crisis requires big thinking, broad application of greenhouse gas (GHG) reduction and mitigation, and authoritative monitoring and measuring of the progress towards established goals. It is the last point that requires a clear chain of command between the City and Mayor, as that is how the actions will mostly be implemented.

Governance and Policy

In order to ensure that all City agencies and initiatives are doing everything to address the disastrous effects of the climate crisis, all plans and programs must be approved by the Office of Climate Action, Sustainability, and Resiliency (CASR). For example, any plan/program, development, zoning request, solid waste contract – anything – must include a climate impact evaluation that is reviewed and ultimately approved by the CASR before an agency or project can move forward.

The City must also work closely with the State of Colorado to ensure it acts boldly to address the climate crisis. We recommend the City add one or more policy positions that focus on statewide and multi-jurisdictional city advocacy. The policy team will help pass legislation as well as shape policies and regulations that will impact Denver.

Workforce

Opportunities exist for the City to integrate its workforce development approaches with equity and climate action. As such, we recommend the City adopt the following goals:

a. By 2025, 30% of the workforce engaged in mitigation, development, adaptation, and resiliency projects are people of color and those from under-resourced communities.
b. By 2025, training centers are accessible and recruiting from the most impacted communities to support work force transitions and development, based on a community-engaged assessment of needs.
c. By 2025, set and require a percentage of public climate action construction and infrastructure project hours to be performed by apprentices, focusing first on Department of Labor registered apprenticeships for people of color, Native Americans, and workers affected by the clean energy transition.

Key Strategy

By 2021, hire a Jobs Director to the Office of Climate Action, Sustainability, and Resiliency. The director will be dedicated to creating employment pathways across sectors and departments and will tie policies to new jobs. A key role would be to help recruit and train local students, people of color, Native Americans, under-represented individuals, those from under-resourced communities, people unable to find steady work, and those who need to transition to different jobs due to new policies. The goal is to provide new, stable employment that supports climate action, including an integrated approach to those opportunities found throughout our recommendations report such as:

- clean, renewable, and carbon-free energy jobs
- energy efficiency
- multimodal transportation
- retrofits of existing homes and buildings
- resilient infrastructure
- sustainability jobs

Engagement

All City-led engagement efforts on climate action must be equitable. We recommend the following goal for equitable engagement:

1. By 2025, all climate action related stakeholder groups and community engagement efforts are inclusive of the communities most impacted by the climate crisis, including people of color, Native Americans, and under resourced communities. This will ensure such engagement will be effective in creating equitable outcomes.

Affordability

The affordability crisis in Denver requires that the City consider how climate action can benefit our community through investments that make housing and transportation more affordable and that such investments avoid exacerbating this crisis. We recommend the following affordability goals:

a. From the design stage through implementation, all climate action policies and programs prioritize affordability and equitable outcomes, especially for the communities most impacted by climate change.
b. By 2023, sufficient funding is in place to ensure that frontline communities are supported in implementing identified climate actions so that these communities can continue to afford to live in Denver while addressing climate crisis.

Resilient and Sustainable Economy

During this severe public health and resulting economic crisis, it is more important than ever to ensure that the City builds a resilient and sustainable economy that benefits both people and planet. The Task Force recommends the following resilient and sustainable economy goals:

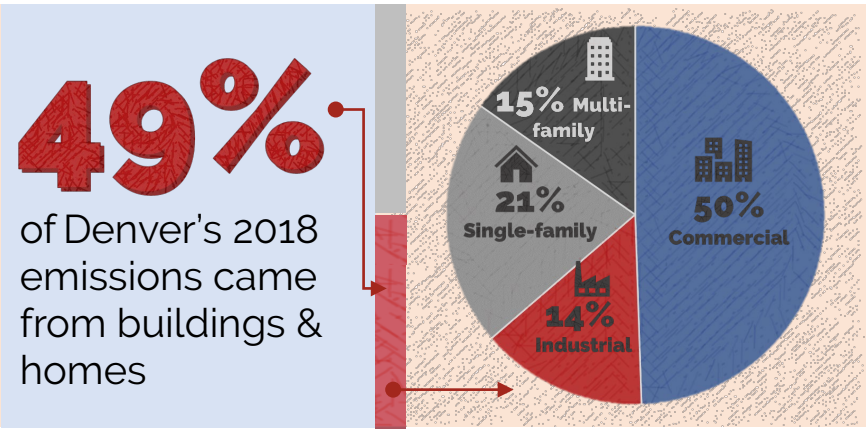
1. By 2030, Denver is the nationally recognized hub for sustainable economic development and innovation.
2. By 2030, Denver will have a thriving and resilient economy with the creation of new businesses that are geared toward addressing emissions and adapting to climate change. These new businesses will have at least 50% local workforce development and transition training. Preference will be given to businesses owned by people of color or women with a goal of 30% of new businesses being owned by people of color or women.

Eliminate Greenhouse Gas Emissions

Denver's Climate Action Task Force developed a set of goals and recommendations for each sector that contributes significantly to Denver's greenhouse gas emissions: buildings and homes, transportation, energy supply, and consumption and waste.

Buildings and Homes Policy Recommendations & Supports

Figure 4. 2018 Buildings and Homes Breakdown



Buildings and homes must be addressed for us to do our part in reversing climate change. In Denver buildings and homes represent 49% of the 2018 emissions. Broken out, buildings (commercial, multifamily and industrial) are 34% of GHG emissions and homes are 15%. While data is not available for further greenhouse gas emissions associated with each building type, a breakdown of commercial and multifamily is provided by square footage in Figure 4.

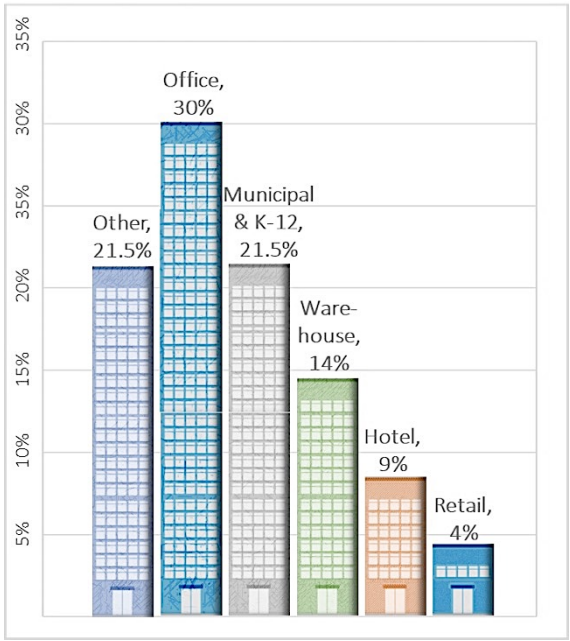
From 2005 to 2017, emissions from residential buildings dropped around 19% for commercial and multifamily buildings and 9% for other residences. The drop in emissions is primarily due to the state Renewable Portfolio Standard driving a cleaner electric grid. The Task Force broadly reaffirmed Denver's goal of 100% renewable electricity for the City by 2030. However, because much of Denver's Buildings and Homes emissions are from natural gas heating, additional measures are needed.

Reducing GHG emissions in buildings and homes also represents an opportunity to provide people with healthier, more affordable places to live and work. And, the investments to improve our buildings and homes can provide critical jobs as our economy recovers from COVID-19, as well as good returns for owners as their buildings and homes are improved and energy bills lowered.

Climate work in buildings must be done in a way that enhances quality of life, reduces energy consumption, and eliminates the household energy burden on low-income households. Every solution outlined below must be implemented in a way that:

- Does not increase the short and long-term costs for low-income households and helps make housing more affordable with heating and cooling systems that are lower cost and easier to operate and maintain.

Figure 5. Proportion of commercial square footage in Denver for buildings of 25,000 square feet or more



- Creates opportunities for people of color and Native Americans to work in the clean energy economy.
- Improves occupant comfort and health through better indoor air quality, and more comfortable temperatures indoors on extremely hot or cold days.
- Ensures that no requirements reduce the amount of affordable housing in existence and being built in Denver.
- Ensures that policies do not compromise low-income tenants or increase pressures on communities at risk for displacement.
- Identify specific blocks and areas in Denver that would benefit from the most incentives to keep affordable housing and commercial spaces affordable. Periodically reevaluate incentives to ensure that they continue to help residents and businesses who are vulnerable to displacement.
- Promote and communicate about the climate renovations in a way that helps low-income households participate.
- As part of implementing these recommendations, the City should complete an analysis of the potential impact of all these policies on the housing market and ensure that programs and policies support the diversity and cultural richness of Denver, while also preventing the displacement of low-income people and businesses in the community.

Buildings Co-benefits	
Social Equity	● Energy costs have a disproportionate impact on lower income residents. ● Energy efficiency measures lower energy bills, saving money for households and businesses.
Local economy	● Reduction in building energy use reduces costs. ● When a business or household lowers their energy costs, the savings can be spent elsewhere in the local economy. ● Policies and related programs will create a market for jobs to support retrofitting existing homes and buildings.
Energy Independence	● Reducing the use of imported fossil fuels lowers the community's vulnerability to energy price and supply shocks.
Deferred Infrastructure	● Reducing energy consumption can help defer the need for new sources of energy generation.
Public Health	● Reducing fossil fuel use in buildings and energy generation reduces the emissions of air pollutants, improving air quality and lowering risks of asthma, respiratory disorders, heart attacks, and cancer.

Buildings Goals

Denver Climate Action Task Force Goals		
2025	2030	2040
40% Reduction	**60% Reduction**	**100% Reduction**
● Incentives are in place and effective in ensuring 50% of new buildings are net zero emissions. ● Codes ensure 100% of new homes are net zero emissions. ● Incentives are in place and effective in ensuring 50% of residential housing implements efficiency, electrification, and indoor air quality measures. ● Homes use 10% less energy.	● All new buildings are net zero emissions. ● 50% of all existing homes and buildings have zero heating emissions and are providers of demand flexibility to the grid. ● Buildings use 30% less energy. ● Incentives are in place to put all existing homes and buildings on a path to net zero emissions.	● All existing and new homes and buildings have zero heating emissions and are providers of demand flexibility to the grid. ● Buildings use 50% less energy.

Note: Incentives do not refer solely to financial incentives. Stakeholders should be engaged in determining what incentives would be most meaningful to the buildings and homes development market.

Following are our recommendations for achieving goals for new and existing buildings and homes.

Solution 1. Net Zero New Buildings and Homes Policy and Incentive Recommendations

Solutions for new buildings and homes are based on the code development process. Buildings include office, retail, multi-family, industrial, and other commercial spaces. Homes include both attached and detached single-family. Denver updates their Building and Fire code every 2-3 years and the bases for these changes are the codes developed by the International Code Council (ICC). The dates referenced below indicate the year in which a code would be passed—there is a 2-3-year delay in buildings being built to any new code. For example, the code passed in 2019 is required in 2020, meaning buildings begin to be designed to the new code in 2020, and are typically built to the new code in 2021 and 2022.

In Denver's latest 2019 code development cycle, the first ever Denver Green Code was developed based on the International Green Conservation Code (IgCC). It is not required, but a voluntary "stretch" code. The Task Force recommends building on this achievement with the following codes, policies, incentives, and trainings. These are critical to the success of achieving emission reduction targets. Highest impact policies are indicated with the red icon.

Phase 1: 2020-2022	
	Base Code a: Use the first Denver Green Code as the minimum for the next base energy code and include any other efficiency improvements from the forthcoming 2021 International Energy Conservation Code (IECC).

	Green Code a: Create a new, more stringent, Denver Green Code each code cycle, which will then become base code in the next code cycle. In 2021, the Denver Green Code should require: ● Net-zero new homes (highly efficient, all-electric, renewable energy, grid-flexible). ● All-electric new buildings.
	Encourage use of less steel, concrete, and other carbon intensive materials where feasible. Encourage building reuse for lower emissions and better urban vitality and character. The City will develop a process for evaluating material use in buildings to determine the most appropriate and least impactful material selections for building types. *[connection: see consumption and waste construction policies]*
	Require green infrastructure along with Denver Green Code, which would include efficient landscapes: tree canopy, green infrastructure, pervious paving, and open space. *[connection: see adaption and resilience policies]*
	Address parking and zoning in conjunction with transportation. *[connection: see transportation policies]*
	Incentivize affordable housing through zoning in coordination with Denver's Department of Housing Stability (HOST).
	Provide net-zero energy new buildings and homes training for developers, design teams, contractors.
	New construction net-zero energy buildings and homes incentives. In particular, building height incentives and expedited permitting incentives should be considered.
Phase 2: 2023-2025	
	Base Code b: The 2021 Denver Green Code becomes the base code in the 2024 building code. ● All new homes will be net-zero (highly efficient, all-electric, renewable energy, grid-flexible). ● All new buildings will be all-electric where feasible. The City will establish a process to determine if there are any building types or locations where the technology or cost would make electrification prohibitive.
	Green Code b: In 2024 the Denver Green Code should require net-zero for all buildings (highly efficient, all-electric, renewable energy, grid-flexible).
Phase 3: 2025-2030	
	Base Code c: The 2024 Denver Green Code becomes the base code in the 2027 building code. ● All new buildings will be net-zero (highly efficient, all-electric, renewable energy, grid-flexible).
	Green Code c: In 2027 the Denver Green Code should require outcome-based codes for buildings – they must design to a specific efficiency, then ensure the building operates at that energy performance.
	Base Code d: The 2027 Denver Green Code becomes the base code in the 2030 building code. ● Outcome based codes for all new buildings.

Solution 2. Reducing Emissions from Existing Buildings Policy and Incentive Recommendations (commercial, multifamily and industrial)

The solutions for existing buildings need to account for a larger range of building ages and building types. In particular, multifamily buildings may at times need different solutions than commercial buildings. Additionally, some buildings have been upgraded and others need upgrades. Because of this, the recommendations include more flexible solutions and end-of-life equipment replacement considerations. As part of this, the Task Force looked at and considered policies that are working in other jurisdictions and states to understand what may be possible for existing buildings. Each of the existing building recommendations are listed below and prioritized to show the near term, mid-term, and longer-term solutions. Highest impact policies are highlighted in gray.

Phase 1: 2020-2022
Implement a building performance policy for all buildings to meet goals. Set targets far enough out for owners to plan for upgrades. Provide performance and a menu of prescriptive options for flexibility. For multifamily buildings, consider the market impacts on low-income populations and ways to mitigate those impacts. The City should review existing programs such as the benchmarking requirement and other Energize Denver programs to evaluate how they can be augmented to address the goals outlined by the Climate Action Task Force. • Supports COVID recovery by driving investment in projects that create jobs as well as health and wellness benefits while limiting higher costs impacts for tenants.
Require specific system upgrades at time of system replacement (building envelope, HVAC equipment, renewables, energy storage, etc.) Ensure available options are in sync with historic preservation regulations and encourage reuse and renovation of existing buildings.
Requirements for building quick-payback efficiency upgrades (lighting, controls, grid-flexible) and operational improvements.
Energy transparency policy (disclosure, display energy performance). Design carefully to drive market to value efficient buildings. Roll-out in a way that is fair and minimizes business impact. Use existing metrics that people will be familiar with.
Consider policy mechanisms that help to incentivize actions that reduce emissions and disincentivize those that drive up emissions. Possibilities for further study include revenue neutral fees and incentives for electrification, energy efficiency, etc.
Equitably develop low-income & affordable housing support in meeting efficiency requirements. Ensure requirements aren't put on affordable housing without providing developers with access to financing and incentives that would pay for upgrades.
Design incentives for electrification of existing buildings so that a priority is put on low-income multifamily housing electrification.
Work with Xcel Energy to review, expand, and complement utility incentives to ensure incentives are sufficient to achieve our goals, in particular in sectors where there are gaps (i.e. industrial).
Beginning in 2020, Denver prioritizes mitigation solutions that also reduce other harmful air pollutants, in addition to greenhouse gases, especially in under-resourced communities and communities of color with poor air quality.

Phase 2: 2023-2025
Requirements for electrification at time of HVAC equipment replacement, no new natural gas equipment. Require that by 2040 all natural gas equipment has been replaced where possible. The City will establish a process to determine if there are any building types or locations where the technology or cost would make electrification prohibitive.
Require disclosure at time of sale any equipment replacements needed to meet the 2040 electrification requirement.
Evaluate lifecycle emissions of each product required in retrofits as part of shaping the requirements.

Solution 3. Reducing Emissions from Existing Homes Policy and Incentive Recommendations (attached and detached single-family)

Similar to existing buildings, the solutions for existing homes need to account for a large range of building ages and construction types. Additionally, some homes have been upgraded and others need upgrades. Because of this, the recommendations include more flexible solutions and end-of-life equipment replacement considerations. As part of this, the Task Force looked at and considered policies that are working in other jurisdictions and states to understand what may be possible for existing homes. The solutions for existing homes include both recommendations to enhance energy efficiency as well as reduce emissions in homes. Each of the existing home recommendations are listed below and prioritized to show the near term, mid-term, and longer-term solutions.

Phase 1: 2020-2022
Energy transparency policy (disclosure of home energy use and cost at time of sale by seller). Use existing metrics that people are familiar with (i.e., energy statements).
Require disclosure at time of sale of any equipment replacements needed to meet the 2040 electrification requirement.
Design incentives for electrification of existing homes so that priority is for low-income households.
Work with Xcel Energy to expand and complement utility incentives, such as faster hook-ups and fuel switching. Create incentives for higher performance major home renovations.
Beginning in 2020, Denver prioritizes mitigation solutions that also reduce other harmful air pollutants, especially in low-income households and communities of color with poor air quality.
Phase 2: 2023-2025
Implement a building performance policy for efficiency in rental properties (multifamily and homes) as part of a rental registry and licensing program. Include financial hardship appeal process. Ensure ventilation is sufficient and that upgrades improve overall health and safety.
Require an informational home energy audit prior to issuing a permit for any remodeling/renovation.

Consider policy mechanisms that help to incentivize actions that reduce emissions and disincentivize those that drive up emissions. Possibilities for further study include revenue neutral fees and incentives for electrification, energy efficiency, etc.
Phase 3: 2025-2030
Require efficiency improvements at the time of major renovations.
Require electric equipment at time of HVAC and water heater replacement. Require that by 2040 all natural gas equipment has been replaced where possible.

Buildings & Homes Supports

In conjunction with the solutions, the Climate Action Task Force developed a set of strategies needed to support our community and enable the passage of equitable policies and incentives listed above. A few Phase 3 policies that need more development are also included here. The supports for buildings and homes that aren't tied to a specific policy above are listed below. They fall in the following categories:

- Marketing and Outreach: Outreach to the public on the value of energy efficiency, healthy buildings, and beneficial electrification. Communicate Denver's climate goals and work.
- Training and Education: Provide training and education on energy efficiency and building electrification.
- Financing: Finance solutions for buildings and homes for energy efficiency and beneficial electrification.
- Advocacy: Advocacy at the state or federal level for policy change that parallels the recommendations of the Task Force.
- Education: Educate local officials in surrounding jurisdictions about Denver's codes, policies, and incentives so they can consider adopting similar ones.
- Programs: Programs to engage the community and connect incentives.

Phase 1: 2020-2022
➢ Marketing: Educate general public on value of energy efficiency and healthy buildings and potential clean energy jobs in buildings. Work with schools to promote these career tracks.
➢ Marketing: Education on energy efficiency, building electrification focused on health benefits and better indoor air quality.
➢ Outreach: Summarize annual energy savings from buildings and homes to community
➢ Training: Develop training for building owners, operators, managers, developers, homeowners, and realtors (work with the Department of Regulatory Affairs to require training) focused on energy efficiency, net-zero energy, and strategic building electrification.
➢ Training: Workforce training for technicians and contractors to enhance energy efficiency and strategic building electrification. Encourage workforce training of contractors tied to contractor licensing and unions to encourage use of efficient equipment by contractors. Provide incentives or scholarships for existing trainings/certificates by industry associations, trade schools, and community colleges. Work with Denver Public Schools to promote careers in climate solutions, specifically sustainable buildings. Promote or subsidize extracurricular modes of education in sustainable building. Create green business incubators.

- Training: Create training and jobs in the clean energy transition focused on our most impacted/vulnerable communities. Create market incentives for hiring green workforce.
- Education: Develop an Energy Resource Center that provides support, guidance, and assistance to help owners, managers, contractors, etc. complete design and projects focused on energy efficiency and strategic building electrification.
- Education: Promote models where tenants and building owners are educated on sustainable benefits to building improvements.
- Advocacy: Xcel Energy Time of Use electricity rates to encourage use when the grid is less carbon intensive. Ensure that equity is part of the rate design to enable low-income households to take advantage of better rates and not unintentionally burden them with higher bills.
- Advocacy: Regulatory changes at state level and Xcel Energy. Advocate for new construction incentives for affordable housing, in particular to enable electrification.
- Programs: Connect/enhance low-income programs, include incentives that improve indoor air quality and health. Ensure ventilation is sufficient and that upgrades improve overall health and safety.

Phase 2: 2023-2025

- Marketing: Communicate Denver's goals, work, and health benefits to the community.
- Outreach: Host/participate in events, meetings, and conferences.
- Outreach: Build awareness and celebrate success.
- Programs: Small commercial and multifamily, connect/enhance low-income programs improve affordability through integration of existing programs (childcare and others).
- Program: Connect Sustainable Neighborhoods program to energy and electrification. Target early adopters of renewables and efficiency with electrification messaging.
- Financing: Solutions for commercial and multifamily buildings.
- Financing: Solutions for homes.
- Advocacy: Support residential PACE financing for zero energy ready homes by evaluating and advocating for it for it to be considered by Colorado's General Assembly, building on the work of the Colorado Energy Office. Any proposal should prevent predatory lending.

Phase 3: 2025-2030

- Policy/Code: Convert building types to reduce GHG.
- Policy/Code: Historic home and building considerations. Accessibility within historic buildings as a consideration.
- Determine energy efficiency solutions for temporary housing through rental policies and affordable housing programs.
- Program: Create a green certification or green credit program.
- Advocacy: Reduce GHG through renewable natural gas and carbon-free hydrogen.
- Connection-Waste: Address waste in buildings. *[see Consumption and Waste recommendations]*
- Connection-Transportation: Reduce construction transportation emission *[see Transportation policies]*

Evaluating Cost and Greenhouse Gas Impact

Combining the solutions and support into strategies with cost considerations is critical. It is also essential that building policies and incentives account for a holistic assessment of environmental impacts to avoid unintended consequences. The following chart shows the estimated program cost and GHG impact of the strategies. A combination of the codes, policies, and support is needed to ensure equity and impact.

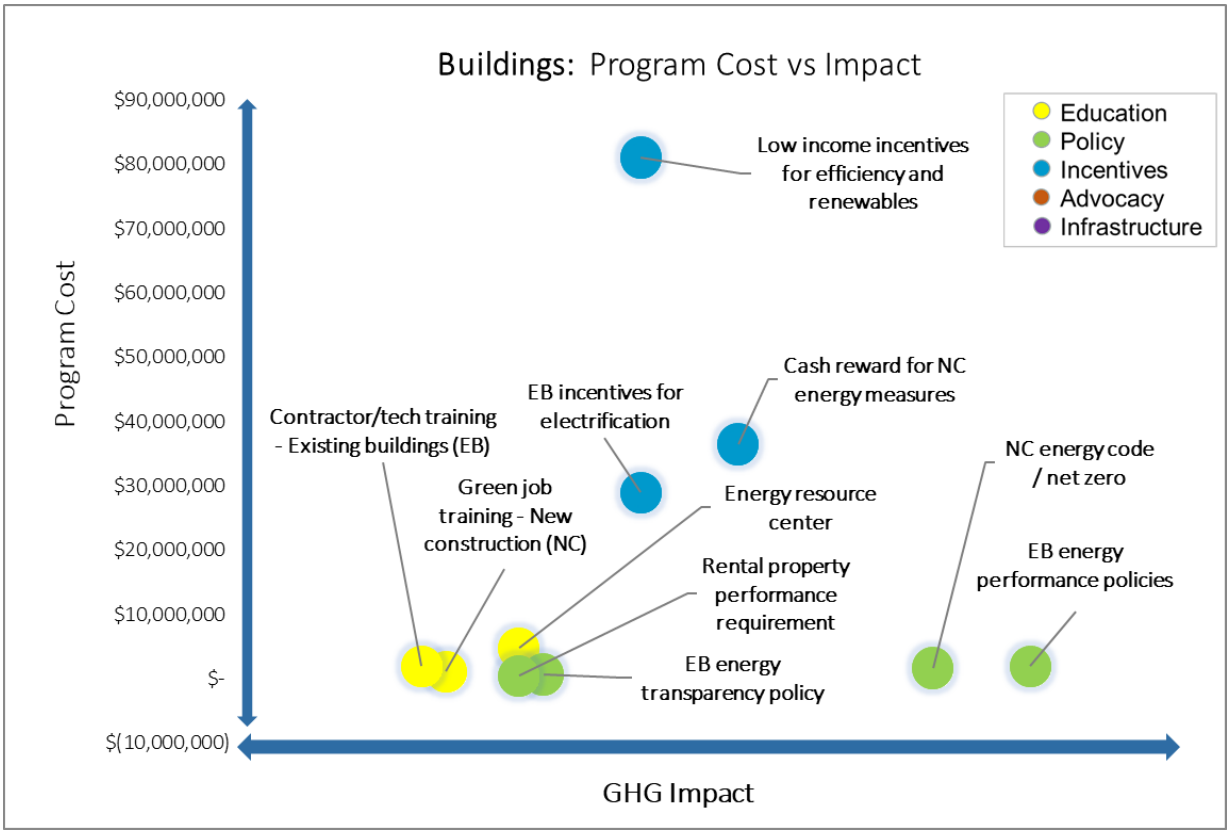


Figure 6. Program costs versus impact for buildings and homes. Note that policies for buildings are high-impact and low cost, but require other marketing, training, and incentives to be effective and equitable.

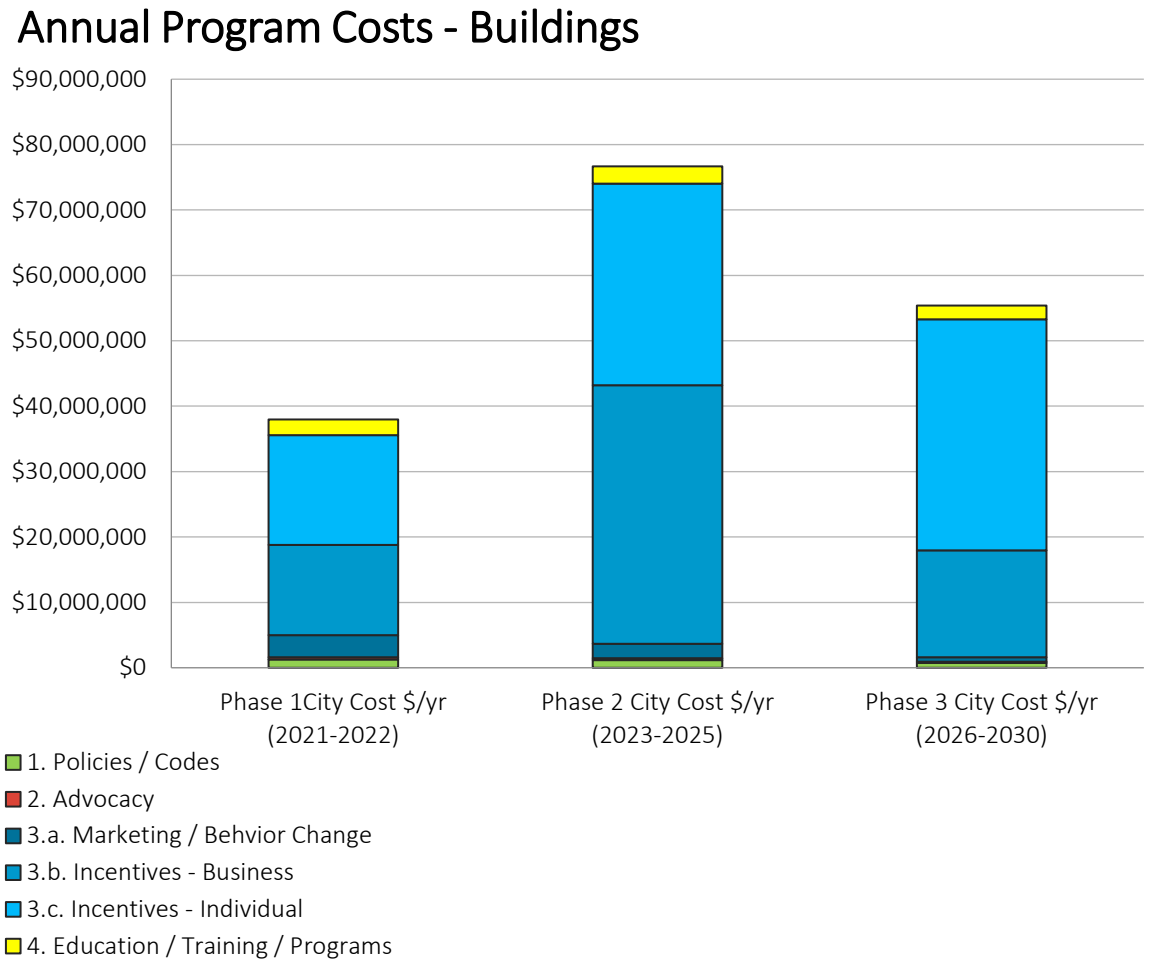


Figure 7. Annual program costs by phase for buildings and homes

Cross-sectional Influences and Cost/Benefit Considerations for Electrification

Electrification policies should include robust technical and cost-benefit analyses to ensure the equitable decarbonization of Denver's buildings and transportation sectors. To be successful, full electrification will require a prudent investment strategy and a paradigm shift in utility regulatory structures and incentives. Electrification leads to overlapping cross-sectional considerations that are also discussed in the transportation and electricity supply sections.

The City will need to pursue strategies and work collaboratively with Xcel Energy to better understand how building and transportation loads along with converting energy production to clean renewable sources can be functionalized into grid assets. Climate related heat stressors are another important consideration for grid demand management. While there will be considerable efficiency gains in converting gas-powered furnaces and water heaters to electric, there will be a load increase that will require grid infrastructure investment.

Implementation of the City's net zero energy building plan—in which net zero buildings are defined as being 1) highly energy efficient; 2) all electric; 3) powered by renewable electricity; and 4) providers of demand flexibility for the grid—may help to reduce the amount of additional distributed and utility-scale

grid infrastructure needed to achieve full electrification. There will need to be appropriate incentives and compensation structures to encourage customer participation in demand flexibility programs if beneficial electrification is to benefit the grid.

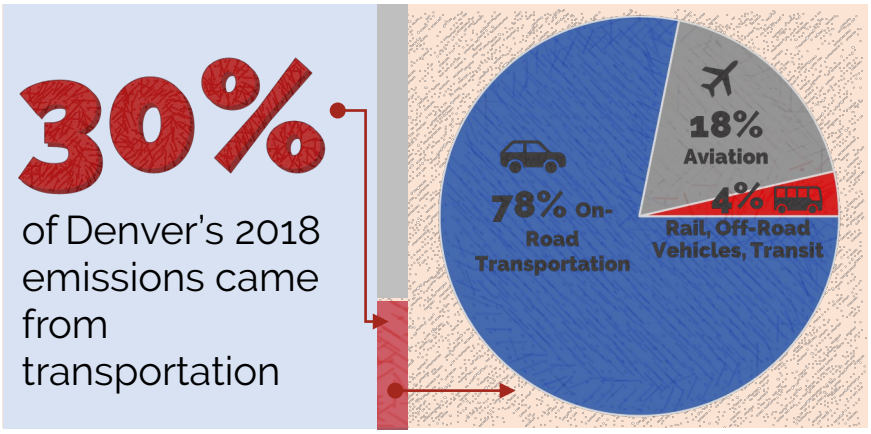
Currently, Colorado statute calls for separate regulation of Colorado's electricity and natural gas supplies, rate bases, and investment portfolios. Denver's aggressive decarbonization objectives are likely to increase load in buildings and transportation and shift natural gas customers to the electric system. Without legislative and regulatory intervention to enable the holistic regulation of energy systems, as opposed to the independent oversight of electricity and natural gas, the departure of natural gas customers could lower revenues on Xcel Energy's gas system without equally reducing the costs of maintaining the system causing rates to increase for the remaining customers.

The City will need to think critically about the technical feasibility, cost, and value of electrification on a sector by sector basis, while also acknowledging the cost of inaction or continued investment in fossil fuel infrastructure, which may eventually become stranded assets. In addition to carbon emissions reductions, the electrification of commercial and residential buildings can provide communities across Denver access to co-benefits such as improved indoor air quality, safer and healthier homes, well-paying jobs, and greater access to affordable clean and efficient energy to reduce monthly energy bills. The technical limitations or inapplicability of electrification for industrial and chemical processes may require additional research and possibly investment in new or developing carbon-free technologies.

As with all the recommendations in this report, Denver leaders should acknowledge and address potential equity impacts to low-income communities including economic barriers to electrification in Colorado. Incentives and targeted programs may be necessary to support low-income communities as electric appliances and vehicles move down the cost curve to reach price parity with fossil-based alternatives. Legislative and regulatory actions will be particularly important to address the risks of burdening a subset of the Denver community or customer base with a disproportionate share of maintaining and paying for existing fossil-based infrastructures.

Transportation Recommendations

Figure 8. 2018 Transportation Emissions Breakdown



In 2018, transportation was responsible for 30% of greenhouse gas emissions in Denver, the second largest source after buildings and homes. The majority of transportation emissions result from driving private vehicles and light trucks, and nearly 3 out of 4 Denverites drive alone to work. Denver has one of the highest single occupancy vehicle (SOV) commute rates in the nation (73%) compared to other large metropolitan cities (Seattle's SOV commute rate is 44%).

Transportation is typically a household's second highest expense (behind housing). Access to affordable and reliable transportation is critical to participate in society, such as access to opportunities like jobs, school, or social connections. Transforming our transportation system not only offers the opportunity to act on climate but also to improve equity, reduce harmful air pollution, and improve quality of life and safety in our communities. Investments in transportation solutions that prioritize the movement of people and not just vehicles can provide safe and convenient ways to make essential trips and create critical jobs, especially as our economy recovers from COVID-19.

Transportation and mobility improvements today can also improve equity in our city and undo the harm disproportionately brought onto people of color and low-income residents by an inequitable transportation system. In particular the lack of frequent, reliable, widely accessible public transit exasperates inequity as it forces low-income households to bear the financial burden of owning and maintaining a vehicle. All of the solutions below should prioritize the following:

- Reduce air pollution and safety concerns that too often impact low-income households and people of color.
- Expand access to opportunity for all residents, particularly those underserved by transportation systems now and historically, and the third of the population that can't or don't drive due to age, income, or disability.
- Lower barriers to participate in society by lowering the cost and time spent for travel required to meet basic needs.
- Increase workforce opportunities through jobs dedicated to transportation infrastructure projects and emerging industries as a result of the shift to different modes of transportation.

Transportation Co-Benefits

In addition to helping meet our climate goals and expanding access and opportunity, improving Denver's transportation system offers numerous benefits to society, the local economy, our infrastructure, and public health.

Transportation Co-benefits*	
Social Equity	● Expanding access to mobility options like biking, walking, and transit, for people who don't have a personal car.
Local economy	● Reducing transportation costs with lower-cost or free options like walking, biking, and public transportation. This saves people money personally and across society. ● Building transit and biking and walking infrastructure also helps create local jobs within our community. ● Retail sales can increase up to 50% when streets are walkable and bikeable. ● Mixed-use Transit Oriented Development (TOD) expands commercial opportunities and promotes living and working in the same area.
Energy Independence	● Reducing our dependence on fossil fuels lowers Denver's vulnerability to energy price changes or supply shocks.
Deferred Infrastructure	● Less driving means less wear and tear on the roads and increased state of good repair. In addition, bicycle and pedestrian infrastructure is less expensive to maintain over time.
Public Health	● Developing around transit and reducing driving improves air quality, which helps to alleviate health impacts like asthma. ● Improved air quality benefits low-income households who live on high-volume corridors where air quality is worst. ● Active transportation like biking and walking can help reduce obesity and other health risks. ● Improving transportation infrastructure reduces crashes and improves safety for people walking, biking, taking transit, and driving.

*Content informed by Pathways to Deep GHG Reductions in Oakland: Final Report, Bloomberg Associates, March 2018.

Transportation Goals

The goals established by the Climate Action Task Force focus on reaching the following benchmarks in overall GHG emissions (below 2005 levels):

2025	2030	2040
40% Reduction	60% Reduction	100% Reduction
● 15% of all vehicle registrations are electric with charging infrastructure in place. ● Complete 75% of the bike network and 50% of the pedestrian network.	● The frequency, reliability, and affordability of transit routes are improved as indicated by 25% of commute trips use transit. ● Reduce SOV commuters to 50%, because more people are walking, biking, and taking public transit. ● 30% of all vehicle registrations are electric and affordable for all Denver residents. ● Transportation system fully multimodal, physically accessible, affordable, adaptable to changing climate and emergencies.	● Emissions-free, affordable, convenient transportation system.

Note: Currently 7% of commuters in Denver take public transportation to work, though 40% of commuters in downtown take transit. Approximately 4% of new vehicle registrations are electric every year, making up 1% of total registered vehicles in the city.

Transportation Recommendations

The following sections outline the work that the Climate Action Task Force believes is necessary to meet the recommended goals for Denver's transportation system. The phasing timeline indicates when the City should begin work and implementation, with recognition that some solutions will take many years, or span across phases, to fully implement.

Through multiple convenings of Task Force members, community engagement via numerous sources, and assessment of all of the feedback provided, it became clear that the City of Denver must build out a transportation system that accommodates all modes of transportation for all kinds of users, and re-balance the system to make green transportation choices the most practical choices. Task Force members recognize that the use of a vehicle for some individuals and their families is their only option to get to some destinations. Providing safe, convenient, affordable transportation options, along with policy and program incentives and pricing structures, will reduce unnecessary SOV trips. This premise guides the way in which the following sections were developed.

The transportation recommendations are divided into an initial section on land use and transportation and six specific sections with the following categories:

1. improving transit;
2. reducing vehicle trips;
3. reallocating public space;
4. increasing clean vehicle options;
5. changing behavior; and
6. embracing micromobility options.

As noted later in this section, the Task Force recognizes and emphasizes that all of these solutions support one another and will be stronger when combined in an integrated system. The goal is to build an emissions-free, fully multimodal system.

Micromobility: Small, lightweight devices operating at speeds typically below 20 mph. These devices may be privately owned or rented from a provider. Examples include: bicycles, cargo bikes, e-bikes, and e-scooters.

Multimodal means the availability of a variety of ways for a person to get where they need to go, such as walking, micromobily options, public transit, and driving or riding in an automobile.

Highest impact policies are indicated with red icons, and recommendations are divided into recommendations for **implementation** at the top (the City should plan to implement), **evaluation** (the City should evaluate how to implement), or **consideration** (the City should consider these tactics to meet implementation goals).

Transportation and Land Use

The following section addresses climate gains in transportation and buildings through land use policies. Smart growth (compact development, mixed-use development, and infill) combined with transportation improvements is one of the most impactful ways to reduce emissions. Favoring density over sprawl, with even simple changes, such as allowing Accessory Dwelling Units (ADUs) and other light density zoning changes, consumes less land, improves transportation and building energy efficiency, and makes it easier to reach climate goals. These efforts can also help increase availability of more affordable housing options, letting more people live in smaller, more affordable units closer to jobs and necessities. In the Task Force's public outreach, hundreds of Denverites stated their firm support of land use changes and density, especially if paired with transit improvements and affordability controls.

It's important to get started on these high impact policies right away. San Diego Regional Planning Agency (SANDAG) found that smart growth policies developed in the last 10 years will account for an estimated 30% reduction in regional greenhouse gas emissions. Another study found that "Compact neighborhoods composed of low-rise multifamily homes consume up to 37% less energy in total." DRCOG's Metro Vision Regional Transportation Plan estimates a 24% reduction in VMT with its Transit and Urban Centers scenario (Regional Bus Rapid Transit (BRT), completed Fastracks, and free transit combined with development and infill at BRT stations, urban centers and key employment centers). Numerous studies also show how compact development reduces driving and emissions. For instance, a 2011 study from the U.S. EPA found that shifting to compact, transit-oriented development is just as important as shifting to the most energy efficient building designs and fuel-efficient vehicles for reducing household energy use and emissions. A 2013 study from the University of California Transportation Center found that household driving mileage is 18% less in an urban area versus suburban area.

Denver should revise its land use policies to create more walkable communities where most necessities and amenities are within a 15-minute walk or bike ride from where people live. Denver should also

concentrate new and affordable housing near high-frequency transit corridors to increase transit access and reduce car dependency. Walking, biking, and transit are logical modes of travel when people aren't forced to live so far away from where they work or need to access necessities. Also, walking and biking are an obvious and attractive choice in Denver – which has a flatter topography, a reliably dry climate, and milder year-round temperatures than many cities in the country. The nearer people are to services, entertainment, and their places of employment, the lower greenhouse gas emissions will be. Therefore, crafting land use policies that allow for people to live, work, play, and pray within their community will reduce climate impacts and also build community.

These policies should allow for Equitable Transit Oriented Development. Such policies should be used to address past inequities and gentrification pressures and take a broad view to address issues of racial equity, community health, access to economic opportunity, and environmental goals. Too often our land use policies have been racist and prohibited people of color from living in certain neighborhoods through red-lining and prohibiting multifamily housing by promoting only single-family zoning. Land use policies also need to elevate and accelerate access to and use of public transportation. Note that gentrification is and will continue to be a legitimate concern. In general, people are willing to pay more to live in walkable neighborhoods. This drives up the cost of housing and displaces low-income residents, pushing them further toward the outer fringes of the city. That's why it's imperative for Denver to integrate an affordable housing policy into its climate plan. Seattle created an Equitable Development Implementation Plan to correct their history of racist zoning policy.

Smart growth and increasing density should be neighborhood specific. It shouldn't mean luxury condo blocks – it can also mean allowing residents to build a small ADU in their backyard that they can rent out, or retrofitting a single-family home into a duplex.

The Task Force identified the following **overarching strategies** for growth through land use and zoning policies that reduce vehicle miles traveled (VMT) and greenhouse gas emissions and can improve housing affordability:

- Amend zoning policies to allow more dense housing options citywide by lifting exclusionary single-unit zoning.
- Create more mixed-income neighborhoods citywide by allowing and encouraging mixed use, light density, and higher density infill development.
- Encourage equitable Transit-Oriented Development (TOD) and affordable higher-density development near high-frequency transit.
- Eliminate minimum parking requirements (see Solution 1 below).
- Introduce parking maximums or incentives for developers to build significantly less parking (see Solution 2 below).
- Establish all land use and transportation policies in Phase 1.

Phase 1: 2020-2022
Promote new Accessory Dwelling Units (ADUs) by removing regulatory barriers and owner-occupancy and parking requirements, streamlining permitting, creating an affordable loan program, and increasing the number of ADUs allowed per lot.
Remove restrictions on group living.

	Amend zoning policies to allow more dense housing options citywide by lifting exclusionary single-unit zoning to allow options like duplexes, triplexes, fourplexes, and rowhouses, and subdividing existing structures, starting with the urban and urban edge context and expanding to the suburban context.
	Allow and encourage for higher density near transit centers and corridors with an emphasis on affordable housing.
	Establish density minimums, particularly near commercial centers and along transit corridors.
	Create an Equitable Development Plan to ensure that density and development activity is focused on community needs and local culture.
	Create new policy to ensure tenant protections and rights.
	Evaluate Greenfield, Brownfield, and large area development policies that requires compact and mixed-use development.
	Evaluate potential for a Transfer of Development Rights (TDR) program to compensate open space and historic building owners and achieve citywide goals, such as open space and historical buildings goals. TDR rights should be used to concentrate compact mixed-used development near transit nodes and corridors.

While not strictly a transportation issue, land use – more than nearly anything else – impacts the transportation options Denverites can use. The policies recommended above will have lasting impacts on our city, helping reduce emissions for decades to come while expanding the availability of more affordable housing options and access to opportunity. Most of the policies themselves can be implemented quickly, while the benefits may take years to fully materialize, so the Task Force recommends they are all established in Phase 1. This will take political will and strong leadership from Denver's leaders and is necessary to meet our climate goals.

Solution 1. Make transit convenient, reliable, accessible, and affordable

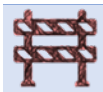
Public transportation, or transit, is the backbone of a sustainable transportation system. Transit moves many more people more efficiently than personal vehicles. Making our buses more convenient, reliable, accessible, and affordable will attract more people to choose these options over driving, while expanding access to opportunity for all Denverites. Of these, the key components are convenience, through frequency, and affordability. Frequency is achieved with transit arriving at least every 15 minutes throughout the day, as defined in Denver Moves: Transit. Transit will be a key first step before Denver can fully implement measures to increase the cost of driving, like congestion pricing.

The task force identified the following **overarching strategies** for improving public transportation:

- Partner with Regional Transportation District (RTD) to improve current RTD programs, services and fees.
- Invest in RTD services to increase frequency and reliability of service with a focus on denser areas of the City.
- Prioritize transit on the street (see Solution 3; Re-allocate Public Space).

- Create equitable transit options through free transit for low-income households, youth, and seniors.
- Establish a Bus Rapid Transit Network (BRT: a bus system that operates like a rail system) to move more people quickly on major corridors.
- Electrify the transit fleet.

Phase 1: 2020-2022
Plan for buying up service from RTD for Denver Moves Transit Corridors, so buses come more frequently.
Plan for Bus Rapid Transit on all major corridors, integrated with local and regional transit systems.
Plan and begin implementing for Denver to pay for free transit for seniors 65+, individuals with disabilities, Medicare recipients, and youth (ages 6-19).
Align transit plans with other multimodal projects and bike and pedestrian networks.
Add transit priority signals and dedicated bus lanes (see Solution 3), improve rider boarding areas and amenities, and integrate with walking and biking improvements.
Remove the following policies through state-level legislative action: RTD Farebox requirement (that at least 30 percent of RTDs revenue come from fares), prohibition for paying for parking, parking requirements, and prohibitions on residential and commercial development on RTD-owned land.
Partner with RTD to create an optimized, efficient, productive Reimagine RTD network.
Evaluation
Evaluate how to develop strategies to support RTD to improve recruitment and retention of bus drivers.
Evaluate how to combine bike share and transit pass payment and/or operations systems (e.g., Austin and LA). This could include Lyft's Community Pass program.
Explore flexible on-demand services to connect to the core network in RTD areas if the neighborhood isn't dense enough for frequent RTD service.
Consideration
Partnership and Investment: Consider whether to lower RTD fares in concert with the Metro Vision 2050 Plan (under RTD Control unless City pays for fares).
Partnership and Investment: Consider whether to adopt Community EcoPass Program for downtown employees.
Partnership and Investment: Consider whether to partner with university systems to provide free EcoPasses to university communities. Consider building some of the cost into tuition.

	Partnership and Program: Consider whether to make RTD Live program more accessible.
	Partnership: Consider whether to work with RTD to encourage fleet replacement plans that include electric vehicles and EV maintenance.
Phase 2: 2023-2025	
	Implement frequent 15 minute or better service 18 hours a day on routes citywide.
	Begin to implement bus rapid transit on all major corridors, integrated with local and regional transit systems.
	Fully implement free transit for seniors 65+, individuals with disabilities, Medicare recipients, and youth (ages 6-19).
	Partner with RTD to ensure they exclusively purchase electric buses as the existing fleet is retired.
	Continue work with RTD to create an optimized, efficient, productive Reimagine RTD network.
Phase 3: 2025-2030	
	Partner with RTD and invest in a fully electric RTD and City of Denver fleet.
	Complete the Bus Rapid Transit network.
	Partner with RTD and invest in providing free transit citywide.

Transit in the city of Denver is run by RTD, the regional transit agency. Changing public transportation will require a number of external supportive actions, including: RTD board support; state legislative action to eliminate the RTD fare requirement and allow RTD to develop or lease the land they own and profit from it; strong partnerships between the RTD board, RTD operations, and the City of Denver; and data collection and analysis to assess impacts of different policies, street design, and reforms. In Phase Three, the City should evaluate whether transit is accessible and frequent enough to achieve climate goals, evaluate a move to free transit citywide and offer it if this will substantively change mode share and get more people to take transit instead of driving.

Solution 2. Reduce vehicle trips

Concurrent with providing convenient low- or zero-emission transportation options that are convenient and affordable, Denver should strive to reduce unnecessary vehicle trips. The cost of driving and parking private vehicles does not accurately reflect the societal cost, including climate emissions, air pollution, and use of public space. Changing the price for driving to reflect demand and reallocating public space (see Solution 3) will allow the City to prioritize other modes of transportation. Ultimately, a congestion pricing program, which is a fee paid by users to enter a restricted area to relieve traffic congestion, will be necessary to meet climate goals and is our top recommendation for this category. As noted above, a deep investment in transit and other options will be necessary to provide options as the price of driving is adjusted.

> **Congestion pricing** "is a way of harnessing the power of the market to reduce the waste associated with traffic congestion. Congestion pricing works by shifting purely discretionary rush hour highway travel to other transportation modes or to off-peak periods, taking advantage of the fact that the majority of rush hour drivers on a typical urban highway are not commuters. By removing a fraction (even as small as 5%) of the vehicles from a congested roadway, pricing enables the system to flow much more efficiently…. There is a consensus among economists that congestion pricing represents the single most viable and sustainable approach to reducing traffic congestion."
>
> ~ Federal Highway Administration

The task force identified the following **overarching strategies** for reducing vehicle trips:

- Price driving during peak periods and into dense areas through a congestion pricing program.
- Adopt policies to manage existing parking to meet goals, including through increasing the cost and managing parking supply.
- Reduce parking in new construction.
- Prioritize non-peak freight delivery to reduce peak hour emissions and improve safety and ease of travel.

Phase 1: 2020-2022
Right-size the cost of parking private vehicles (meters, lots, buildings) through the adoption of meter price increases and fees for parking lots, buildings, and other off-street parking options, and tie revenue to multimodal improvements.
Reduce parking in RTD station areas to improve efficacy of mobility options.
Eliminate parking minimums through updates to existing development and zoning requirements for buildings.
Introduce parking maximums or significant incentives for developers to build significantly less parking.
Manage curb related right-of-way resources via additional metered parking and more paid permit parking.

	Allow shared parking and parking districts to “unbundle” parking costs from housing and commercial costs.
	Prioritize off-peak freight delivery in the City of Denver and incentivize use of cargo bikes or other smaller delivery vehicles.
	Marketing and outreach: Create education and outreach campaigns that inform and affirm low-carbon transportation choices.
Evaluation	
	Evaluate how to develop an equitable congestion pricing policy – define goals, assess equity impacts and solutions, begin stakeholder engagement so that strategy immediately moves to action in Phase 2.
	Evaluate how to ensure proper funding for building and maintaining sidewalks and other safe pedestrian infrastructure like shared streets or repurposed travel lanes.
	Evaluate how to develop a pilot pedicab or eTuk service in under-resourced communities.
Phase 2: 2023-2025	
	Begin adopting congestion pricing systems in dense areas or on heavily traveled roadways, such as Downtown, Cherry Creek, Pena Blvd, I-25, etc.
	Implement impact fees for those who do business in Denver and contribute to emissions, like Uber, Amazon, etc.
	Implement congestion pricing public campaign to acclimate residents and visitors to these trip cost structures.
Evaluation	
	Evaluate a policy that would charge by vehicle miles traveled in Phase 3.
	Evaluate reducing transit fares on high ozone days.
Phase 3: 2025-2030	
	Fully build out congestion pricing systems in dense areas or on heavily traveled roadways, such as for Downtown, Cherry Creek, Pena Blvd, I-25, etc.
	Assess achievements and success toward reduction of single occupancy vehicle trips to 50%.
	Implement vehicle miles traveled pricing systems, as needed.

Successfully reducing the number of vehicle trips in Denver will require more than just internal policies. Additional support includes City Council approval on some policies; vocal supporters to make the connection between the price of parking and driving and our climate and mobility goals; infrastructure investment; and an extensive education campaign.

Solution 3. Reallocate public space

Much of Denver's public space is dedicated to the transport and storage of personal vehicles, including travel lanes, curbside parking, and off-street parking lots. We can distribute space more equitably among different modes and land uses to allow all Denverites to travel safely and affordably, however they choose. There should be a balance of high-quality, permanent infrastructure that offers the greatest long-term benefits, with more temporary infrastructure that can be moved quickly and be used to test pilot concepts. Throughout public comments, there was strong support for safety infrastructure and policies that create safer street environments for people biking and walking.

The task force identified the following **overarching strategies** for reallocating public space:

- Infrastructure: Reallocate street space to create convenient multimodal options.
- Infrastructure: Connect and complete multimodal networks.
- Infrastructure: Create inviting new public spaces that encourage low carbon transportation.
- Outreach: Increase education and outreach to inform and affirm re-balancing public space for different needs.

Phase 1: 2020-2022
Repurpose travel lanes by adding bus-only lanes, protected bike lanes, and safe pedestrian space on major corridors with a focus on the high injury network of roadways.
Create a network of car-lite or car-free streets into downtown and other key corridors, as well as high bike- and pedestrian-use areas (e.g., neighborhoods, and connections to parks and commercial districts).
Identify and eliminate any legal barriers related to building and maintaining sidewalks.
Reallocate parking space supply by, for example, creating mid-block loading spots and on-street bike parking and removing end-of-block parking on every block, thus improving intersection safety.
Create a Right of Way plan that ensures uniformity and availability of loading zones for freight delivery and passenger pickup/drop-off, as well as increased on-street bike and scooter parking.
Connect neighborhoods via car-lite urban loop trails e.g., 5280 Trail, Via Verde (Westwood), North Park Hill Art Walk, Montbello Walkable Loop.
Create sustainable green areas and public plaza spaces that make multimodal travel and public space more inviting (e.g., Wynkoop Plaza).
Increase education and outreach on the need to reallocate public space and buildout the bike and pedestrian network.
Lower speed limits to make using streets without a car safer and more inviting.
Eliminate turns on red to create safer intersection environments.

Consideration
Consider increasing infrastructure for safe storage options for bikes and scooters.
Phase 2: 2023-2025
Fund the buildout of low carbon transportation networks as identified in the Denver Moves Plan, e.g., shared streets, sidewalks and other pedestrian infrastructure, and bike and bus transit networks.
Add transit priority signals (see Solution 1) and dedicated bus lanes with improved rider boarding areas and amenities.
Complete 75% of the planned bike network.
Complete 50% of a safe pedestrian network citywide, including sidewalks, shared streets, repurposed travel or parking lanes, and more.
Consideration
Consider restoring tree lawn space and maintain the urban canopy.
Phase 3: 2025-2030
Complete 100% of the bike network.
Complete 100% of a safe pedestrian network citywide, including sidewalks, shared streets, repurposed travel or parking lanes, and more by 2030.
Complete Transit Goals, including bus rapid transit (see Solution 1).

In order for the Department of Transportation and Infrastructure to reallocate public space, there are a number of external supportive actions that are needed, including: demonstrated public support in communities; a comprehensive Right of Way plan; intergovernmental coordination within city agencies (Parks & Rec, CPD, Mayor's Office, City Council, Denver Water, Fire, Xcel Energy); and consideration of how street space intersects with housing and land use.

Solution 4. Increase clean vehicle options

Reducing emissions from transportation will require fewer people to drive fewer miles (through compact development bringing destinations closer together, and expanding transit, biking, and walking). Any driving that does occur should be electric. Electric vehicles (EVs) can run entirely off of clean renewable energy like wind and solar, reducing climate emissions and harmful air pollution. EVs also save owners in reduced fuel and maintenance costs. Electric vehicles can be owned by individuals, but Denver should also strive to have shared electric vehicles to enable less car ownership and reduce vehicle miles traveled. Finally, electric vehicles are not limited to cars and trucks –clean transportation options can be expanded to include electric bikes, scooters, and more. In short, EVs are an important part of a low-carbon multimodal future and are essential alongside other options to reduce driving. In order to reach the goal

of having a zero-emissions transportation system, all vehicles must be electric (or zero-emission) and run on carbon-free energy. Over time, the supply chain for materials and minerals for EVs should continuously improve to further reduce environmental and climate impacts.

The task force identified the following **overarching strategies** for increasing clean vehicle, electric bike, and scooter options:

- Expand charging infrastructure across the city with a targeted and equitable approach.
- Encourage EV adoption through outreach, incentives, and shared fleets.
- Lead by example by electrifying Denver's fleet vehicles and installing public charging on City property.

Phase 1: 2020-2022
Plan for electrifying the Denver Municipal Fleet.
Plan and partner with public private partnerships where available, Xcel Energy, and other stakeholders to increase electric vehicle and micromobility charging at the following locations: ● Right of way ● Workplaces ● High-density areas ● Neighborhoods without garages ● City buildings ● RTD Park & Rides ● Other public buildings ● Public micromobility hubs ● Apartments and multifamily housing locations
Partner with DPS to provide an "earn-a-bike" or "loaner to owner" program for students (and family members) who want to bike or ebike to school and other places. This could include a bike repair workforce development fellowship with income opportunity.
Increase education and public outreach on benefits of electric vehicles and electric bikes.
Support the electrification of high mileage vehicles, including partnering with Uber and Lyft to electrify their vehicles.
Evaluation
Evaluate how to adopt a resolution by the City Council outlining the city's intent to eliminate all carbon pollution from vehicles by 2040.
Evaluate how to create equitable programs that offer subsidies or vouchers to individuals who purchase EV's and e-bikes.
Evaluate how to incentivize employers to trade parking passes for EcoPasses, or bike share (e.g., parking cash-out program).
Evaluate how to implement incentives for individuals who buy ebikes or scooters including a voucher program for low-income residents.

	Evaluate how to implement incentives for individuals who buy EV's including a voucher program for low-income residents.
Consideration	
	Consider whether to adopt penalties for gas powered business vehicle fleets.
	Consider whether to introduce "Feebates" – a system of fees on high polluting vehicles that are redistributed as rebates for EV's. Consider equity and target heavy duty vehicles.
Phase 2: 2023-2025	
	Expand EV/ebike sharing programs with city investments.
	Electrify the Denver Municipal Fleet, including medium and heavy-duty vehicles.
	Continue education and public outreach on benefits of electric vehicles and electric bikes and existing incentives to purchase either or both.
Evaluation	
	Evaluate how to expand EV Carshare.
	Evaluate whether to restrict gas cars to 3-4 days a week.
	Assess progress towards meeting EV adoption goals.
	Assess progress in EV registrations rates.
	Evaluate the need for incentives for vehicles or chargers to move the market.
	Create a plan and begin implementation for low- or zero-emission zones, including for commercial delivery and general traffic.
	Evaluate practicality of a low- or zero-emission zones, including for commercial delivery and general traffic.
Phase 3: 2025-2030	
	Increase the number of EV charging stations in Denver, including at apartments and multifamily housing locations, using public private partnerships where available, partnering with Xcel Energy, and working with other stakeholders.
	Continue education and public outreach on benefits of electric vehicles and electric bikes and incentives to purchase either or both.

	Full buildout of low- or zero-emission zones, including for commercial delivery and general traffic.
Evaluation	
	Evaluate if policy restrictions should be put in place on gas-powered vehicles, as needed.
	Determine whether additional regulation is needed to meet EV goals, such as only EV registrations, only EV cars sold (e.g., San Francisco, British Columbia, Los Angeles).

Supporting electric vehicles in the City of Denver will require: data collection and review to assess progress; coordination with Xcel Energy, the State of Colorado, the Regional Air Quality Council, and other partners to maximize impact; and partnership with private companies, including car dealerships, car share providers, property owners, and EV charging companies.

Solution 5. Change behavior via new options and incentive programs

Building out sustainable transportation options like public transportation, biking and walking, along with infrastructure to support electric vehicles is critical. However, changing behavior can still be challenging. The City can play a role in encouraging people to take new options. Public comment surveys via Denver Public Schools show that parents desire flexibility for work from home. Education, outreach, and incentives will be important to elevate the options within our changing transportation system. The City can partner with employers and other entities to encourage people to travel in more sustainable ways. As we have learned during Denver's COVID-19 "Stay-at-Home" period, increasing telecommuting significantly reduces trips and improves air quality. Denver should incentivize employers to increase telecommuting.

Programs to encourage and incentivize people to take more sustainable transportation options should be run alongside the City's other efforts like building infrastructure and improving access to options, including ebikes, 3-wheel bikes, bikeshare and transit, to make getting around without a car more accessible for all Denverites.

The task force identified the following **overarching strategies** for changing behavior via new options and incentive programs:

- Increase weekly telecommuting.
- Develop incentives for individuals, developers, and employers to reduce single occupancy vehicle trips with an emphasis on equity.
- Implement equitable incentive telework programs for individuals.

Phase 1: 2020-2022	
	Require new development and large employers to have an ongoing Transportation Demand Management (TDM) program that caps SOV trip generation (could include parking reduction as an incentive).
	Plan how to develop resources and incentives for employers introducing new telecommuting options, e.g., a four-day work week model.

	Partner with Denver Public Schools on teleschooling options.
	Create pilot projects incentivizing developers to create affordability via expedited permits, reduced fees, etc.
	Develop a plan to incentivize developers to build transit-oriented development, including sidewalks, bike lanes, and charging stations for electric vehicles and bikes.
	Foster employer-driven incentives such as microtransit, and grace periods for employees impacted by transportation issues.
	Work with Uber and Lyft to discourage solo ride-hail trips in favor of shared trips (Uber and Lyft Pool).
	Develop incentives for companies to invest in EV charging stations in low-income areas.
Evaluation	
	Study successful telecommuting models for employers introducing new telecommuting options (e.g., a four-day work week model).
	Determine if there is state authority to change work and school schedules to promote telecommuting.
Phase 2: 2023-2025	
	Pass a Commuter Benefits Ordinance requiring employers with over 20 employees to offer pre-tax alternative transportation commuter benefits, e.g., in Seattle.
Evaluation	
	Further evaluate incentive programs for developers, employers, and individuals.
Phase 3: 2025-2030	
Consideration	
	Consider advocating for a change of work and school schedules via state legislative action.

Changing behavior and creating new incentives will require numerous supports beyond policy, including City monetary investment; education campaigns; coordination with providers like RTD, shared mobility and micromobility providers to offer discounts and passes; close relationships with the Transportation Management Associations (TMAs) and businesses to promote other commute options and programs; coordination with car dealerships and bike shops selling EVs and e-bikes; and state policy on work and school schedules.

Solution 6. Expand and embrace innovative mobility options

New technology-driven options have dramatically changed the way Denverites get around. Just a decade ago, the iPhone was brand new, Uber and Lyft were just getting started, and no one imagined electric scooters would dominate local discussion in cities. While ride-hailing or shared mobility as it's been

imagined to-date isn't perfect, they have changed the conversation and pushed us to reconsider how to get around, offering the opportunity to reduce car ownership. Denver should continue to consider innovative mobility, particularly shared and electric options, to expand clean transportation options for residents. As Denver expands micromobility options, it is important to provide options citywide, with partners and also with city investment to ensure that low-income areas have the same or better access to attractive, affordable first/last mile micromobility options.

The Task Force identified the following **overarching goals** for expanding and embracing innovative mobility options:

- Electrify ridesharing and expand pooled ridesharing (or otherwise make ridesharing options more sustainable).
- Increase micromobility options and accessibility.
- Study rideshare and micromobility patterns and emerging mobility options.

Phase 1: 2020-2022
Prioritize wider bike lanes for cargo bikes and bikes with trailers, and prepare for more widespread use of micromobility options in bike lanes.
Establish free citywide bike sharing offered by the City's selected providers.
Ensure equitable placement of micromobility options citywide with city investment.
Expand on-street micromobility parking.
Require private providers to submit anonymized data and study micromobility and rideshare patterns to determine user patterns and impact on congestion and GHG.
Implement an ebike and eCargo bike program for low income individuals.
Implement an ebike and eCargo bike program for local business delivery, e.g., Miami's partnership with DHL.
Evaluation
Study rideshare and micromobility patterns and emerging mobility options.
Study how best to electrify rideshare and expand pooled rideshare through partnerships.
Study policy options to charge users/providers more for single occupancy rideshare trips.
Study policy options to charge fees for pickup and drop-off at the airport to provide an incentive to EVs and pooled rideshare trips.

Phase 2: 2023-2025	
	Establish programs for use of micromobility for low-income user groups through contract with micromobility companies in the city.
	Expand on-street micromobility parking.
	Charge users/providers more for single occupancy rideshare trips.
	Charge fees for ride-hailing with greater fees for single riders, and reduced fees for shared rides (pool) and electric vehicles, e.g., in NYC and Chicago.
Evaluation	
	Assess the future needs of micromobility in the buildout of the bike network.
Phase 3: 2025-2030	
Evaluation	
	Assess new needs and micromobility opportunities and implement programming and infrastructure.

For Denver to fully maximize innovative mobility options, other supportive actions are needed. These include: state action to regulate or allow municipalities to regulate ride hailing; close relationships and some regulatory authority over ride hailing and ridesharing; strong private sector support to deliver micromobility options; updates to city policies; and funding to ensure options are accessible to all.

Integration

A common theme in the public feedback about these solutions was that Denver must invest in all of these options, as they will work best when combined. The goal is to provide Denverites multiple affordable and accessible low-carbon options that help people with their transportation needs.

Offering people an array of options reduces car ownership, which saves households money. People may typically choose to take a rapid bus to work, but on the weekend may choose to take a shared electric vehicle for grocery shopping or bikeshare to visit a friend. Land-use changes that bring people's homes close to where they work, play, and pray facilitates these modes of travel. A multimodal future should be pursued holistically, with a wide set of solutions, including transit, biking and walking, electric vehicles and shared vehicles.

Evaluating investment and greenhouse gas impact

In addition to more successfully providing people options in a way that works for everyone, these strategies will have the greatest emissions impact when implemented together. Meeting our climate and mobility goals will require a combination of infrastructure investment, policies, partnerships, outreach, and education across multiple sectors.

According to analysis from Erin Nobler, a PhD student at CU Denver, a combination of congestion pricing, parking fees, transit priority, transit frequency and free transit could reduce Denver's annual greenhouse gas emissions from light duty vehicles up to 34%. Specifically, this analysis found that:

- Congestion pricing could reduce traffic volumes 15-25%.
- Increased parking fees could reduce traffic volumes 10-34%.
- Free transit could increase ridership 25-70%.
- Doubling frequency of transit could increase ridership 50%.

The following chart shows the estimated program cost and relative greenhouse gas emission impact of the strategies. It is important to remember the co-benefits that the solutions offer as well. For example, while an improved transportation infrastructure has a high cost, it offers permanent physical improvements to Denver's communities, increasing safety, expanding access, and improving quality of life for decades to come. Additionally, some of the costs reflected within infrastructure investment (like infrastructure to set up congestion pricing) will ultimately generate much more revenue than the lifetime cost.

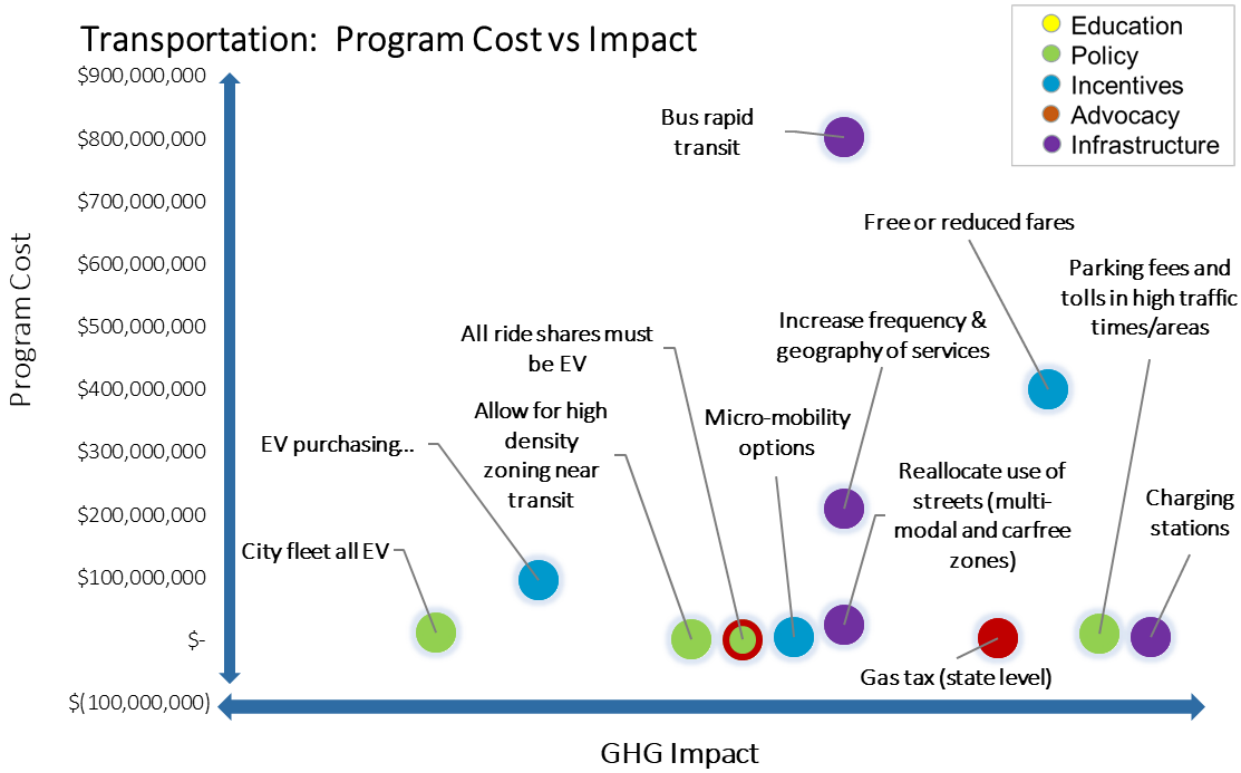


Figure 9. Note that integrated strategies will be far more effective in reducing vehicle miles traveled than individual land use, transportation, or pricing strategies pursued on their own. Also, infrastructure and EVs provide significant co-benefits for the community and economy.

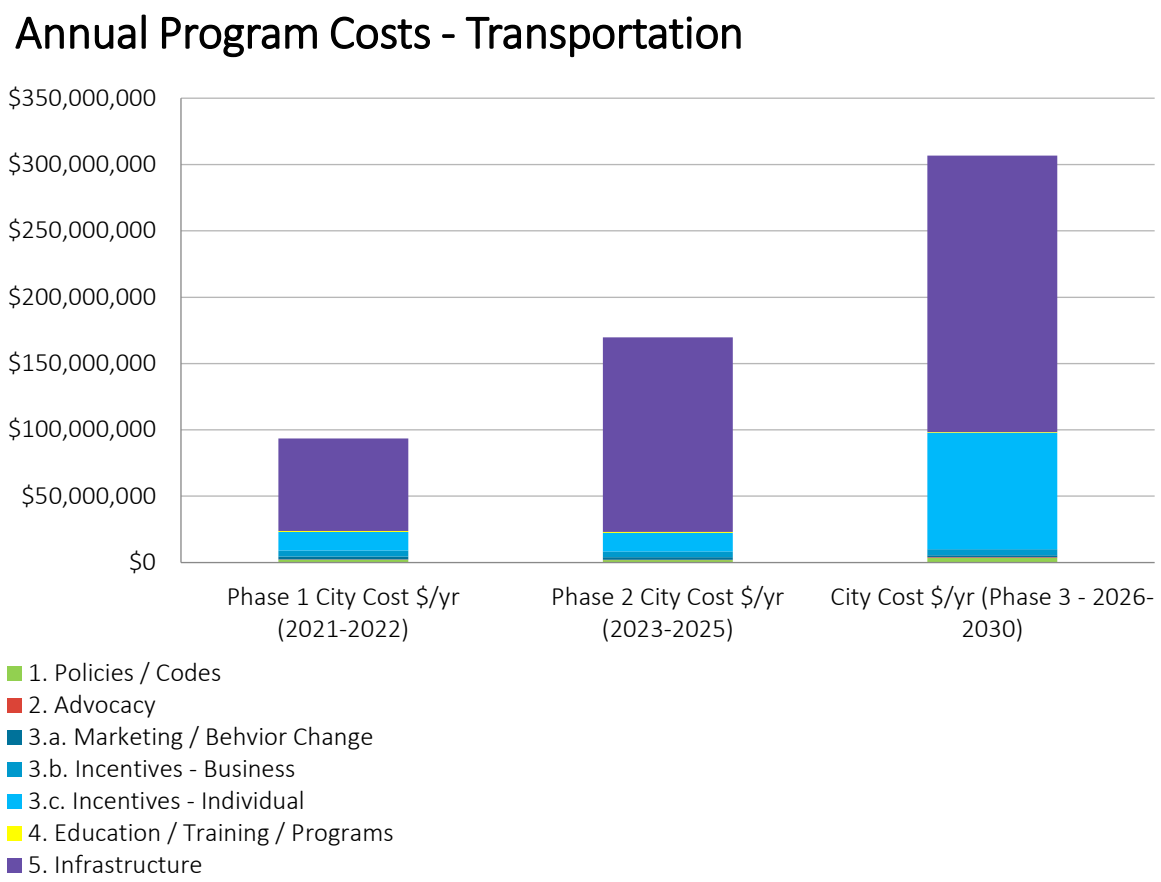


Figure 10. Annual program costs by phase.

Cross-sectional Influences and Cost/Benefit Considerations for Electrification

Electrification policies should include robust technical and cost-benefit analyses to ensure the equitable decarbonization of Denver's buildings and transportation sectors. To be successful, full electrification will require a prudent investment strategy and a paradigm shift in utility regulatory structures and incentives. Electrification leads to overlapping cross-sectional considerations, which are also discussed in the buildings and electricity supply sections.

Electrification of the transportation system will require not just charging infrastructure in residential and commercial spaces, but also will require increased electricity supply. SB19-077 authorized a process at the Colorado PUC whereby a public utility may undertake implementation of an electric motor vehicle infrastructure program in their service territory.[3] Xcel Energy filed their first transportation electrification plan in May of 2020 in proceeding 20A-0204E. The plan calls for about $102 million in investments and programmatic support for transportation electrification in Colorado across a three-year timeframe. However, these costs are proposed to be offset by additional revenues from customer participation in EV specific programs, technology solutions, such as battery deployments at DC fast charging stations, and other system benefits. Xcel Energy reports that the average monthly bill impact is expected to be only $0.46 per month for residential customers.[4]

[3] SB19-077, Electric Motor Vehicle Public Utility Services. https://leg.colorado.gov/bills/sb19-077

[4] Attachment SWW-6. Proceeding 20A-0204E.

The Public Utilities Commission (PUC) oversight of transportation electrification planning efforts allows for Denver and other stakeholders to intervene by reviewing the plan and advocating on behalf of their constituents throughout the process. The proposed plan includes initial considerations for data sharing and EV charging control system requirements that will enable customer participation in demand management programs to help with electric system management. As the EV charging industry matures, it will provide a valuable opportunity for utilities and other stakeholders to influence how technology vendors develop and standardize effective demand management capabilities.

As with all the recommendations in this report, Denver leaders should acknowledge and address potential equity impacts to low-income communities including economic barriers to electrification in Colorado. Incentives and targeted programs may be necessary to support low-income communities as electric appliances and vehicles move down the cost curve to reach price parity with fossil-based alternatives. Legislative and regulatory actions will be particularly important to address the risks of burdening a subset of the Denver community or customer base with a disproportionate share of maintaining and paying for existing fossil-based infrastructures.

Electricity Supply Policy Recommendations & Supports

Denver's renewable electricity supply is essential to achieving Denver's decarbonization objectives. Grid electricity consumed in buildings and homes accounted for 33% of Denver's emissions in 2018 (Figure 11). Decarbonizing the electricity supply is foundational to achieving climate mitigation benefits through the electrification of vehicles and buildings in the coming decades.

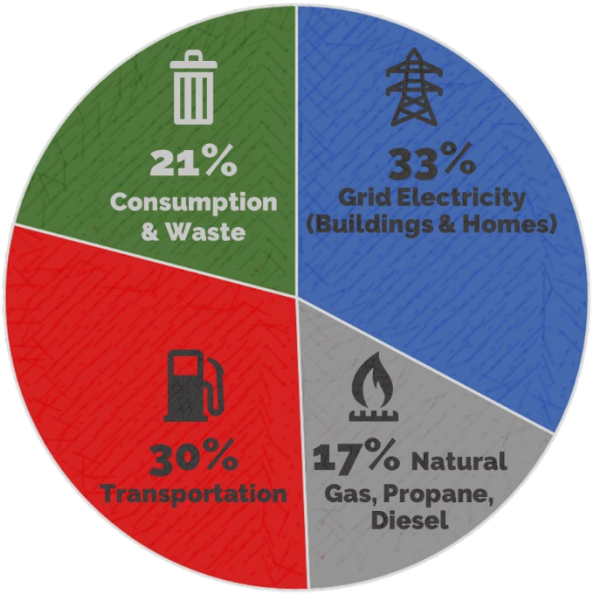


Figure 11. 2018 Emissions in Denver by Source (mt CO_2e).

Denver is the largest city served by Xcel Energy. Community-wide electricity consumption represents almost 25% of Xcel Energy's total retail sales in Colorado. Thus, Denver's choices can meaningfully influence the resource makeup and functionality of a 100% carbon-free electric grid. Success for Denver's electricity decarbonization goals are based on the Denver community's contributions towards decarbonizing the entire electric system.

Denver is fortunate that Xcel Energy was the first investor-owned utility in the country to announce a voluntary target to deliver 100% carbon-free electricity by 2050 and to produce 80% less carbon on their electric system by 2030 from a 2005 baseline. However, there is still a gap that Denver must close between Xcel Energy's carbon reduction trajectory and the City's community-wide electricity decarbonization goal (Figure 12). Exceeding the 2030 target will require Denver to work closely with Xcel Energy and to pursue several complementary strategies to decarbonize the electric grid.

The City and County of Denver will retain ownership of the renewable energy attributes and carbon offset value of its electricity supply to the greatest extent possible. Additionally, strategies in which Denver enables the production of Renewable Energy Credits (RECs) that are transferred to and retired by the utility to enable system-wide decarbonization – such as through investments in local, additive renewable energy resources including municipally hosted community solar gardens—are preferred to strategies in which Denver purchases RECs from existing resources or resources in other service territories.

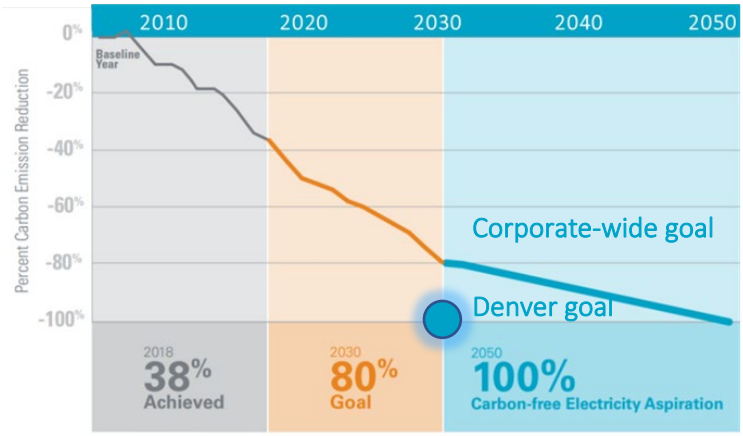


Figure 12. Xcel Energy, Corporate-wide Carbon Reduction Trajectory
Adapted from Xcel Energy Carbon Reduction Plan, 2019

The City and County of Denver could theoretically purchase enough RECs to account for 100% of community-wide electricity use. Denver's Citywide electricity use reached 6.7 million megawatt-hours

(MWh) in 2019. Each REC represents one MWh of renewable electricity. Xcel Energy's Certifiably Renewable Percentage in 2020 is projected to be 30%. Denver could ask taxpayers to fund REC purchases through a renewable electricity option, such as Windsource at a cost of $15/MWh, to "clean" the remaining 70% of the community's power supply. This would cost taxpayers $70.3 million in the first year.

To continue to claim that Denver is powered by 100% renewable electricity, REC purchase costs would continue to be borne by Denver's taxpayers year-after-year until Xcel Energy reaches its publicly stated and statutorily mandated requirement that 100% of the electricity delivered to retail customers be carbon-free by 2050.

Yes, Denver would need to buy fewer RECs over time as the electric grid incorporates more renewable and carbon-free resources. However, the cumulative cost of REC purchases is expected to reach over $571 million by 2030 and $932 million by 2050. REC purchases are therefore not recommended as an appropriate option for Denver to achieve its electricity supply decarbonization goals. If hundreds of millions of dollars of taxpayer money becomes available to support Denver's electricity decarbonization, those resources should be spent by investing locally in carbon-free energy infrastructures that enable co-benefits, such as workforce development, utility bill savings, and more resilient public facilities.

REC sales to third parties detract from the renewable electricity content of the delivered grid mix and undermine Denver's ability to reach its electricity decarbonization goals. Fortunately, once Xcel Energy's Clean Energy Plan is submitted to the PUC no later than March 31, 2021 and subsequently approved, all RECs used to comply with the requirements of the Clean Energy Plan will need to be retired in the year they are generated.[5] Additionally, Xcel Energy proposed in PUC proceeding 19AL-0268E to increase its Certified Renewable Percentage (CRP) year-over-year using tactics, including, but not limited to, phasing out utility-directed REC sales to 3rd parties by 2030. Denver should also intervene in relevant PUC proceedings and advocate that Xcel Energy meet or exceed its proposals, such as in proceeding 20A-0226E.which pertains to regulatory approval for REC transactions.

The Climate Task Force has embraced equity and community impact as core criteria for Denver's evaluation of climate action strategies. Fundamentally, the objective of Denver's climate work is to enable an environment in which Denverites can live, work, and thrive for generations. Denver's electricity decarbonization investments can and should strengthen the community. The City needs to understand the problems and challenges faced by the community and ensure that Denver's climate solutions are also addressing community problems. All Denverites have the right to participate in and benefit from the energy transition.

Electricity Supply Goals

The Climate Action Task Force is aware that in 2018, Denver made the pledge to achieve 100 percent renewable electricity for municipal buildings by 2025 and community-wide by 2030.[6] The Task Force generally supports these goals with one modification. Carbon emissions are what matters as pertains to climate change mitigation. The technology pathway to achieve a 100% carbon-free, let alone 100% renewably powered electric system, is still uncertain. Where technically possible and economically feasible, the Task Force supports maximizing the deployment of energy storage devices. Expanding the

[5] § 40-2-125.5 C.R.S., (3)(a)(III) The qualifying retail utility shall retire renewable energy credits established under section 40-2-124(1)(d), in the year generated, by any eligible energy resources used to comply with the requirements of this section.

[6] "Denver: 80x50 Climate Action Plan." Denver Department of Public Health and Environment. July 2018.

scope of the community-wide target to include both renewable and carbon-free electricity options that prioritize avoiding air pollution, emissions, and creating waste byproducts will increase the likelihood of success for Denver, while meeting the intent of the goal from a climate mitigation perspective.[7]

Denver Electricity Supply Goals		
2025	2030	2040
Municipal buildings 100% renewable electricity	Community-wide 100% renewable or carbon-free electricity	----

The sections below outline the strategy recommendations that the Task Force believes will be necessary to decarbonize Denver's electricity supply.

Electric Supply Solutions Overview

There are many possible pathways to decarbonizing Denver's electricity supply. The Task Force recommends that the following five high-level solutions be used in combination:

1. Decrease the carbon-intensity of the utility grid mix.
2. Expand distributed energy resources.
3. Lead with municipal infrastructure.
4. Educate and engage the community.
5. Invest in a workforce that will result in a carbon free energy system.

The strategies are enduring concepts that can endure beyond Denver's attainment of the City's electricity decarbonization goals. The strategies are intended to enable systemic changes that instigate a rapid, lasting, and equitable transition to a 100% carbon-free electric system. Systemic changes are needed to create simplicity in the energy transition. General members of the community should not need to concern themselves with researching and becoming experts in carbon-free electricity systems. When Denver is successful, buildings will be built to use less energy and the utility will provide carbon-free electricity in the same reliable and affordable manner to which customers are accustomed.

Solution 1. Decrease carbon intensity of the utility system

Denver's electricity supply is highly dependent on the percentage of carbon-free electricity available to the community through the utility grid mix. Active participation in Colorado PUC proceedings and close collaboration between Denver and Xcel Energy are necessary to advance Denver's and Xcel Energy's mutual decarbonization objectives.

Xcel Energy is required by §40-2-125.5, C.R.S. to file a plan with the PUC to reduce carbon dioxide emissions associated with retail electricity sales by 80% from 2005 levels by 2030. Denver's involvement in the development of this plan and cooperation with Xcel Energy can help to meet and exceed this objective. However, while Xcel Energy is pursuing an 80% reduction in carbon dioxide emissions by 2030, the path to 100% carbon-free is uncertain. As such, the City-utility partnership and participation in state regulatory proceedings should be prioritized in all three phases.

[7] Note: The task force did not discuss nuclear, so this should not be seen as either a statement for or against nuclear power.

Collaborative planning and a prudent evaluation and deployment of both utility-scale and distributed energy resources is needed. As the City pursues the electrification of buildings and expands its electric vehicle infrastructure, it can ensure that such systems can support demand flexibility and enhance the functionality of the electric system.

The Task Force recommends the following tactics to enable the success of strategy 1. The highest impact tactics are indicated by a red icon.

Phase 1: 2020-2022
Strengthen City-utility partnership to accelerate the transition to a renewable electric grid.
Active Participation in State Legislative Affairs and Public Utility Commission proceedings.
Hire an energy policy person in the CASR office to increase the depth of the office's policy team and support this and other strategies.
Phase 2: 2023-2025
Continued City-utility partnership and participation by Denver in state regulatory proceedings.
Denver intervention in and support during implementation of Xcel Energy's statutorily required Electric Resource Plan to achieve an 80% reduction in carbon emissions by 2030.
Phase 3: 2025-2030
Continued City-utility partnership and participation in state regulatory proceedings.
Grid flexible loads (EV charging, electric water heaters, space heating), and community-sited renewables + storage enable operation of a carbon free electric grid.
Pursue strategies to achieve carbon-free renewable liquid and gaseous fuel at scale (storage; fuel cell electricity; transport; industry).
Work with Xcel Energy to bring more carbon-free electricity onto the Colorado electric system.
Supports
Adherence to the spirit of Denver/Xcel Energy, Energy Future Collaboration.
Rulings by the Public Utilities Commission that align with Colorado's electricity objectives.
Technology advancement and infrastructure investments to enable carbon-free liquid and gaseous fuels and operation of a carbon-free grid.

	Review and strengthening of the Denver/Xcel Energy Franchise Agreement to advance Denver's decarbonization and community impact objectives (the current agreement expires in 2026).

Solution 2. Expand distributed solar in Denver (rooftops and community solar)

Denver has significant untapped distributed energy potential. Community-wide subscriptions and participation in renewable electricity programs accounted for only 1.9% of the Denver community's electricity use in 2018. If Xcel Energy is successful in reducing carbon emissions on the electric grid by 80% by 2030, the Denver community will need to deploy or subscribe to approximately 675 MW of carbon-free electric resources to account for the remaining 20% of the decarbonization goal. As of 2018, Xcel Energy reported 56 MW of on-site solar capacity in its Solar*Rewards program by Denver residential and commercial electricity customers.[8] According to Google Project Sunroof, 72% of buildings in Denver are solar-viable and could accommodate more than 1,600 MW of solar capacity, generating 3.4 million MWh-AC of electricity each year.[9] Distributed energy resources can also be sited as solar canopies over parking lots or at City-owned vacant land such as at Denver's landfill or the Denver International Airport and at private property connected to Xcel Energy's Colorado service territory.

Priority actions to expand distributed energy resources include supporting community solar garden and rooftop solar programs and continuing to adopt the latest model International Energy Conservation Code (IECC). Denver currently uses the latest model energy code, the 2018 IECC with strengthening amendments. Denver's voluntary Green Code already has extra efficiency and renewable outcomes compared to the base energy code. The City is working on a concurrent strategy to achieve net zero carbon in new buildings by 2035. To be successful, this will require continued building code updates and the incorporation of distributed energy resources. The Electricity Supply subgroup of the Task Force supports these activities and recommends that Denver adopt the upcoming 2021 IECC (as specified in the Implementation Plan), including its anticipated net zero emissions appendix.

Denver should prioritize strategies in which the City's facilities and community participation in renewable electricity programs **create additive RECs**. The City should retain ownership of RECs to the greatest extent possible but also support strategies in which additive RECs are generated, transferred to, and retired by Xcel Energy towards system-wide decarbonization.

Denver as an electricity consumer is nested within Xcel Energy and the broader Colorado electric system. Success in achieving Denver's renewable electricity target, particularly through the subscription to and deployment of additive renewable electricity capacity, has a net beneficial effect on Xcel Energy's system-wide decarbonization objectives when accompanied with REC retirement. If Denver hosts a community solar garden on a building and the RECs are transferred to and retired by Xcel Energy, the carbon intensity of the system will decrease. Conversely, if Denver buys and retires a REC from the Windsource program (in which procured RECs can be up to 5 years old), the carbon intensity of the system does not change. Focusing on Denver's contributions to the decarbonization of the entire electric system, rather than emphasizing REC purchases, could make resources available for the City to invest in additional renewable electricity capacity to the benefit of both the community and the utility. As was mentioned previously, the

[8] Xcel Energy, Community Energy Reports. https://www.xcelenergy.com/working_with_us/municipalities/community_energy_reports

[9] Google Project Sunroof. https://www.google.com/get/sunroof/data-explorer/

cumulative cost of REC purchases would be expected to reach over $571 million by 2030 and $932 million by 2050.

As Denver approaches its 2030 goals for decarbonization of its electricity supply, the community can be confident that more locally hosted renewable power will be directly counted into Colorado's electricity supply. RECs generated by resources acquired and relied upon as part of Xcel Energy's forthcoming Clean Energy Plan filing will need to be retired in the year they are generated.

Public comment through the Consider.It platform suggested subsidizing the installation of solar panels on a sliding income scale. This suggestion is in line with the Task Force recommendation to expand rebates and incentives beyond utility programs. However, it must also be evaluated in the context of the fiscal challenges confronting Denver's recovery from the COVID-19 public health and economic crisis. If Denver were to subsidize solar panels at a rate of $1 per watt (compared to an average residential rooftop system cost of $3/watt), it would require approximately $1 million for every 1 MW of solar deployments. In the near term, providing funding, rebates, or cash incentives to support distributed energy resources may be prohibitively resource intensive.

If a funding source becomes available for Denver's climate action efforts, highly targeted rebate and incentive programs may indeed be a valuable component of Denver's climate action portfolio. While facing resource constraints, the City should focus on lower-cost strategies, such as providing education and supporting existing community-based organizations, updating building codes, and advocating at the PUC for favorable regulation and utility-programs to enable the expansion of distributed energy resources.

The Task Force recommends the following tactics to enable the success of Solution 2. The highest impact tactics are shown by a red icon.

Phase 1: 2020-2022
Fund community solar (and rooftop solar) programs near-term.
Adopt the upcoming 2021 IECC building code, including its anticipated net zero emissions appendix.
Expand rebates and incentives beyond utility programs.
Increase funding for community-based energy organizations and nonprofits with energy efficiency and renewable energy programs with established programs.
Expedite and minimize costs for permitting and inspections.
Rebates for optional switching from natural gas to electric.
Ease Landscaping Zoning Requirements for community solar gardens.

Phase 2: 2023-2025
Adopt the latest model International Energy Conservation Code (IECC) with strengthening amendments to advance Denver towards Net Zero Carbon New Buildings.
Strengthen building codes for energy intensive loads to include grid controllable attributes to remove barriers to participation in utility demand side management programs.
Implement a Residential-PACE (Property Assessed Clean Energy) program in Colorado that protects residents from predatory behavior.
Phase 3: 2025-2030
Homes and commercial buildings include on-site renewables standard in building designs.
Assess and begin implementation where feasible of a micro-grid style solution, starting with the neighborhoods most impacted by climate change.
Supports
Additional resources needed to incentivize rooftop solar deployments and energy efficiency.
Building code requirements will be the primary driver to expanded distributed energy resources.
Legislative and regulatory support needed.

Solution 3. Lead with municipal infrastructure

Denver has an opportunity to invest locally in sustainable infrastructures. The Task Force supports the City's commitment to lead by example to achieve 100% renewable electricity for municipal buildings by 2025. City and County of Denver facilities, including Denver International Airport use 368 gigawatt hours (GWh) of electricity annually out of 6,852 GWh of electricity used community-wide (5.4%). The scale of annual electricity consumption and cost to the City creates a valuable opportunity for Denver to invest locally to reduce energy use and optimize its carbon-free energy supply.

Denver's carbon-free electricity procurement strategy should be additive. This means prioritizing Colorado sources of carbon-free electricity capacity above purchasing renewable electricity credits from existing resources or resources in other service territories. It is *insufficient* for the City and County of Denver to achieve its municipal or community-wide electricity decarbonization goals by simply buying renewable energy credits. Denver's actions must prioritize additive renewable electricity capacity and enable the physical operation of a 100% carbon-free electric grid. That means investing locally, advocating for additional utility-scale carbon-free electric resources to be brought online in Colorado, and working in collaboration with Xcel Energy to ensure that the new systems are affordable and reliable.

The Task Force supports the idea that Denver should pursue a net zero carbon standard for new buildings. Denver Executive Order No. 123 (XO123) issued in March 2013, requires that all new City buildings and major renovations are certified to the applicable LEED Gold Certification standards, with the goal of achieving LEED Platinum Certification where economically feasible. XO123 provides a valuable

foundation for municipal facilities to maximize the productivity of the built environment while mitigating its negative environmental impacts. The City can strengthen XO123 to achieve this objective.

The City owns over 150 buildings that can host distributed energy resources. The Task Force supports the first iteration of the City's Renewable Denver Initiative, which will host community-solar gardens on municipal property, supported by $1,000,000 from the Colorado Department of Local Affairs. Potential sites could include City rooftops, parking lots, and vacant land. The City should lease these sites to solar developers for free to host low-cost community solar gardens from which the power can be shared between the City's municipal facilities and low- and moderate-income households. By making the leases free, additional cost savings can be passed on to the subscribers to the solar garden through reduced energy bills. If successful in Phase 1, the City should expand this initiative in the subsequent phases.

The Task Force recommends the following tactics to enable the success of Solution 3. The highest impact strategies are shown by a red icon.

Phase 1: 2020-2022
Prioritize additive renewable capacity above purchasing renewable energy credits from existing resources or resources in other service territories.
Host community solar gardens at municipal properties through the Renewable Denver Initiative and provide a portion of excess power to help low-income residents by reducing the cost of their energy bills.
Require Municipal Facilities to Achieve Net Zero Carbon.
Phase 2: 2023-2025
New municipal facilities are built to a Net Zero Carbon standard.
Municipal facilities are powered with 100% renewable electricity.
Deploy battery storage at the municipally-hosted community solar gardens to enable community- microgrids with resilience capabilities.
Phase 3: 2025-2030
Where feasible, all municipal facilities are retrofitted to be electric, powered by renewable electricity, and support grid flexibility.
Analyze and begin implementation where feasible for connected technologies and smart grid solutions on municipal infrastructures.
Supports
Executive Order 123 strengthens municipal best practices for construction, retrofits, and distributed energy resources.
Capital and operating budgets support investments in municipal energy infrastructures.

	Partnerships with the utility, independent power producers, private industry, and other local stakeholders must be strengthened to support implementation.

Solution 4. Educate and engage the community

The City must establish strong community partnerships and to engage community members in their neighborhoods. The City must earn the trust of Denver's residents, local businesses, and community leaders. The City's programs and investments should create opportunities for Denverites to become advocates for, participants in, and beneficiaries of Denver's transition to a carbon-free economy.

The Task Force recommends that the City employ a persistent, compassionate, and informed communication effort. Denver's climate action investments can and must adopt a multi-solution mentality that is not solely focused on the electricity decarbonization goal but attaining multiple benefits by solving broader community problems. The City can target under-resourced communities for energy investments. Targeted investments can benefit people of color and under-resourced communities by providing a healthier environment and relief from the financial burden of proportionally higher utility bills.

Partnerships with trusted and established community organizations and institutions such as Denver Public Schools is essential to Denver's success.

The Task Force recommends the following tactics to enable the success of Solution 4. The highest impact tactics are shown in red.

Phase 1: 2020-2022	
	Listen to the problems and challenges faced by the community and ensure that the solutions to community problems help to decarbonize Denver.
	Work with Denver Public Schools (K-12) on energy education and curriculum. Energy education and curriculum are standard in Denver schools (not just math and science, but also in Civics, English, and other humanities classes).
	Conduct city wide solar assessment and develop targeted programs for businesses and homeowners to go solar.
Phase 2: 2023-2025	
	Community members are aware of Denver's renewable electricity target and have barriers removed to participation in renewable energy, energy efficiency, demand-side management, and electric vehicle programs.
Phase 3: 2025-2030	
	Members of the community have ample opportunity to benefit from and participate in the energy transition.
Supports	
	Two-way communication and collaboration with non-profits, faith-leaders, and other community organizations throughout Denver.

	Collaboration with Denver Public Schools and local universities to develop a curriculum and make available to all Denver residents free of charge.
	Ensure all members of the community have a voice and that people of color, Native Americans, and under-resourced communities are actively included.

Solution 5. Invest in energy workforce development programs

As the City invests in new energy infrastructures it should take steps to ensure that such investments empower members of the Denver community with access to workforce development and employment opportunities. The Task Force acknowledges that workforce development efforts may be most effective and economically viable by paying people to do the work necessary for Denver's energy transition.

Workforce development programs should be implemented with an equity lens. These programs should prioritize job skills, transition training, apprenticeships, and other opportunities that engage, recruit, and retain economically disadvantaged workers. Priority should be given to programs that both reduce greenhouse gases and promote economic, social, and environmental benefits.

The Task Force recommends that the City prioritize supporting existing energy workforce development programs before creating new job training programs. The Task Force foresees a valuable role for an Energy Jobs Director who would be accountable for coordinating with, supporting, and providing resources to encourage energy workforce development. This person would help to shape Denver's culture so that each hire perceives themselves as having a role in Denver's decarbonization. They could implement standard operating procedures in City purchasing to require equity considerations in the workforce of any contractors hired by the City. The Energy Jobs Director would also help to coordinate across schools, non-profits, and industry associations to facilitate the flow of prospective energy employees from vocational schools and job training programs to gainful employment in Denver's new energy economy.

The Task Force recommends the following tactics to enable the success of Solution 5. The highest impact tactics are shown by a red icon.

Phase 1: 2020-2022	
	Support and expand programs for energy infrastructure training and job placement.
	Partner with local universities on student exposure to energy employment pathways.
	Hire a City of Denver energy jobs director responsible for coordinating, supporting, and providing resources to established programs of other city agencies and nonprofits.
Phase 2: 2023-2025	
	Energy job training programs are readily available to people of color and under-represented groups and are aligned with employment opportunities upon program completion.
	Employment pipelines established between local universities and energy companies.

	Ensure that non-violent drug offenders are not excluded from job training opportunities.
Phase 3: 2025-2030	
	Denver is a regional hub for the new energy economy and partner to neighboring communities to replicate what works.
Supports	
	Empower and support existing workforce programs (GRID Alternatives, Solar Energy International, and others).
	Resources needed to hire a City of Denver energy jobs director. Resources acquired to support energy jobs programs, establishing Denver as a regional hub for the energy economy.

Evaluating Investment and Greenhouse Gas Impact

Combining the solutions and support into strategies with cost considerations is critical. The following chart shows the estimated cost of the strategies and their impact on greenhouse gas emissiosn. To ensure both equity and impact, the Task Force's recommended education and incentive strategies will need to be used in combination with high impact and low cost policies.

The Task Force recommends that the City take efforts to track progress and keep the public informed of that progress in a manner that is intuitive, transparent, and easily verified. The City has access to annual data reports from Xcel Energy that can be used to calculate the carbon content of Denver's electricity supply and community participation in carbon-free electricity programs each year.

The City must balance the goals of equity, community impact, and climate impact by continuously reevaluating its tactics and reprioritizing resources across the recommended strategies over the next decade. The evaluations should be based on need, impact, and equity considerations. Climate change is an all-encompassing issue that broadly affects public health, the economy, and the ability to live and thrive in the Denver community. The carbon-free electricity goals are one part of what must be a holistic approach to economy-wide decarbonization.

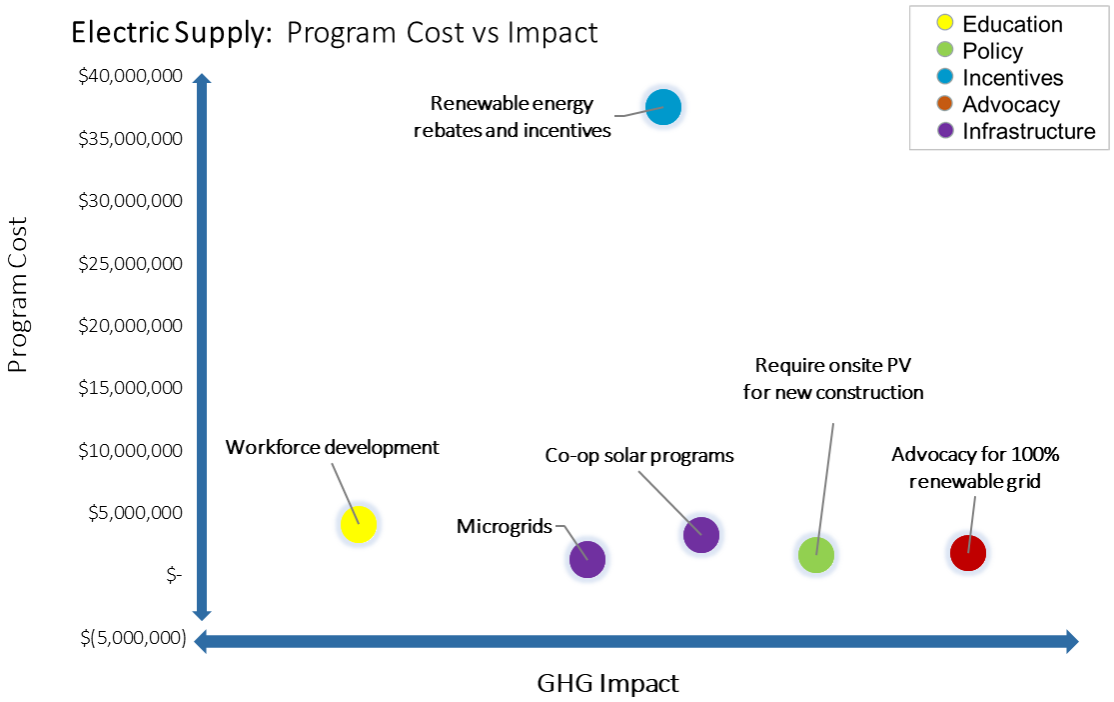


Figure 13. Program costs versus impact for electric supply. Note that advocacy is low cost and has the highest impact on increasing renewable energy on the electric grid. Significant investment is also needed to achieve substantial community goals.

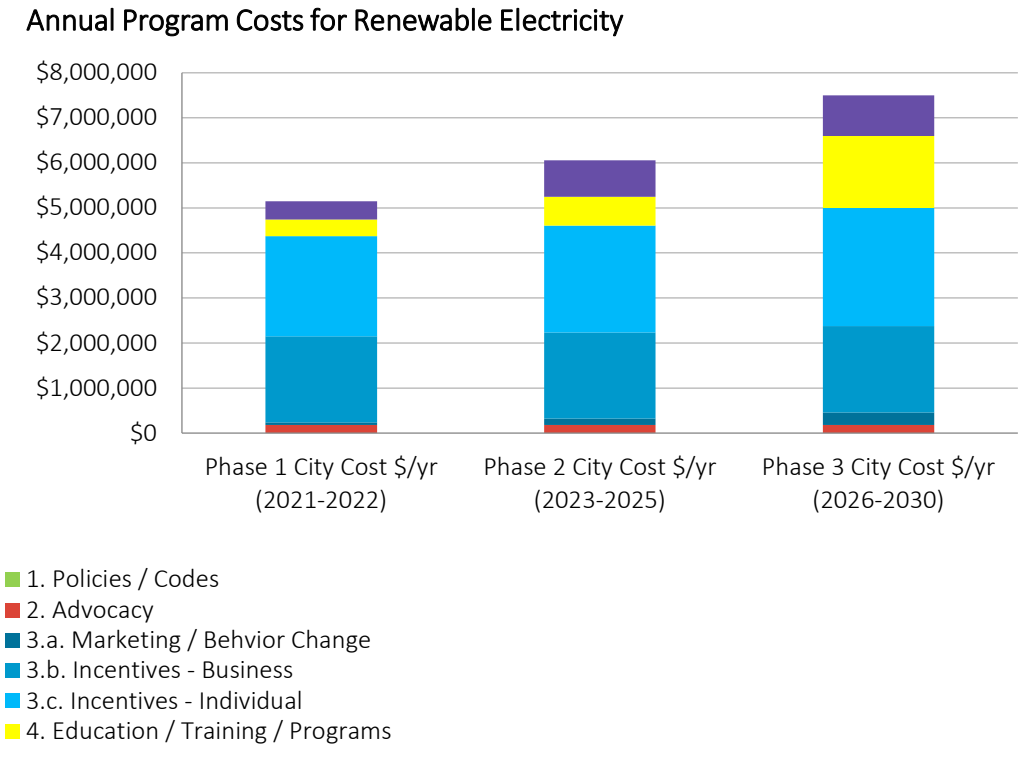


Figure 14. Annual program costs for renewable electricity

Cross-sectional Influences and Cost/Benefit Considerations for Electrification

Electrification policies should include robust technical and cost-benefit analyses to ensure the equitable decarbonization of Denver's buildings and transportation sectors. To be successful, full electrification will require a prudent investment strategy and a paradigm shift in utility regulatory structures and incentives. Electrification leads to overlapping cross-sectional considerations that are also discussed in the buildings and transportation sections.

The City is engaged at the Colorado Public Utilities Commission (PUC) and with Xcel Energy to better understand how building and transportation loads can be functionalized into grid assets. There is currently a disconnect between customer compensation for grid services versus utility compensation for capital investments. The PUC acknowledges this challenge in decision C19-0957 that, "Non-wires alternatives [which generally comprise energy efficiency, demand response, solar PV, storage and other DERs as solutions to remedy constraints on the distribution grid] may reduce the utility's opportunity to earn a rate of return and potentially may lead to lost revenue." Distributed energy resources lead to customer and third-party participation in the electricity supply and management system that is inherently at odds with the traditional investor owned utility cost-of-service compensation model.

The incorporation of distributed energy resources in providing grid services and adding system value is acknowledged by Xcel Energy in filings pertaining to its Community Resiliency Initiative, "energy storage system assets can be leveraged by the Company to provide grid services on an ongoing basis the majority of the time. These grid services include: (1) reducing system peak and localized feeder peak demand; (2) integrating renewables through distributed storage; and (3) reducing overall system costs by using the storage assets to arbitrage power prices. These overall electric grid services help keep electric rates low for our customers."[10]

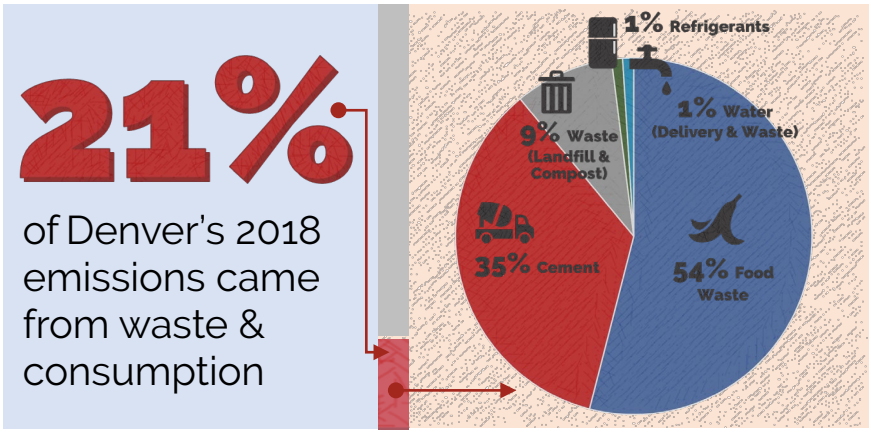
For buildings and transportation electrification to enable system-level benefits requires performance-based financial incentives for a utility to incorporate and manage customer-owned solar and other distributed energy resources. Additionally, customers should be appropriately compensated for owning and providing utility access to their distributed energy resources and demand flexible loads. The City should continue its participation in relevant PUC proceedings such as 19M-0670E related to distribution system planning and 19M-0661EG related to performance-based metrics to advocate for the alignment of utility incentives with the stated public benefit goals of § 40-3-117, C.R.S. Regulatory shifts may encourage innovation and enable a more integrated electric system with distributed energy resources, highly efficient all-electric buildings, and electric vehicles.

As with all the recommendations in this report, Denver leaders should acknowledge and address potential equity impacts to low-income communities including economic barriers to electrification in Colorado. Incentives and targeted programs may be necessary to support low-income communities as electric appliances and vehicles move down the cost curve to reach price parity with fossil-based alternatives. Legislative and regulatory actions will be particularly important to address the risks of burdening a subset of the Denver community or customer base with a disproportionate share of maintaining and paying for existing fossil-based infrastructures.

[10] Direct Testimony and Attachment of Charles A. Gouin page 12 lines 4-12. Proceeding 19A-0225E. (Attachment G)

Consumption Emissions and Waste Policy Recommendations & Supports

Figure 15. 2018 Consumption & Waste Breakdown



In 2018, consumption and waste were responsible for 21% of greenhouse gas (GHG) emissions in Denver. Consumption refers to greenhouse gas emissions associated with the use of goods and services by residents of the city. Note that this excludes emissions from visitor activities and those goods and services that are produced in the city and exported. It does include emissions from goods and services that are imported and ultimately used and consumed. The breakdown in Figure 15 is an estimate, as Denver has yet to conduct a consumption-based emissions inventory. Because of this, the current GHG Inventory conducted by Denver only captures a small percentage of the total GHG emissions associated with consumption. A study by C40, the leading global organization working with cities to advance climate action, estimates that consumption-based emissions from nearly 100 of the world's big cities already represent 10% of global greenhouse gas emissions. Without urgent action, those emissions will nearly double by 2050.

The Task Force adopted the following consumption and waste goals:

- By 2025, 50% of Denver's commercial and residential waste is diverted from the landfill.
- By 2025, all residents and businesses have convenient access to recycling and composting at their home and work.
- By 2030, make Denver Metro area into a regional hub for innovative businesses that support the manufacturing of materials made from locally recycled sources and find new ways to recycle materials.
- By 2030, a 40% construction and demolition waste reduction and diversion goal.
    1. Denver requires 100% of asphalt, concrete, excavated soil, and land-clearing debris to be diverted.
    2. Denver requires all new demolition projects to have at least a 65% material diversion rate (by weight) by "recycling, reuse, or salvage."
    3. Require city infrastructure projects to use "negative emissions" concrete by 2030. As the tech improves, costs will decrease, and a transition to this material could be reasonably made by this date.
    4. Maximize the percentage of construction materials that are a) recycled and b) made from recycled waste.
- By 2030, reduce Denver's food waste 50% or more.
- By 2040 or sooner, Denver achieves city-wide zero waste targets of 85% or more of waste diverted from the landfill.

Social, Economic, and Health Benefits

Reducing consumption and waste has the potential to provide people with fewer greenhouse gas emissions and healthier places to live and work. And, the investments to improve our systems and foster a circular economy can provide critical jobs as our economy recovers from COVID-19.

Climate work pertaining to consumption and waste must be done in a way that improves equity. Every solution outlined below must be implemented to address the following bullet points:

- Social equity: Does not adversely impact low-income households through increased fees and costs.
- Local economy: Provides employment opportunities in the waste and circular economy.
- Public Health: Reduces waste and harmful emissions associated with landfilling organic materials and carefully mitigates environmental pollutants sometimes associated with materials processing and manufacturing.
- Regional collaboration: Takes the larger regional wasteshed into account and looks for opportunities to work with our neighboring municipalities to share resources and infrastructure.

Solution 1: General waste diversion and reduction policies and incentives

Solutions for general waste reduction address means for reducing municipal waste generation in the form of trash, recycling, and compost. The Task Force recommends the following strategies to enable the success of Solution 1. The highest impact tactics are shown in red.

Phase 1: 2020-2022
Execute a Denver Waste Audit that includes but is not limited to all municipal waste operations, “urban mining” and construction and demolition analysis, and Denver's potential to be a circular economy.
Develop and Adopt a Zero Waste Plan and Ordinance in coordination with the Solid Waste Master Plan and the preliminary findings of the Denver Waste Audit, incorporating tailored programs for different sectors, such as multifamily, businesses, circular economy study, and construction and demolition analysis.
Approve and implement volume-based pricing, aka Pay as You Throw (PAYT) policy, where compost and recycling are the standard waste service and trash is charged by the size of the trash cart chosen by the customer. This would include subsidies or exemptions for low income households. Implementation may be incremental to allow for recovery from the economic downturn. In addition, enforcement would be needed to tag carts that are contaminated (i.e., non-compostable materials in a compost cart and non-recyclable materials in the recycling one) for one-to-one education and ultimately fines or penalties.
Institute a fee in restaurants for use of single use plastics and food-grade Styrofoam, similar to disposable bag fee.
Require that all food service businesses offer reusable dinnerware for customers dining onsite, and only give disposable items upon customer request. Exclude food trucks from the requirement and instead require them to provide compostable ware.
Collaborate with DPS schools and higher education campuses to recycle and compost, beginning with elementary and middle schools and partnering with the Youth Sustainability Board, DPS Sustainability Department, and other Zero Waste School programs such as Eco-Cycle’s Green Star Schools and Green Up Our Schools.

	Ensure that a high proportion of recycling and composting employees come from highly impacted communities.
Phase 2: 2023-2025	
	Ban single use plastics and food-grade Styrofoam.
	Require all multifamily buildings to recycle and compost.
	Require all businesses to recycle and compost.
	Provide incentives or rebates for qualifying small businesses to offset additional costs of composting.
	Expand Denver's ability to handle higher volume of recycling and compost waste through assessing current capacity for materials processing and coordinating infrastructure improvements to increase capacity accordingly.
	Assess current capacity for materials processing, such as recycling, construction and demolition, organics, hazardous waste, and hard-to-recycle (HTR) materials, like appliances, furniture, textiles, and scrap metal.
	Coordinate infrastructure improvements to increase capacity for recycling, construction and demolition, organics, hazardous waste, and hard-to-recycle (HTR) materials.
	Install recycling next to all City trash cans, along with educational information on how/what to recycle, including at parks, RTD stations, and gas stations.
	Provide waste receptacles in camps for people experiencing homelessness.
Phase 3: 2026-2030	
	Sponsor a region-wide waste and recycling program that incentivizes waste reduction through the cost structure, working in conjunction with the state, Denver Regional Council of Governments, Recycle CO, Front Range Waste Diversion board, and other municipalities along the Front Range. More info here.
	Develop a hazardous waste facility.

Solution 2: Food waste reduction policies and incentives

Phase 1: 2020-2022	
	Remove liability and legal barriers to allow restaurants and grocery stores to donate unused food items. Educate on donating unused food items.
	Require an executive order for City operations and offices to adopt food waste reduction measures, including DIA.

	Collaborate with school districts, schools, and higher education campuses to track and disclose pounds of food wasted and set annual reduction goals and measures. Foster widespread student awareness around these goals and measures, place educational emphasis on local food sourcing with support from school gardens.
	Support policy initiatives of the Denver Good Food Purchasing Coalition to require large Denver institutions to implement the Good Food Purchasing Program.
	Food Waste Reduction Pilot expansion and support.
	Create a permanent position beyond 2021 for the Food Waste Recovery Program Administrator position.
	Expand and support Denver Emergency Food Access Partners.
Phase 2: 2023-2025	
	Provide tax credits for donations of food from grocery stores, restaurants, hotels, and other institutions that serve and sell food.
	Partner with Certifiably Green Denver to recommend adding a criteria for restaurant and caterer certification to be part of the Zero Food Print and regenerative farming 1% opt-out program. This charges customers an optional 1% of the bill to support these practices.
	Require measurement of food waste at City events (and other events).
	Require big food institutions, including grocery stores and hospitals, to track and disclose pounds of food wasted and set annual reduction goals and measures. Require large institutions to disclose food waste, food waste goals, and annual tracking by using a tool such as the EPA's Food Recovery Challenge web app or a similar food waste tracking tool.
Phase 3: 2026-2030	
	Food waste ban at the landfill to decrease emissions.

Solution 3: Construction and demolition waste reduction policies and incentives

Phase 1: 2020-2022	
	Conduct an “urban mining” study and develop an implementation plan to carry out recommendations as part of the Denver Waste Audit.
Phase 2: 2023-2025	
	Require minimum waste diversion rate for construction and demolition as part of building code for products that have viable end markets, focusing on diverting low-hanging fruit, such as cardboard, clean wood, and metal.
	Require demolition permit applicants to obtain a deconstruction assessment and/or cost estimate. Increase demolition permit fee while incentivizing deconstruction with

	reduced or waived fee. Include a deconstruction deposit, and if deconstruction has been met, the deposit is paid back.
	Require City infrastructure projects to meet reduced carbon emissions standards for construction materials for reusing, recycling, or composting construction waste when economically viable.
	Develop a construction and demolition recycling facility that accepts materials from the public and developers.
	Ensure Denver's concrete and asphalt recycling infrastructure has sufficient capacity to meet new policy requirements for waste diversion.
	All new City-built infrastructure is required to use post-consumer recycled material and provide subsidies for private companies to use it.
Phase 3: 2026-2030	
	Integrate as much as feasible material reuse requirements into building codes such as corrugated cardboard, concrete, metals, mercury devices, wood, aggregates, and demolition products, including reusable cabinets, doors, windows, flooring, fixtures, carpet, carpet pad, ceiling tiles, porcelain and roofing shingles, and the reuse or recycling of clean lumber and wood sheathing, and other reusable building materials
	Require buildings to be designed for flexibility and deconstruction.

Solution 4: Consumption emissions management policies and incentives

Phase 1: 2020-2022	
	Conduct a Consumption-Based Emissions Inventory (CBEI) for Denver.
	Develop a framework for carbon reporting for certain products.
	Perform deep dive into the City's own supply chain / procurement and create sustainable purchasing policy for the City.
Phase 2: 2023-2025	
	Require embodied carbon material reporting for construction materials used for City infrastructure projects.
	Require embodied carbon reporting for other high-emitting products, TBD.
	Convert 75% of City waste trucks to electric or compressed natural gas vehicles.
	Collaborate with Metro Wastewater Reclamation to capture and divert wastewater methane to a pipeline.

	Yard waste ban at the landfill to decrease emissions.
Phase 3: 2026-2030	
	Require embodied carbon material standards for construction materials used for commercial and residential construction.
	Tax products based on the embodied carbon of the product.

Solution 5: Circular economy policies and incentives

Phase 1: 2020-2022	
	Conduct a circular economy study as part of the Denver Waste Audit.
	Create a sustainable purchasing policy for the City and County of Denver which examines both supply chain and procurement for the City and considers how to focus on purchasing from local businesses to help boost the local economy.
	Support Extended Producer Responsibility (EPR) policy at the state level.[11]
	Coordinate regionally to establish programs and policies that support a circular economy for waste products, such as funding for local and regional end markets that use waste materials to create new products or research that creates new processes to recycle waste materials.
	Require Denver's Eco-Grow compost on new city projects, construction, and landscape in partnership with Denver Parks and Rec, DOTI.
	Create a job training program for "hard to employ" population to learn product repair in partnership with existing technical training programs and nonprofits.
Phase 2: 2023-2025	
	Tax credits or financial incentives for businesses with Extended Producer Responsibility or product take-back programs.
	Incentives to develop city-wide infrastructure for material and product reuse.
	In partnership with DEDO, develop incentives for companies to take part in closed loop opportunities created once End Market bills pass.
	Open "stuff sharing" centers for tools and other items at all public libraries.

[11] Extended producer responsibility (EPR) laws, which require the manufacturer of a product to be responsible for its ultimate recycling, reuse or disposal, has become a significant waste management option in recent years in the effort to increase recycling and landfill diversion rates.

Phase 3: 2026-2030
Create product take back / Extended Producer Responsibility requirements.
Incentives for manufacturers to use recycled materials.
Incentive for businesses to use cradle-to-cradle process for manufactured products.
Require “cradle-to-cradle” certified products for City development projects.

Supports for Consumption Emissions and Waste

A strong outreach and education campaign is needed for the Waste and Consumption recommendations. Community Based Social Marketing (CBSM) programs are key for “social norming.” This “social norming” should lean on achieving broad youth awareness, as “norming,” starting with youth, has the potential to be highly effective and pervasive. Waste is a sustainability measure everyone can do, with proper education and infrastructure in place, the City can reach high diversion rates with low contamination rates.

The state has great examples of education programs that can provide guidance in designing a zero waste campaign. Two of these are Boulder’s Universal Zero Waste Ordinance outreach and education for Businesses and Apartments and Boulder County’s “Food Waste Ends with You” campaign.

Outreach and education around sustainable waste alternatives in the City’s current infrastructure is needed; many don’t know Denver has local mattress, electronics, paint, hard-to-recycle, and even construction and demolition recycling facilities. Partnering with these organizations is key to waste diversion and will continue to grow Denver’s circular economy.

Additional support may be needed for waste diversion in construction and demolition, such as subsidies for companies recycling harder-to-divert building waste and subsidies for companies recycling low-weight, low-volume materials, such as light bulbs.

Evaluating Investment and Greenhouse Gas Impact for Consumption and Waste

Figure 16 depicts the cost versus impact of consumption and waste strategies. Circular economy infrastructure for waste is the highest impacts and one of the lowest cost investments. Additionally, policies have a strong impact and low cost. It should be noted that while the PAYT program has expensive startup costs, it pays for itself quickly. This is represented in Figure 16 which shows the average annual cost by phase for each solution type. Phase 3 costs are significantly reduced.

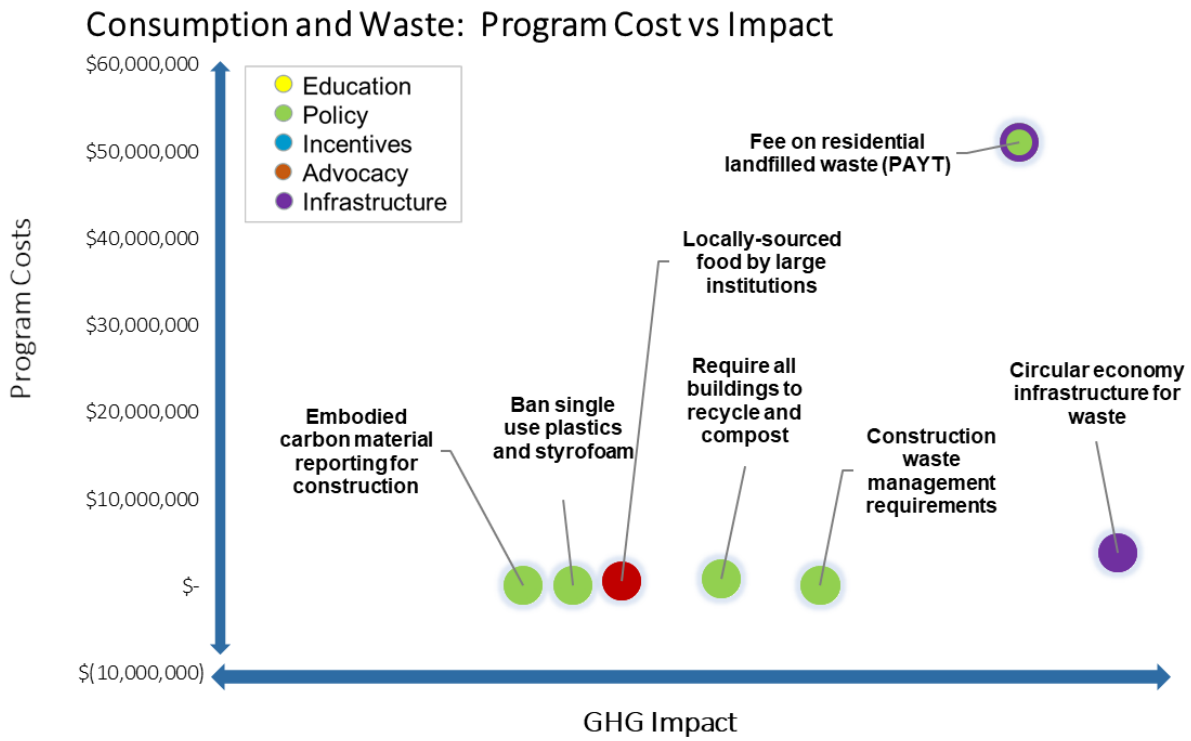


Figure 16. Program cost vs impact for consumption and waste strategies

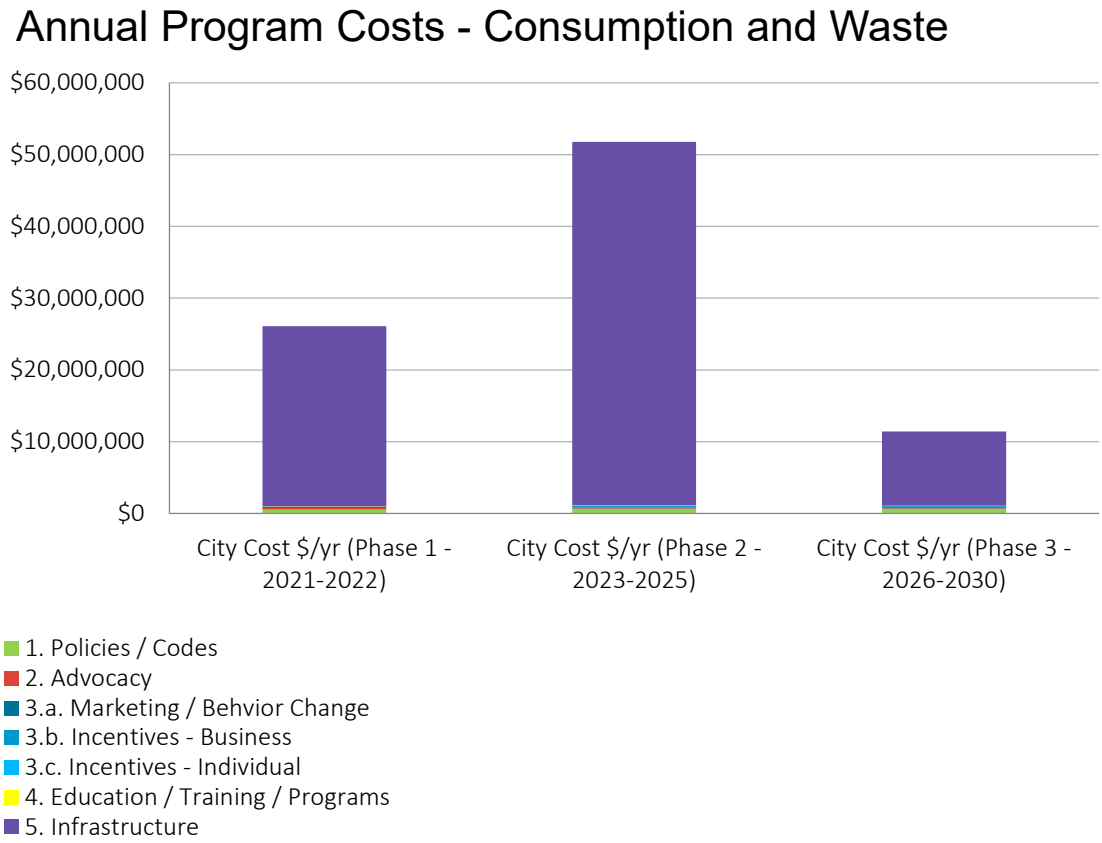


Figure 17. Annual costs by phase for consumption and waste strategies.

Adaptation and Resiliency

While we know that mitigation efforts at whatever level will reduce the impacts of climate change in the future, there is still the need to adapt to and be resilient in the face of a range of climate related impacts. Some key threats identified by the Climate Action Task Force are included in Table 3.

Adaptation: Adjustments in ecological, social, or economic systems in response to current and expected climate change effects.

Example: reducing water consumption in line with predicted availability.

Resilience: The ability to quickly recover from hardship or disruption, whether chronic or acute.

We also know that investing in solutions now to adapt and become more resilient in the face of climate change will have clear benefits, financial and otherwise, in addition to avoiding some of the worst risks outlined above. According to the Global Commission on Adaptation, "governments that make an investment on climate resiliency strategies, policies and technologies can experience high rates of return on effective measures with benefit costs ratios that can range from 2:1-10:1 or even higher depending on the adaptive measure."[12] For instance, investing in green infrastructure can be a less expensive and cost-effective option to managing runoff, as well as increasing energy efficiency and reducing energy costs. Expanding tree canopy could not only help reduce the urban heat island effect, but also manage runoff and increase water and energy efficiency in nearby buildings. With these benefits in mind, the Task Force recommends the following goals.

Adaptation and Resiliency Goals

Buildings and Infrastructure

a. By 2025, building codes are more stringent in addressing key vulnerabilities (indoor air quality, heat).
b. By 2030 all buildings meet indoor air quality standards and have sufficient cooling, including schools.
c. By 2030, the infrastructure (i.e., improved structure of people's homes, heating and cooling of community centers) is in place and used to protect vulnerable populations against high heat events, poor air quality related to wildfires, weather events, and other emergencies.
d. By 2025, develop and codify standards for water and green infrastructure to be adaptable to highest resiliency standards, e.g., flooding, storm water).
e. By 2030, transportation system is fully multimodal, physically accessible, affordable, adaptable to changing climate and emergencies.

[12] Global Center on Adaptation. Available here. (Accessed: 19th May 2020)

Table 3. Climate Crisis Threats to Denver	
	Air quality: Denver residents already live with elevated pollution levels every day, and air quality is likely to degrade further from heat related ground-level ozone formation, increased allergens, and more frequent wildfires.
	Mental health: Exposure to climate related disasters, changes, and uncertainty can lead to increased anxiety, depression, and post-traumatic stress disorder.
	Emergency services: Emergency response can be overwhelmed or stressed by large scale or repeated disasters as well as the onset and exacerbation of a host of diseases ranging from asthma to kidney disease.
	Epidemics and vector borne diseases: Changing temperatures and land use patterns are expected to increase our risk of vector borne diseases and epidemics.
	Power outages due to severe weather: Severe weather in Denver, including hail, strong winds, and heavy snow can also lead to power outages.
	Hail damage: Hailstorms are predicted to be less frequent but more severe, causing significant damage.
	Heat waves: Heat wave days in Colorado are expected to jump from 10 per year to nearly 50 per year by 2050. Heat related mortality is likely to double by 2050, with low-income households and those vulnerable to heat, such as older adults, most at risk. In addition, heat waves reduce worker productivity, impacting Denver's economy.
	Flooding: Changing climate patterns and poorly planned development that limits permeable land (already at less than 50% of the surface area in Denver) increase the risk of flooding.
	Drought & Water Use: Colorado is one of the states most threatened by severe drought in the coming decades. Drought could impact water supplies both for use in Denver and also could impact food security for food grown in Colorado and for Denver's supply chain. In addition, increased heat means that plants need more water to survive. This drives up water use in Denver's outdoor spaces as well as for agriculture across the state.
	Wildfire: Climate change is also expected to increase the area burned and length of the fire season. Post-fire erosion can cause major problems for water supply and storage infrastructure. In addition, Denver can be impacted by poor air quality from fires.
	Climate impacted economy: Climate related disasters often disrupt the local economy, with direct damages to property, and loss of jobs and revenue. Tourism will also be impacted.
	Greater inequities: Further exploration indicates that people of color, Native Americans, under-resourced communities, low-income households, children, older adults, those with disabilities, outdoor workers, the unhoused, and other frontline communities will be hardest hit. Many of Denver's poorest neighborhoods have high ratios of impervious surfaces, lack shade, are in the 100-/500-year flood plain, have worse air quality, and have a high vulnerability to extreme heat. At the same time, there is great opportunity to improve the lives of those most impacted by the climate crisis. Because these communities are already exposed to increased risk, addressing these risks by ensuring the communities are more resilient and adapt to climate change can and should be transformative.

Emergency Preparedness and Response

- By 2023, Denver's emergency response plan is updated to address issues of equity and emerging climate change related disasters that could impact the city.
- By 2030, the public health infrastructure has the capacity to address key impacts that are exacerbated by climate change. (Note, key impact areas may include air quality, mental health, emergency services, epidemics, vector borne diseases, power outages due to severe weather, hail damage, heat, and flooding.)
- By 2030, communities most vulnerable to the key impacts exacerbated by climate change are protected and resilient.

To address these goals, we recommend the following five solution sets. Especially high impact strategies are indicated with a red icon.

Solution 1. Resiliency and adaptation planning and risk evaluation

Phase 1 (by 2022)
Develop and adopt a Resilience and Adaptation Plan in which equity and affordability are key goals, and which employs a broad interpretation of resilience and addresses key areas, including the economy and public health in addition to natural hazards. Identify co-benefits of improving resilience and adaptation throughout the City.
Conduct a comprehensive risk evaluation that includes public health, food security, water, fuel, infrastructure (including roads, bridges, power lines, airport, real estate, critical facilities, etc.), critical supply chains, and the economy. Specifically address lessons learned from COVID-19, including risks to essential workers, vulnerable communities including the un-housed, and inequities in exposure.
Engage the entire Denver community in the planning and risk evaluation process and ensure procedural equity.
Identify needed modifications to existing City plans and procedures to build resilience, adapt to climate change, and improve equity.
Phase 2 (by 2025)
Invest in infrastructure and community programs to mitigate key risks identified in Phase 1, beginning with risks that will most impact vulnerable communities.
Build local capacity and pursue a circular economy to reduce supply chain risks.
Phase 3 (by 2030)
Update and continue to implement a cutting-edge Resiliency and Adaptation Plan that prioritizes equity and affordability.

Solution 2. Adaptation and resiliency policies: indoor, built infrastructure

Phase 1 (by 2022)
Update building codes for new buildings to require green infrastructure and resilient design, including harnessing low-energy cooling techniques, battery storage, storm resistance, energy and water efficient design, and water reuse.
Protect vulnerable populations by inventorying and expanding existing community centers to provide heating, cooling, and air quality relief. Confirm that all centers are accessible via public transit and walkable from most neighborhoods, utilizing existing community resources (such as local schools) where possible.
Phase 2 (by 2025)
Establish incentives for existing buildings to increase resilience based on building codes for new developments.
Phase 3 (by 2030)
Review building codes for new and existing buildings and add additional requirements for resilience and adaptation where possible, utilizing the point of sale to require investments for existing buildings.

Solution 3. Adaptation and resilience policies: outdoor

Phase 1 (by 2022)
Revise building and zoning codes to require green infrastructure in outdoor areas for new development, including limiting impervious surfaces, increasing drought tolerant tree canopy, promoting use of native and adaptive plants that provide pollinator habitat, etc.
Develop incentives for green infrastructure at existing developments that match requirements at new development.
Prioritize biodiversity and pollinator habitat wherever possible within City managed landscape.
Phase 2 (by 2025)
Identify existing impervious surfaces owned or managed by City that can be converted to pervious/green spaces and begin plan for conversion.
Work to systematically expand tree canopy in under-resourced neighborhoods.
Develop sustainable funding program to cover maintenance of green infrastructure on public spaces throughout City, as well as offer assistance in under-resourced neighborhoods.
Phase 3 (by 2030)
Modify policies to ensure parks and other outdoor spaces offer air quality, cooling, and recreation benefits for all equitably.

Solution 4. Equitable recovery from climate related disruptions

Phase 1 (by 2022)
Develop an economic resilience fund that will help vulnerable populations and small businesses recover from climate-related disasters. The resilience fund would be intended to supplement available funding from private insurance and other state and national funds, with particular focus on low income households and people of color, as well as small businesses owned by women and people of color. Funds should be available following an emergency declaration by the Denver Mayor for any climate-related disaster, including drought, extreme heat, hail, flooding, tornado, or pandemic. Eligible expenses should include infrastructure costs, small business payroll, temporary housing and shelter, and other transition costs to ensure that small businesses stay solvent through economic hardships related to climate disasters and to ensure that vulnerable populations in the City of Denver are able to recover while adapting to the changing climate.
Provide a staffed, integrated resource access point for small businesses and Denver residents on "recovery" resources. Conduct extensive and continued outreach to make sure communities are aware of the program and ensure timely access to services by limiting barriers for low income households, people of color, and service workers, regardless of legal status.
Phase 2 (by 2025)
Establish stable and long-term source of funding for economic resilience.
Phase 3 (by 2030)
Review funds expended to date from economic resilience fund and revise plan as needed to ensure it has intended effect.

Solution 5: Community development for resilience

Phase 1 (by 2022)
Develop and Implement a Community Resilience Engagement and Education Plan. The plan should prioritize equity and include not only communication on what the City is doing to build resilience but also establish and strengthen communication networks to be used during crises.
Develop a Food Sustainability, Security and Justice Plan that incorporates the lessons learned from COVID-19, utilizes local farms, neighborhood restaurants, Denver Public Schools venues and local food pantries to ensure localized approach to food supply. Address how to protect essential workers in the food supply chain and provide essential support, such as childcare, health care, transportation, and fair wages.
Investigate increasing Denver's Flood Community Rating System Score by taking steps outlined by the National Flood Insurance Program to improve community flood resilience.

Phase 2 (by 2025)
Engage with neighborhood associations and existing City programs, including those working with homeless populations, to embed resiliencies into community work. This would be through gaining local disaster response knowledge and community connections.
Enact a Good Food Purchasing Policy that ensures fair consideration for local procurement, work wages, and equity. *[connection: see consumption and waste]*
Phase 3 (by 2030)
Work with the Denver Economic Development and Opportunity office to prioritize financial and other support to small local businesses to build more local food supply.

Adaptation and Resiliency Investment

Adaptation and resiliency will help Denver prepare for and respond to crisis events in the future, saving billions of dollars in the future. Figure 19 depicts the annual costs by phase and solution type.

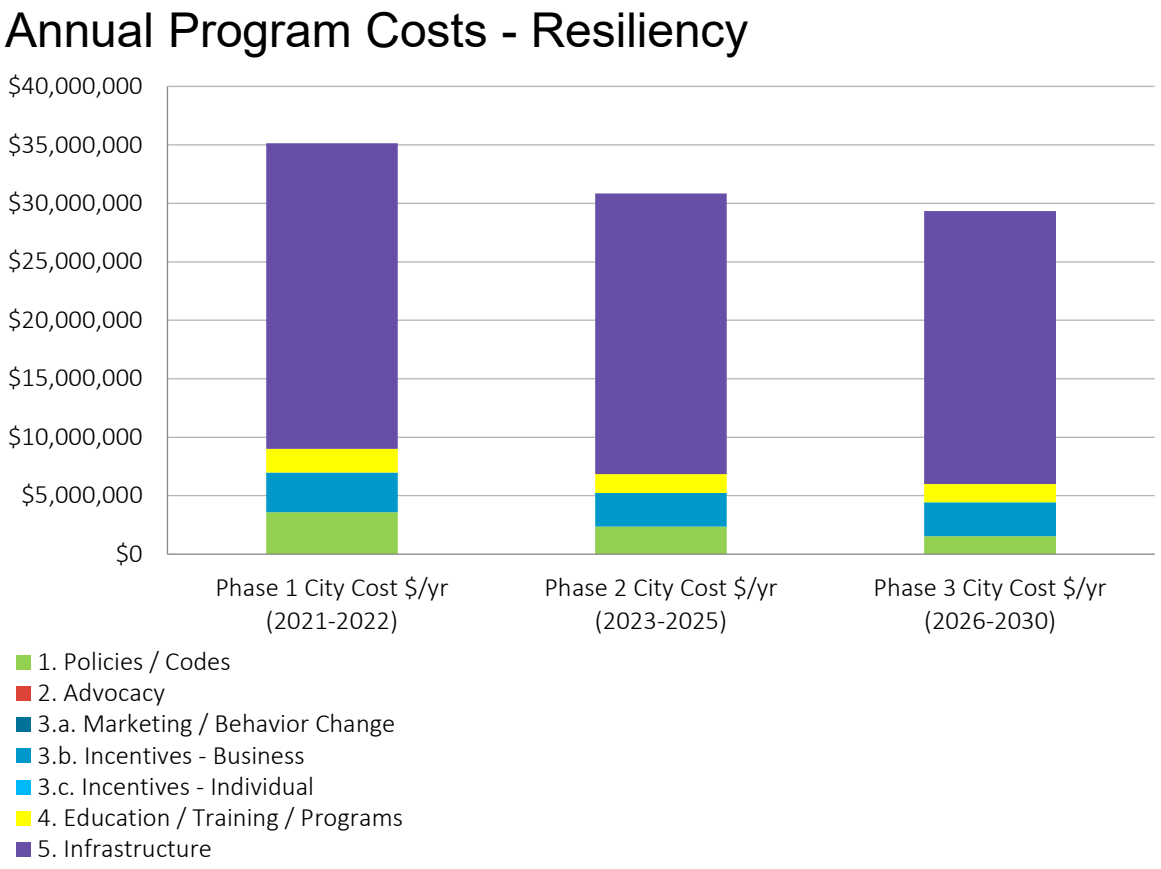


Figure 18. Annual program costs by phase for adaptation and resiliency strategies.

Revenue and Investments

Investments and Recommended Funding Options

Revenue Generation Evaluation Principles

In developing revenue options, the Task Force recommends that four key principles be considered when choosing revenue options (Figure 19):

1. Relative Revenue: We support identifying a funding package that brings in sufficient revenue to address climate change and meet the goals. This means removing options that may be good in isolation but that would make it difficult to move forward higher yielding revenue options.
2. Supports Behavior Change or Higher Polluters Pay More: We support revenue generation that can impact behavior. Rewarding, or at least not punishing, good behavior is a key value. In addition, disincentivizing behaviors that contribute to climate change is also important, even if it doesn't generate significant revenue. We also have a principle that higher polluters should pay more. That means that those entities or individuals that are the most-polluting have to pay a higher price per unit of GHG emissions than those that are less-polluting.
3. Equitable: Throughout this report we have stressed the need for solutions that are equitable and help correct, rather than exacerbate disproportionate impacts to people of color, Native Americans, and under-resourced communities. The same is the case for revenue generation.
4. Healthy Economy: We envision a new economy that is grounded in sustainability that allows for all people in Denver to thrive. As part of this, we cannot unduly burden businesses and reduce Denver's regional competitiveness.

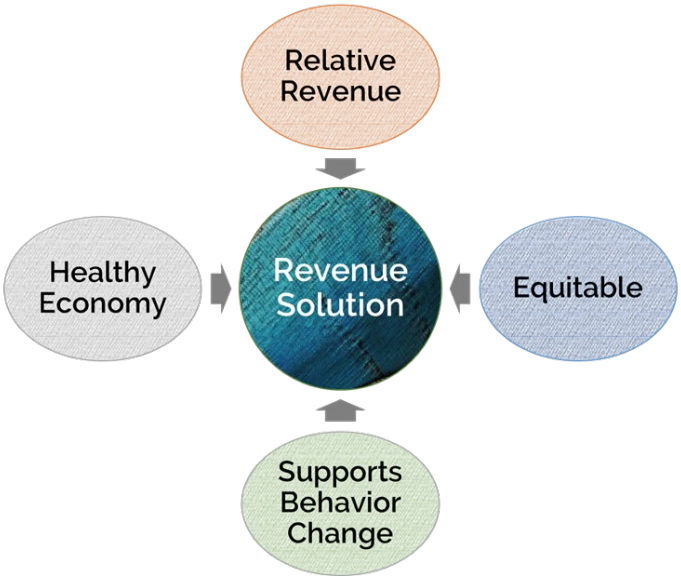


Figure 19. Revenue principles framework.

Within these broad principles, the Task Force identified a total of fifteen criteria, which are listed in Appendix 5.

Identified Viable Revenue Options

The current economic circumstances related to COVID-19 are grim at the time of writing this report. To that end, the Task Force explored many options generated through discussion and the public engagement process. We have identified how these funding options could be instituted to balance the four key evaluation principles identified above as much as possible. Not one of these revenue sources alone will fully meet the revenue needs, so we've developed a package of revenue sources for Phase 1 that we recommend moving forward with and several additional options for Phases 2 and 3 that we believe warrant further study. We recognize that some of these options require a vote by the people of Denver, which creates additional uncertainty, especially during this current economic crisis.

Note that all revenue projections are based on the economy prior to the current economic crisis.

Investment Estimate Overview

The levels of investment presented in this document are reconnaissance level estimates intended to determine the scale of funding needed to accomplish the solutions recommended by the Task Force. Investment estimates were determined for each individual strategy using a variety of resources, including historical data from previous or existing Denver programs, findings from previous or current studies performed for Denver, data on similar programs or studies in other cities, estimates of the staff time needed to implement strategies, and estimates of incentives. An annual investment range was first determined, then a dollar amount was applied to each phase based on the proposed phasing. The investment levels were then rolled into different cost categories.

The highest investment estimates by category are incentives and infrastructure. The largest investment for infrastructure is for transportation capital modifications with costs based on the Denver Moves planning effort. Significant infrastructure costs were also included to improve the waste system and add green infrastructure to the City. Infrastructure investments have many benefits beyond achieving climate goals and are likely to be funded outside the revenue package proposed by the Task Force. For this reason, we have provided revenue estimates with and without infrastructure.

All in all, it will cost the City of Denver an estimated $3.4 billion over the next decade to implement the recommendations and build the necessary infrastructure. Without infrastructure investments, the total cost across all phases is estimated to be $1.3 billion. This is compared to the cost savings estimated at a minimum to be over $20 billion *[see cost of inaction, return on investment]*.

Phase 1 Revenue Package

Phase 1 of the work identified by the Climate Action Task Force requires a significant investment. All-in, at $198 million annually, this is more than can be currently invested. Infrastructure investments, primarily in transportation, are $121 million. While these are critical, we've focused our funding package (see Table 2) on policies and policy implementation, at least for Phase 1. We recommend that the City primarily fund infrastructure in the near future using funding mechanisms such as public-private partnerships, bond measures, green or public banking, or stimulus funds. That brings the minimum total needed to be raised to approximately $76 million (see Table 3). We recognize that this is a significant number, especially during an economic downturn. However, we believe investments now are critical to not only address the climate crisis, but also support economic recovery. We've designed the solutions to support recovery efforts, including job creation and support for people most impacted by the health, economic, and racial justice crises we find ourselves in. This includes investing in building retrofits that will reduce monthly costs to low-income households. This will help make these funding solutions more equitable. Every dollar we spend now in prevention and preparedness will save many dollars in the future.

Table 4. Phase 1 Cost Breakdown

Cost Category	Phase 1 City $/yr (2021-2022)	Revenue Needs w/o Infrastructure $/yr
1. Policies and Zoning Code Changes	$7,643,000	$7,643,000
2. Influence and Advocacy	$1,053,000	$1,053,000
3.a. Marketing and Behavior Change	$5,616,000	$5,616,000
3.b. Incentives for Business	$23,631,000	$23,631,000
3.b. Incentives for Individuals	$33,035,000	$33,035,000
3.c. Training and Educational Programs	$5,580,000	$5,580,000
4. Infrastructure	$121,492,000	---
TOTAL	**$198,050,000**	**$76,558,000**

Table 5. Phase 1 Revenue Package with Initial pre-COVID-19 revenue estimates

Revenue Source	Pre COVID-19 Revenue $/yr (Phase 1 - 2021-2022)	Potential short-term reduction due to COVID-19
1. Sales Tax at 0.25%	$45 m	≅ $36 m
2. Vehicle Efficiency Fee	≅ $15 m	≅ $15 m
3. Parking Meter Increase	$16 m	≅ $13 m
4. Parking Permit Fee	$0.6 m	$0.6 m
5. Commercial Parking Lot and Garage Fee	≅ $10 m	≅ $8 m
6. Meter buy-out fee increase	$0.7 m	$0.6 m
TOTAL	**≅ $87.3 m**	**≅ $73.2 m**

Ballot Initiative: Sales and use tax

Description: A sales and use tax is a consumption tax imposed by the government on the sale of goods and services. A conventional sales tax is levied at the point of sale, collected by the retailer, and passed on to the government. In Denver specifically, there are three separate tax bases to which a sales and use tax rate increase could be applied. They are General, Food and Beverage, and Short-Term Car Rental. In 2018, General taxable sales were $13,919,209,340 and Total (General + Food + Short-Term Car Rental) taxable sales were $17,991,841,735. Sales tax exemptions listed in Section 53-26 of the Denver Revised Municipal Code include sales to governments and charities, all sales made to, billed directly to, and paid for directly by, qualified hospital organizations, purchases of medical supplies, food and water, fuel, and feminine hygiene products.[13] While sales taxes are generally considered regressive, these exemptions in Denver help ease the burden on low-income people.

Draft Recommendation: *The Climate Action Task Force recommends that Council initiates a general sales tax referendum to appear on the November 2020 ballot at a rate of 0.25%.*

[13] "Sec. 53-26. - Exemptions.; Chapter 53, Article II – Sales Tax." Denver Revised Municipal Code. library.municode.com/co/denver/codes/code_of_ordinances?nodeId=TITIIREMUCO_CH53TAMIRE_ARTIISATA_DIV1GE_S53-26EX

The Task Force strongly believes that the City Council must put in place appropriate guardrails to ensure that a new sales tax does not overly burden those in Denver most impacted by social injustices, including what products are exempt from sales tax and specificity about how the money will be spent in a way that will most benefit people of color and under-resourced communities.

Examples: Denver 2018 Parks 2A ballot measure and Denver Initiated Ordinance 301 "Caring for Denver"

- In 2018, Denver City Council advanced a ballot measure to increase the sales and use tax rate by 0.25% with revenue dedicated to parks, open space, trails, waterways, and related acquisitions and capital improvements. It was estimated to generate $45.94 million annually, with a cost to the average household of approximately $28 each year. It passed with 61.9% of the vote and was implemented in 2019. https://ballotpedia.org/Denver,_Colorado,_Measure_2A,_Parks_and_Open_Space_Sales_Tax_(November_2018)
- In 2018, Denver Initiated Ordinance 301 "Caring for Denver" was advanced to the ballot by Denver voters. It proposed a 0.25% increase in the sales and use tax to fund mental health services, suicide prevention, substance abuse services, and recovery facilities and programs. It was estimated to generate $45 million annually. It passed with 69.5% of the vote and was implemented in 2019. https://ballotpedia.org/Denver,_Colorado,_Initiated_Ordinance_301,_Mental_Health,_Substance_Abuse,_and_Homelessness_Services_Sales_Tax_(November_2018)

Revenue potential: The revenue potential depends on the percentage increase in the Sales and Use Tax and the tax base to which it is applied. Using 2018 sales tax figures, starting with a 0.25 percent increase applied to the total tax base, revenue could be in the $44.9 million range.

Considerations: Sales tax is very volatile depending on economic conditions and is being severely impacted by COVID-19. A sales tax is very easy to administer as the systems to bill and collect the tax already exist.

Fee Sources

Vehicle Efficiency Fee at Time of Registration

Description: This is a fee that would be charged by the County at the time of vehicle registration and annually thereafter typically determined by mile per gallon (MPG) of the vehicle, such that more efficient vehicles pay a lower fee. The rate for hybrids would be lower than the gasoline or diesel vehicle fee and zero emission vehicles would be charged an even lower rate or no rate at all. Fees would be determined through a fee study.

Recommendation: *The Task Force recommends a vehicle efficiency fee to be implemented in Phase 1 to address emissions from transportation. It should be structured in such a way that it does not cause undue burden to low income individuals or households either in cost or administratively. It should also be structured to incentivize purchasing highly efficient or zero emission vehicles. The fee should support incentives and policies to improve public transportation, micromobility, and buy-back of low-efficiency vehicles.*

Task Force Discussion:

- Equity: Low-income individuals and households should not feel an undue burden either in cost or administratively. Exemptions should be simple and easy to obtain. The fee should be targeted toward new vehicles rather than older vehicles, and there should be a lower fee for lower value vehicles. Include awareness, especially for low-income people and people of color. Funding can support programs that include EV subsidies for low-income buyers and buy-back programs, including micromobility and public transportation passes. Arrangements should be made with relevant entities so that the buy-back program is known.
- Behavior Change: Two behavior changes are generally being sought. Less driving is a goal of the Task Force, but should be achieved through incentives and better transit options outside of the fee structure and improved transit options. Buying more fuel-efficient vehicles should be incentivized through structure of the fee. Commercial fleet vehicles could pay a higher fee when they are purchasing low-efficiency vehicles, as could second vehicles for an individual owner.

Below are a few examples for how a fee could be structured, with ***Example 1*** prioritizing equity, ***Example 2*** prioritizing revenue, and ***Example 3*** prioritizing behavior change.

- Example 1. The vehicle registration fee should be on average 20% of the specific ownership tax for gas and hybrid vehicles and greatly reduced or full exemption for zero emission vehicles. Further breakdown of the fee could be related to mpg or vehicle type or size, with a sliding scale that leads to a lower fee for high-efficiency gas powered passenger vehicles paying less (e.g. 10%) compared to low efficiency vehicles (e.g., 40%). Zero emission vehicles could have no fee. The existing tax is based on both the value and age of the vehicle, with lower valued and older vehicles charged less than newer vehicles. Modeling the fee off this tax with further assessment based on vehicle type and potentially mpg at the time of registration would greatly reduce the fee both for 1) individuals who cannot afford or choose to own a newer or higher value car and 2) those that purchase efficient or zero emission vehicles.
- Example 2. The vehicle registration fee is $100 for gas powered vehicles and a greatly reduced fee or no fee for zero emission vehicles, with targeted exemptions made for low-income individuals. This fee should increase with the consumer pricing index to keep up with inflation.
- Example 3. The vehicle registration fee could be based on miles per gallon EPA ratings, with a sliding scale that leads to a lower fee for high efficiency vehicles compared to low efficiency vehicles. This should set the base fee amount to the average vehicle mpg (e.g., $100). Currently that is 24 mpg nationally. Rates could be cut by half for the most fuel-efficient vehicles and electric vehicles could be exempt. Rates could double for the least efficient vehicles. Zero emission vehicles would not be charged the fee or the fee could be nominal. Targeted exemptions would need to be made for low-income individuals. Establishing this fee with targeted exemptions would reduce the fee both for 1) low income individuals and 2) those that purchase efficient or zero emission vehicles.

Examples: Could not identify any examples within the U.S. The City of Boulder conducted an initial feasibility study and recommended it as a possible option. The in-depth study can be found here. In addition, France has a fee-bate program, which is described here. Principles for program design have been developed here.

Revenue potential: At the time of writing this report, not all of the data are available to fully generate a number based on the specifications of our recommendation. However, we estimate that a vehicle registration fee could generate $10 to $30 million annually depending on how exemptions are structured and the cost of the fee. As people transition away from gas powered vehicles due to incentives and policies, the revenue generated will likely decline.

Considerations: The administrative burden of this fee has not been analyzed. The state registration system, DRIVE, has limited capabilities. The City would need to work with the Colorado Department of Revenue to fully implement this option. When considering equity, lower-income households may keep inefficient vehicles longer. To correct for this, the fee could be applied as a percent of vehicle value or an income-based exemption could be developed. It is not defined here how exemptions for low-income households should be determined if they are used. Such exemptions should not be burdensome for either the individual or collecting agency and should be provided at the time of registration rather than a rebate.

Parking Meter Fee Increase

Description: Currently Denver charges a flat fee of $1 per hour on all parking meters. At the most basic level, rates could potentially be increased on all existing meters to raise additional revenue, while disincentivizing driving and reducing circling. Along with other climate actions associated with transportation, the City could also invest in advanced meter technology which would allow for more dynamic pricing based on demand and could provide a better user experience like pay by phone. Meters could also potentially be expanded to other areas of the city that currently have free on-street parking.

Draft Recommendation: *The Task Force recommends incrementally increasing parking meter rates over the next three years for existing meters up to $3 based on demand, and ultimately invest in meters that allow for dynamic pricing, and fund stronger meter enforcement and staffing by 2023. This would allow better management of the curb. By 2022, It could raise $16 million annually for transportation related climate action, such as multimodal transportation. In some places, like our college and university campuses, considerations for the impact of those who frequent the area should be taken into account. The City should also explore the addition of new areas with meters to support funding Phase 2.*

Examples:

- Austin: In late 2019, Austin raised its hourly metered parking rates from $1.20 in downtown and $1 outside of downtown to $2 citywide. They hope to increase prices more in coming years, up to $5 an hour for high-demand spaces.
- Chicago: Starting January 2020, Chicago increased parking meter prices by $.50, up to $7 an hour in the Loop and $4.50 in the rest of the business district. The City is also going to install new meters in the West Loop and increase rates from $2 an hour to $4.50.
- Baltimore: Baltimore adjusts its parking meter rates no more than $0.25 every 6 months in order to ensure there are 1 or 2 spaces available on every block. Depending on demand, the price to park on any particular block ranges from $0.50 an hour to $3.50 an hour.

Revenue potential: A conservative estimate of raising existing meters from $1 to $2 an hour in Denver could bring in $8 million annually. From $1 to $3 an hour could bring in a total of $16 million.

Considerations:

- Increased parking meter rates should be structured in a way that reduces demand for parking so there are available spots. This has the additional benefit of reducing circling, which reduces emissions and congestion, while improving people's experience in Denver.
- There would be an upfront cost to purchase new meters but they would allow more flexibility for dynamic pricing based on demand and effective management of city curbside assets.

Commercial Parking Lot and Garage Fee

Description: A commercial parking lot and garage fee would be added on as a percentage of the cost of parking in a surface lot or garage. Denver, under TABOR restrictions, cannot impose taxes without a vote of the people. However, the City can assess fees on things that impose a cost on society and should use that money to support other projects, such as multimodal transportation, to alleviate the burden. Off-street parking does have a big impact on the city, including inducing driving demand (encouraging more people to drive because parking is available), which causes congestion, air pollution, climate pollution and crashes, as well as consumption of valuable space when the city has issues with housing affordability. It may be possible then to assess a fee to mitigate that impact and support multimodal work, though this has not been studied for Denver.

Draft Recommendation: *The Task Force recommends DOTI institute a commercial parking lot and garage fee in an equitable and timely manner to support climate action as part of the Phase 1 revenue package.*

Examples: There is precedent in other cities for charging additional fees for off-street parking, including commercial parking lots and garages.

- San Francisco charges 25% on all off-street parking, which generates about $60 million a year. The money is deposited in the general fund and then the equivalent of 80% is sent to their transit agency.
- Philadelphia has a parking tax at a rate of 22.5% that generates approximately $100 million a year.
- The State of Illinois recently passed a tax ranging from 6 percent for hourly and daily parking to 9% for monthly and annual parking. In addition, Chicago/Cook County has a parking tax ranging from 26% percent to 31%.
- New Jersey municipalities can charge a 3.5% "mass transit access parking tax" on parking. This fee is on top of other fees that may be issued by state law.

Revenue Potential:

- We don't easily have access to the percent occupancy of parking spaces, the average daily rate, nor the exact number of parking spaces in Denver, so these are rough approximations to help inform this process.
- Based on Downtown Denver Partnership's survey of parking in downtown, there are approximately 38,000 "public parking" spaces in downtown.
- The average hourly rate is $8, the average daily rate is $17, and the average monthly rate is $205 (in 2018).
- Since the total revenue of commercial parking is currently unknown, this is a simple rough estimate based off a flat fee of $1 a day per occupied space, with different occupancy levels:
    - 30% occupancy = ~$4 million a year
    - 50% occupancy = ~$7 million a year
    - 70% occupancy = ~10 million a year

Of course, if rates were higher than $1 or based off a percentage rate that on average is more than $1, revenue would be higher.

Considerations:

- One benefit of the fee is that it would support changing behavior by encouraging the use of public transit.
- While the task force reached consensus to move this fee forward, there were concerns expressed about implementing this fee in the midst of the current recession when there will be an interest in encouraging people to come back to businesses downtown, so implementing the fee in an incremental nature could be considered.
- There is also an acknowledgement that some exemptions should be made based on equity and potential legal concerns. Examples from other fees and taxes include hospitals, universities, federal and state owned and operated parking lots, among others. If a parking lot or garage is offering parking for free, then there should be no fee collected.

Parking Permit Fee

Description: Denver currently allows residents to apply for parking permits for certain residential areas in the city, for themselves or guests (26 areas of varying size, including around Auraria, Uptown, Highlands, Mile High, City Park, Mile High Stadium, Wash Park and Cap Hill). These permits are for the purpose of allowing residents to have parking in areas that have competition between residents and commercial parking needs. They are given to residents free of charge on an annual basis. About 30,000 are permitted every year. A hang tag displayed in the car allows them to park without time restrictions. Residential Parking Permits are only valid on the resident's specific block, while Area Permits allow you to park in a certain area. (The permits don't exempt drivers from parking in no parking zones, during street sweeping times or not paying at meters.)

Draft Recommendation: *The Task Force recommends DOTI institute a parking permit fee in an equitable and timely manner to support climate action as part of the Phase 1 revenue package.*

Examples: Different cities implement residential parking permit programs in different ways, including charging fees.

- Fort Collins, for instance, charges no fee for a first vehicle, $15 for a second, and $40 for a third.
- Boulder's Neighborhood Parking Program allows residents of a given neighborhood (12 neighborhoods are included) to get two permits for $17 each a year for vehicles registered in their name, along with two free visitor permits. Businesses can pay $75 a year for a permit for an employee, and can purchase up to 3 a year.
- Portland, OR charges significantly higher amounts. Many neighborhoods are $75, while others are $195, or even $370 a year. Additionally, the City offers a "Transportation Wallet" to residents in the Northwest parking district, whereby residents can trade in their parking permit for a free packet of other transportation options, including a transit pass, and scooter and bikeshare credits (the program is funded by the cost of residential parking permits).

Revenue Potential: In order to best manage the system and take equity and outcomes into consideration, the City would need to do analysis to develop a structure for this (including exemptions and tiers) and to set a price. With that caveat, these are rough estimates based on a flat fee:

- The City currently issues about 30,000 permits every year (for residents and their guests).
- Boulder charges $17 a year for its residential parking permits.

- If Denver charged $20 a year for all 30,000 permits, that would generate ~ $600,000 a year.
- Some other cities in the U.S. charge more (but there would be questions about how to do it equitably and what people could handle). $50 a year could be $1.5 million; $100 a year could be $3 million.

Considerations: Several concerns were expressed and not fully resolved.

- First, the current purpose of the residential parking permit program is not designed for the purpose of identifying neighborhoods where a fee should be instituted. There was interest from a minority in the Task Force to expand the use of residential permits to other neighborhoods because of this.
- There was also an interest from a minority of Task Force members in expanding the use of area permits, which could be for commercial purposes.
- Lastly, there was deep concern regarding equity. Those who don't have garages or parking pads are penalized, many of whom may be lower income households. For this reason, there was some discussion of exempting the first vehicle for each household or finding other avenues for exempting low-income households or even whole neighborhoods.
- The Task Force did not spend the time working through all the ways in which a parking permit fee could be structured, but generally agreed to have DOTI design the fee in an equitable and timely manner.

Meter Buyout fee (bagging)

Description: The City of Denver offers the option to "bag" meters in order to open up curb space for events, construction, or other needs. Meters may be bagged with "No Parking" bags over the meter heads to keep the street clear of parked cars. Meter bagging requests take up to 72 hours to process, so should be submitted at least 1 week before an event. A street occupancy permit must also be obtained for any event that takes place in the street/sidewalks/public right of way. Fees are determined by meter location rate times the number of days, times the number of meters. The fees for meters in the Central Business District CBD and Cherry Creek Business District CCBD are $25 per meter per day and outside of the CBD and CCBD are charged $15 per meter per day of occupancy.

Recommendation: Recommend DOTI increases the fee for meter buyouts for construction or commercial purposes (bagging).

Revenue Potential: Fees in Denver have to be based on the work required to undertake the action (like issue a permit) or otherwise reflect the cost of the asset. Additional analysis would have to be done to understand the costs associated with bagging meters, but this is a rough estimate based on the value of using the asset.

Parking meters in the City of Denver cost $1 an hour and permits to bag a meter are $25 a day (approximately $1 an hour). The Task Force has recommended at least moving the price of metered parking to $2 an hour which could potentially rationalize doubling the bagging rates. Revenue generation would also depend on which categories of bagging were included in a price doubling:

Category	2019 approximate number of bags	Approximate *additional* revenue with *doubling* daily bag price
Construction	8,300	$208,000
Events	7,900	$39,500[14]
Regular	5,300	$133,000
Bus	3,800	$95,000
Food Trucks & Retail Trucks	3,200	$80,000
Reserved Parking	3,000	$75,000
Dumpster/Pod	500	$12,500
Filming	300	$7,500
Other	3,500	$87,500
Total	**35,800**	**$738,000**

Considerations: Several concerns were expressed, but not fully resolved. While the Task Force reached consensus on moving the meter buyout fee forward, several people were concerned that the rate increase was not defined, so it was difficult to understand the impacts and potential revenue that could be raised. In addition, there is interest in exempting certain types of entities from the fee increase, such as nonprofits that are hosting a street event. One Task Force member noted that this fee did not necessarily align with any climate related behavior change.

Phase 2 Revenue Options That Warrant Further Study

Note: Some options may fund Phase 1 if ballot initiative fails or does not move forward.

Table 6. Phase 2 Cost Breakdown

Cost Category	Phase 2 City $/yr (2023-2025)	Revenue Needs w/o Infrastructure $/yr
1. Policies and Zoning Code Changes	$6,141,000	$6,141,000
2. Influence and Advocacy	$912,000	$912,000
3.a. Marketing and Behavior Change	$4,162,000	$4,162,000
3.b. Incentives for Business	$49,128,000	$49,128,000
3.b. Incentives for Individuals	$47,055,000	$47,055,000
3.c. Training and Educational Programs	$5,670,000	$5,670,000
4. Infrastructure	$222,217,000	---
TOTAL	**$335,285,000**	**$113,068,000**

The Task Force recommends exploring which of the following revenue options best meet the principles identified and further study which is the best option to support funding for Phase 2.

[14] Events are typically only $5 instead of $25

Ballot Initiative Options

Retailer Tax / Business Income Tax

Description: A tax applied on the gross revenues of certain businesses meeting a national and local threshold for revenue.

Examples: Portland Clean Energy Fund

- The Portland Clean Energy Fund was a community-driven campaign to pass a tax to fund community clean energy. It requires large retailers (those with gross revenues nationally exceeding $1 billion, and $500,000 in Portland) to pay a surcharge of 1% on gross revenues. Groceries and medicine are excluded. At least 50% of the Fund's energy efficiency/renewable energy projects "should specifically benefit low-income residents and communities of color;" and at least 20% of all Fund grants "shall be awarded to nonprofit organizations with a mission and track record of programs that benefit economically disadvantaged community members."
    - About the City program: https://beta.portland.gov/bps/cleanenergy
    - Tax rules and regulations: https://www.portlandoregon.gov/revenue/78324
    - About the campaign: https://www.portlandcleanenergyfund.com/

Revenue potential: It depends on the threshold on gross revenues and the surcharge percentage. Data on which businesses would fall within the Portland threshold is not readily available and further research is required. Using a conservative estimate based on Denver's gross sales from 2019, revenue could be in the broad range of $16-$164 million.

Considerations: Denver does not currently apply this type of tax to business revenue. Significant additional research is required to identify and analyze the underlying data. In addition, TABOR requires the tax measure to go to a vote with the specific amount of revenue and details about exemptions included. Portland did most of the details on policy making in rules and regulations following the passage of the ballot measure, which would not be possible in Denver.

Task Force Recommendations: *The Task Force recommends further exploring the legality and feasibility of this tax.*

Occupational Privilege Tax

Description: "Occupational Privilege Taxes in Colorado are essentially a "head tax" that is levied on most workers within jurisdictions that have the tax. Simply put, this means that every employee that falls under the requirements in the jurisdiction has to pay it, and there is typically an employer match of this tax. The tax is levied on a city and/or county basis of where you work, even if the business is located outside of the jurisdiction. This can get complicated if a business is located in Glendale, but the employee works in a satellite office or from their home located in Denver. In a situation like this, the employee should not have to pay the Glendale tax, but likely would have to pay the Denver tax."[15]

Examples: Denver currently has an occupational privilege tax.

Revenue potential: Raising the employer paid portion of the tax by $0.50 or $1.00 per month would result in revenue in the range of $6-$12 million.

[15] https://www.eclewis.com/occupational-privilege-taxes/

Considerations: More analysis is needed to understand the implications of this tax increase.

Task Force Recommendations: *The Task Force recommends further exploring whether the occupational privilege tax is a viable option.*

Fee Options

Pay As You Throw

Description: Denver is one of only three large cities where residents do not pay for trash. Pay As You Throw (PAYT) would have residents pay for trash based on the size of trash can they request, with larger sizes paying more. Recycling would remain free, and compost would become free city-wide. Currently solid waste is paid for out of the general fund. Instituting PAYT would free up general fund dollars. Significant investment in a billing system and new bins are needed along with a public engagement effort. The engagement effort will, in part, support understanding the timing, equity, and affordability considerations. Because of these considerations, it may take over a year to begin implementation and an additional year to pay back investments. For this reason, if PAYT is adopted by City Council and the Mayor in 2020 or 2021, it would not fund any efforts until Phase 2.

Examples: Several cities have similar tiered rates, including Seattle.

Revenue potential: It is estimated that the revenue freed up in the general fund will be between $15 to $22 million.

Considerations: PAYT is a policy option that would support behavior change, incentivizing recycling and composting. While the equity is a top priority, there is a concern, especially for larger households and the potential negative impacts on the lowest income communities, in regards to the exclusions being well-designed.

Task Force Recommendations: *The Task Force recommends moving forward in 2020 to further determine how PAYT could be most equitably implemented. If it can be implemented equitably, the Task Force recommends Council adopt a resolution to institute PAYT by the first part of 2021 in order for there to be funds available to support climate action in Phase 2 beginning in 2023.*

Development Impact Fees

Description: Denver could establish an impact fee program for climate, sustainability and resiliency. The actual impact fee Denver could legally impose would depend on the anticipated impacts of growth and proposed development on greenhouse gas emissions, water consumption, or other related impacts. Local governments may not charge development more than what is necessary to defray the capital impacts directly related to the proposed development. An impact fee ordinance would need to be adopted by City Council; voter approval is not required.

Examples: Denver has an affordable housing fee as well as a fee in lieu of compliance under the Green Buildings Ordinance. Fee studies were completed for both to understand what a developer would need to pay to provide the same benefit off-site or to mitigate the impact of their development.

Revenue potential: Unclear without further study.

Considerations: Unclear without further study.

Task Force Recommendations: *The Task Force recommends that the City further study a Development Impact Fee to understand the amount of money that could be generated and how it could be designed to support behavior that reduces greenhouse gas emissions.*

Phase 3 Revenue Options That Warrant Additional Study

The Task Force recommends exploring which of the following revenue options best meet the principles identified and further studying which is the best option to support funding for Phase 3.

Table 7. Phase 3 Investment Breakdown

Cost Category	Phase 3 City $/yr (2026-2030)	Revenue Needs w/o Infrastructure $/yr
1. Policies and Zoning Code Changes	$6,743,000	$6,743,000
2. Influence and Advocacy	$756,000	$756,000
3.a. Marketing and Behavior Change	$2,553,000	$2,553,000
3.b. Incentives for Business	$25,904,000	$25,904,000
3.b. Incentives for Individuals	$125,775,000	$125,775,000
3.c. Training and Educational Programs	$6,006,000	$6,006,000
4. Infrastructure	$242,823,000	---
TOTAL	**$410,560,000**	**$167,737,0000**

Xcel Energy Franchise Fee

Description: Denver currently has a Franchise Agreement with Xcel Energy that includes a 3% fee. This agreement is set to expire in 2026, and there is little chance that the full agreement, of which the fee is a small part, will be renegotiated and revised before then. That said, if an energy tax is not approved by the voters, a doubling of the total franchise fee up to 6% could be considered. The three percent increase is on average a lower percentage than the energy tax. This fee would need to be approved by the voters.

Draft Recommendation: *The Task Force recommends further exploring an increase in the franchise fee in 2026. We recommend that the City work with Xcel Energy to increase the rate and determine how to make this increase more equitable, such as exempting a) low-income individuals in a way that is not burdensome to them, or b) a first tier of energy usage equivalent to the energy needed for an average low-income household. The fee should also support behavior change, encouraging people to be more energy efficient, use renewables, and move away from greenhouse gas contributing natural gas. Lastly, it should be designed in such a way that any additional administrative burden to Xcel Energy is both feasible and paid for by the fee.*

Examples:

- **Minneapolis, Minnesota:**
  - As the city's existing franchise contract with private, monopoly electric and gas companies Xcel Energy and Centerpoint Energy wound down in 2013, it began an exploration of its legal options to accomplish Climate Action and local energy goals.
  - Instead of forming its own utility, the city opted to sign a new franchise contract and in doing so created a novel Clean Energy Partnership with its incumbent utilities establishing a shared commitment to meet the city's climate and energy goals.

- In 2017, the city increased its existing franchise fee (4.5%) on utility customers by 0.5%, raising approximately $8.5 million annually that is directed toward initiatives to reduce energy bills and greenhouse gas emissions of the city's residents and businesses.

Revenue Generated: Current revenue generated varies greatly due to both the weather and gas prices. The last estimate of current revenue was approximately $23 million annually. Doubling the rate would not generate about the same amount for climate action, given exemptions. More research should be done to understand revenue implications and determine an appropriate design of the revenue option.

Considerations: Because this is a flat fee, it does not support behavior change to the same extent as an energy tax, other than generally encouraging reducing total energy consumption and therefore cost. A franchise tax has traditionally been a flat rate across both customer classes and individuals. That said, it could potentially be made equitable. Including exemptions, this could actually provide relief to low-income households. In addition, similar to how some funds are currently used out of the franchise agreement, reinvestments in low-income households and frontline communities would need to be made first.

Congestion Pricing

Description: Fee for travel on congested roads or in congested areas of a city. The price can vary during times of day and demand to be set as low as possible while still enabling free-flowing traffic. The price can also vary based on vehicle type (gasoline or diesel versus electric, delivery vehicles, ride-hailing, etc.). There are different ways to do congestion pricing, but the most effective is "cordon pricing," which charges drivers a fee to enter a specific area, typically downtown. "Area pricing" is another version where drivers are charged to drive within the zone, even if they do not cross the boundary. Cities can use different technologies to collect payments, like license plate readers, mobile transponders, and, in the future, potentially cell phones. Where implemented (including London, Stockholm, and Singapore), congestion pricing has successfully reduced driving, increased transit use, and reduced air pollution, while raising revenue.

Examples:

- London:
  - Implemented in 2003, drivers in 8.5 square miles of central London are charged a fee when driving on weekdays. Since implementation, traffic has fallen 30%, greenhouse gas emissions have fallen 12% and transit ridership has increased 40%, while the population has grown 19%.
  - The city's congestion pricing program raises approximately $137 million net USD annually.
  - London's pricing structure was recently updated to include ride-hailing vehicles (while still exempting taxis) since ride-hailing vehicles now make up a significant number of trips.
- Stockholm:
  - In 2006 when congestion pricing launched in Stockholm as a pilot program, it was opposed by two thirds of the residents. Over the year of the pilot, congestion fell 30-50%, causing the program to gain popularity. A year later, two thirds of residents voted for a referendum to make the program permanent.
  - Before implementing the program, Stockholm purchased new buses, added new bus routes, and expanded service on existing routes.

  - Since implementation of the permanent program in 2007, Stockholm's traffic has dropped 22%, greenhouse gas emissions have fallen 14%, transit ridership is up 5%, while population has grown 26%.
  - Stockholm's program raises about $155 million USD annually in net revenue.
- New York:
  - New York will be the first U.S. city to pursue congestion pricing and will charge drivers traveling in Manhattan below 60th Street (scheduled for 2021). Pricing will vary by time of day between $3 and $9, charged once daily for vehicles entering or driving within the zone.
  - Vehicle trips are expected to be reduced by 58,000-59,000, with greenhouse gas emissions falling 7%. Annual net revenue is anticipated to be $810 million to $1.1 billion.
  - Emergency vehicles and drivers with disabilities are exempt. Residents in the zone making less than $60,000 per year will receive a tax credit equal to the amount paid in congestion charges.
- San Francisco:
  - A 2010 study on feasibility of congestion pricing in San Francisco estimated the potential to reduce peak auto trips 12%, greenhouse gas emissions in the priced area by 16%, and pedestrian collisions by 12%, while improving transit speeds by 20-25%.
  - San Francisco is updating the study with the goal of developing recommendations and a final report in 2021 (though this might change with COVID-19).
- Seattle: Seattle has been studying congestion pricing. Their Phase 1 report, released in May 2019, details eleven pricing mechanisms in other cities and lands on four tools that might be most promising to meet Seattle's goals: cordon pricing, area pricing, fleet pricing (charging specific vehicles like ride-hailing or commercial vehicles in a zone) and a road usage charge (a per-mile charge for driving in a zone).

Revenue potential: Analysis has not been conducted for Denver and revenue would greatly depend on the scope of the program. A congestion pricing study for West Los Angeles projected net revenue of $69 million per year for the first 16 years. New York City estimates $1 billion per year; if that was downscaled 10 times for Denver it would be approximately $100 million per year.

Considerations:

- In addition to generating revenue, charging more for driving is an important way to change behavior and reduce driving, which helps meet our climate goals while improving public health and quality of life.
- Successful implementation of congestion pricing requires robust public transportation and other modal infrastructure, like bike facilities, to be established ahead of time.
- It would require approval from the federal government if done on federally funded streets or highways.
- There is a big upfront capital investment and large ongoing maintenance and operating costs, but overall congestion pricing programs would generate significant net revenue.

Most cities have studied congestion pricing for many years before getting close to implementation (congestion pricing was first suggested in London in the 1960s and in New York City in the 1970s). Denver would need to undertake extensive studies and analysis of other programs and lessons learned, develop modeling to understand the best program for Denver in terms of pricing, geography, collection systems and exemptions, and to estimate the necessary upfront investment and operational costs of the congestion program itself and the needed transit expansion.

Task Force Recommendation: *The Task Force recommends beginning to lay the groundwork congestion pricing as a revenue and behavior change source in the near future, as it would take significant investment in infrastructure to enable this option to fund Phase 3.*

Options that are constrained by TABOR:

Real estate excise or transfer taxes

These taxes may be constrained by the legal limitations in TABOR.

Options that require state action:

Gas tax

This is preempted by state law because the state already applies a gasoline tax that is designed to cover the impact of vehicles. The City could advocate for this to be changed at the state level.

Ride-hailing fee

Description:

Fee on ride-hailing services (like Uber and Lyft) and potentially taxis to decrease congestion and encourage public transportation. The fee is generally flat, regardless of ride duration or length, although it can vary based on number of riders and location.

Examples:

- New York City:
    - There is a fee on rides that begin, end or pass through Manhattan, south of 96th Street. Uber and Lyft are charged $2.75 a ride and taxis are charged $2.50, by registering with the city and state and paying each month.
    - Starting in October 2020, passengers taking taxis or ride-hail services from any of the three airports in the region (Newark, LaGuardia and JFK) will pay an additional fee of $1.25 for taxis and $2.50 for Uber and Lyft.
- Chicago: Chicago previously had a flat tax of $0.72 for Uber and Lyft trips in any location. In late 2019, the city updated it to incentivize shared rides and increase fees in downtown. A shared ride in neighborhoods changed to $0.65 while private rides went up to $1.25. In downtown on weekdays from 6 am until 10 pm, shared trips are charged $1.25 and private trips have an additional $3 fee.

Revenue potential: The state currently regulates ride-hailing and taxi services and it is unclear whether Denver or any municipality could assess a fee on the riders or service providers on their own without state action.

Considerations: Again, Denver likely can't do this on its own right now. Previously, some state legislators had expressed interest in instituting a fee on ride-hailing.

Next steps: The City should begin conversations with the state's General Assembly to advocate for a statewide ride-hailing fee in the near term, especially given interests from some of its members.

Options constrained by federal requirements:

Airport Road Toll

Pena Blvd. is owned and operated by the airport. The FAA requires that any toll would go back into operations and maintenance of the road and related airport expenditures.

While many Task Force members believe that this would be a good option to fund climate action, at least at the airport, we failed to reach consensus minus one, with two no votes, and did not move this to a supermajority vote.

Airline fuel fee

The FAA requires that the fuel fee be dedicated to aviation operations.

Additional Options that did not reach consensus

Energy use tax (sometimes called a carbon tax at the local level)

Description: A tax assessed on each kilowatt (kWh) of electricity and/or therm of natural gas used by a customer. It could be placed on residential, commercial, and/or industrial customers and would be paid as a separate line on the customer's bill. In Denver, this would be Xcel Energy, as well as natural gas transport providers. The utility or transport gas provider bills the tax, collects it from customers, and remits it in a transfer to the city. This is sometimes referred to as a carbon tax, but it is not a true carbon tax because it is not applied based solely on carbon emissions. Rather, it is applied based on energy consumed. For natural gas, 100% of the energy is fossil based and electricity is currently 70% fossil based. The energy used in buildings is the single largest source of greenhouse gas emissions in Denver.

Examples: Boulder, CO, Resilient Denver ballot measure, and Denver City Council bill from 2019.

- Boulder, CO
  - The Boulder Climate Action Plan (CAP) tax, first implemented in 2007, applies only to electricity use by residential, commercial, and industrial customers and is collected by Xcel Energy. Tax rates are different for each of three sectors: residential is $0.0049 per kWh or $21 annual average cost, commercial is $0.0009 per kWh or $94 annual average cost, and industrial is $0.0003 per kWh or $9,600 annual average cost. The CAP tax generates approximately $1.8 million each year. There are exemptions for customers who subscribe to wind- or solar-generated power. You can read more about Boulder's CAP tax here: https://bouldercolorado.gov/climate/climate-action-plan-cap-tax
- Resilient Denver proposal appearing on this November's ballot
  - The Resilient Denver proposal places a tax on both electricity and natural gas usage for all customer classes:
    - Residential is $0.005 per kWh and $0.04 per therm.
    - Commercial and Industrial are $0.010 per kWh and $0.08 per therm.
  - Beginning January 2025, the natural gas tax increases 10% annually to encourage the shift to non-fossil fuel energy sources.
  - Exemptions are included for 1) households 50% or below AMI; 2) households subscribed to a 100% renewable electricity program; 3) sales to federal, state, and local governments; 4) sales to charities; 5) commercial and industrial energy use below the 3 year rolling average for that customer class.
  - Estimated annual revenue is $46 million.
- The Denver City Council proposal last summer taxed only commercial and industrial customers for both electricity and natural gas. It was estimated to raise approximately $43 million.

Revenue potential: The amount of revenue this proposal generates depends on 1) the tax rate applied for each kilowatt of electricity and therm of natural gas; 2) whether residential, commercial and industrial

customers are included; 3) what types of exemptions are provided (low-income customers, exempting a certain amount of energy use, customers with renewable energy etc.); and other factors.

Considerations: There are administrative costs to set up the billing, collection, and administration of the tax that would need to be paid by the City, including costs by the utility and transport gas providers to set up their systems to collect and remit the tax. Some households in Denver are energy burdened and exemptions would have to be included to ensure they do not have to pay the tax and that the process to exempt them is as automatic and seamless as possible. Electrification is an important strategy, so a tax should consider how this could affect electricity bills. A shift to renewables is also important, so exemptions for customers with renewable energy should be considered. As Xcel Energy is becoming increasingly renewable, some Task Force members do not believe electricity should be taxed and that the energy tax should focus on natural gas.

Task Force Discussion: This option failed to meet the Task Force's consensus minus one threshold, with five votes against moving forward with further exploring an energy tax. Because some Task Force members believe strongly that an energy tax is worth further exploration, a request was made by a Task Force member to move to a supermajority vote. Task Force rules indicate that any Task Force member can call a vote to vote. The threshold to move from consensus minus one to a vote is a 75% supermajority. If this threshold is passed, a 75% supermajority vote may be taken at the next meeting. However, the initial vote to move from consensus minus one to a supermajority vote was not passed, with a 50/50 split across task force members.

Next Steps

We greatly appreciate the faith that Mayor Hancock and City Council entrusted in us to deliberate on these critical and timely issues. After several months of debate and learning, we have reached unanimous consensus.

At the same time, we understand that supporting the economic recovery from COVID-19 is urgent. Addressing racial injustice is urgent. We recognize the existing inequity in our society brought to light by COVID-19 and the Black Lives Matter movement. At the same time, ensuring that we address the climate change and are prepared for the next climate related crisis is urgent. Indeed, issues of equity, health, and climate are interrelated. Our recommendations will support economic recovery and racial justice. That is why we must adopt these recommendations in 2020 to build Denver back as a more just, equitable, healthy, and sustainable community.

Moving Forward Phase 1 Revenue Recommendations. To achieve this vision, we urge the Denver City Council and Mayor Hancock to immediately begin the referral process for our recommended sales tax ballot initiative and to move forward the additional fee options to fund Phase 1 of the plan.

Implementation Plan. In addition, we ask that the City and County of Denver develop an implementation plan, including bringing high impact Phase 1 policies to City Council, Mayor Hancock, or the appropriate commission or department for quick passage. In instances where funding is required, adopted policies can be ready for full implementation once revenue sources become available. This will ensure that policies are equitably and affordably implemented.

Implementation Challenges and Political Will.

In his last address to us, Mayor Hancock said, "I imagine that the recommendations you plan to submit are meaningful, and therefore challenging." Indeed, the recommendations included in this report are likely to be challenging, especially given potential resistance from residents and industry groups.

We offer this guidance for those wrestling with how to move forward. Consider that for five months 25 volunteers, including community and industry interests, donated over 1,000 hours of their time and expertise, while integrating the advice of technical and process experts. The good news is that figured this out as a group. We reached consensus.

However, we experienced challenges with reaching agreement firsthand. It took great effort to create dozens of recommendations and to get unanimous consensus from the varied members of the Task Force. We deliberated on every point, from every perspective.

The members of the Task Force entered this endeavor in good faith. We reasoned that City leaders chose us to make these difficult decisions and do the heavy lifting, not just for appearances, but because they valued our diverse expertise, our commitment to the issue, and our desire to make the City of Denver strong enough to withstand the climate crisis.

The Choice Ahead.

Now our choice is clear. Either we can set up more processes to renegotiate these agreements, likely coming to similar conclusions after having lost precious time, or we can act now. We ask our elected officials and department leads to be courageous and unequivocal in moving forward.

We urge Denver to leverage the momentum that has been created by our diverse Task Force membership having reached full consensus. We can only achieve the vision included in this report if we acknowledge the suffering and tremendous cost to our community if we fail to act and invest now.

We thank you in advance for what we expect to be strong and swift action.

Appendices

The following appendices are available in a separate document. Below are brief descriptions of each appendix.

Appendix 1. Task Force Members

This appendix lists the 26 members of the task force and their respective organizations.

Appendix 2. Recommendations Process

This appendix describes the voting process the Task Force used.

Appendix 3: Issue Briefs (Fact Sheets)

This appendix includes information from the 2018 emissions inventory along with strategies gathered from other cities, states, and countries that informed the Task Force recommendations.

Appendix 4. Public and Stakeholder Input

These appendices describe the public engagement process that was lead by the Civic Consulting Collaborative team.

4.a. Methodologies

Members of the public provided insights through three distinct processes around needs and opportunities, equity, and solutions. This included two rounds of Meetings in a Box, Stakeholder Advisory Groups, and broad public input through an on-line forum. Even in the face of COVID 19, we reached over 4,000 members of the public and collected thousands of comments.

This appendix describes the purpose of the various public engagement processes and why they were selected. In-person public meetings needed to shift to virtual meetings in the face of COVID 19. The methodology section describes why the Consider.it Platform was selected.

4.b. Meetings in a Box Round 1

Meetings in a Box are a dispersed engagement technique that leverages social networks for intimate conversations. There were 28 confirmed in-person Meeting in a Box round 1 sessions that drew at least 247 participants.

This appendix provides a summary of the findings from the first round of Meetings in a Box.

4.c. Meetings in a Box Round 2

Over 100 people virtually participated in Meeting in a Box round 2. This appendix provides a summary of the findings from the second round of meetings in a box.

4.d. Stakeholder Advisory Groups

Five Stakeholder Advisory Groups (SAG) were conducted. The purpose was to specifically reach out to those we wanted to hear more from in a small group setting after viewing the MIB participants. About 40 individuals participated. The following groups of people were identified as critical voices in this process:

1. Climate Justice and Equity
2. Workforce
3. Business and Industry
4. Youth and Climate Advocate
5. Climate Vulnerable People

This appendix provides a summary of the findings from the Stakeholder advisory groups

4.e. Consider.It Public Online Forum

Due to COVID 19, we had to switch from in-person public engagement forums to an online forum. From April 20 through May 4, 2020, 3,686 unique individuals visited the site and made over 9,000 pageviews. Within the broader array of spectators identified through Google Analytics, 814 individuals created accounts in to participate in rating and commenting on proposals. These individuals generated thousands of proposal ratings and comments as well as hundreds of new proposals. It was a very active forum! We hired community liaisons to specifically outreach to communities of color, the Spanish speaking community, and immigrants.

This appendix describes the methodology and themes by category of the public comment.

Appendix 5. Revenue Subcommittee Criteria

Although the Revenue Subcommittee only met a few times due to COVID 19, they were able to develop a set of criteria for the Task Force to consider when selecting revenue options. This appendix lists the criteria.