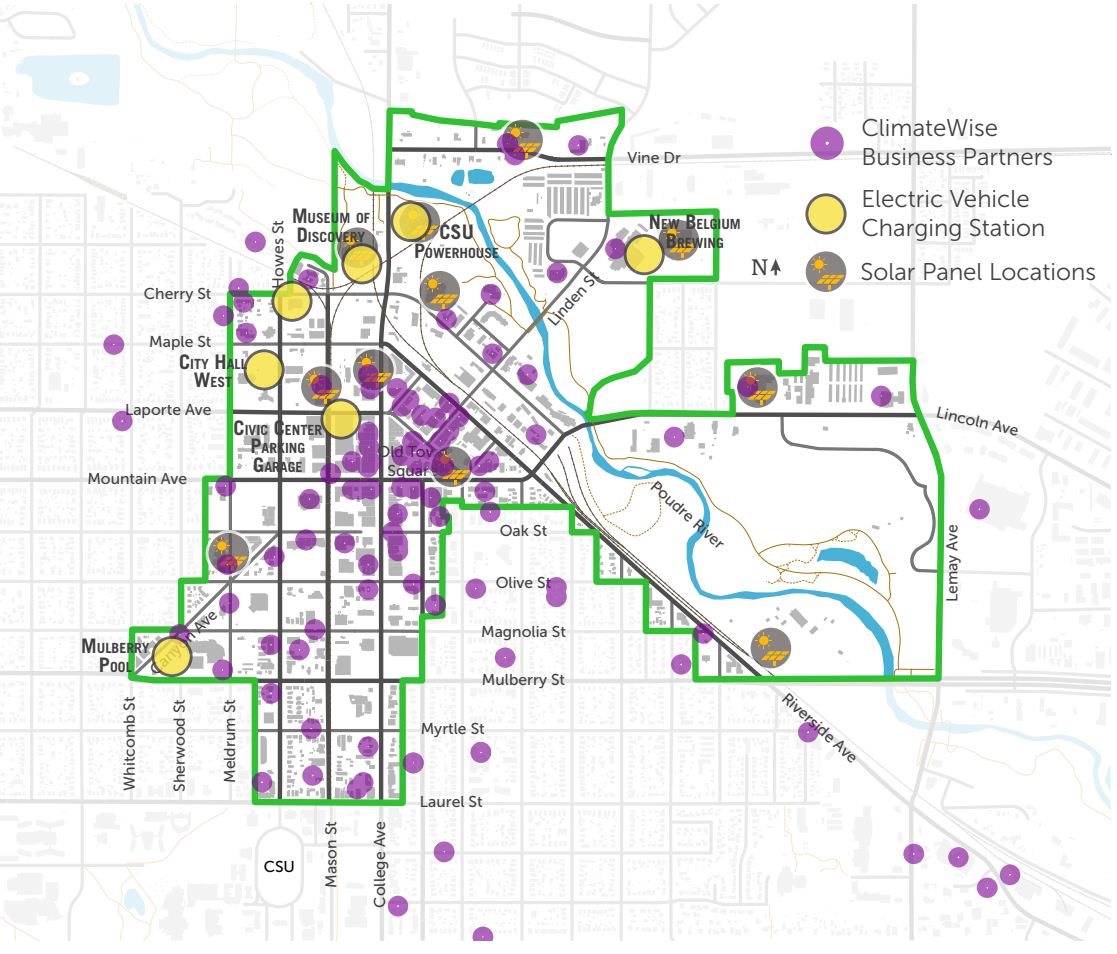
# Implementing Climate Action Plan Priorities

In 2015, the City of Fort Collins adopted new goals to reduce greenhouse gas emissions in the years to come:

- 2020 - 30% below 2005 levels
- 2030 - 80% below 2005 levels
- Carbon neutral by 2050


As the heart of our community, the downtown area has the opportunity to lead the way in supporting the priorities of the Climate Action Plan:

- Improved energy efficiency (for both new and existing buildings)
- Renewable energy production and use
- Increased transit ridership, bicycling and walking
- Increased use of fuel-efficient and electric vehicles
- More efficient land use patterns
- Increased recycling, composting and waste reduction
- Carbon storage and sequestration (e.g., increasing the urban tree canopy)

## Priorities for the Downtown Plan (from public outreach):

1. Connect to and protect the Poudre River Corridor and other unique natural resources.
2. Pursue and support innovative energy and environmental projects.
3. Incorporate nature and opportunities to escape the urban environment into existing and new development.
4. Enhance downtown's capacity to manage stormwater and flooding.
5. Showcase and celebrate energy innovation and environmental stewardship.

## Key Questions:

1. What does environmental innovation look like downtown?
2. How can downtown lead the way in achieving the community's greenhouse gas reduction goals?
3. How can nature best be integrated within the downtown area?

# Implementing Climate Action Plan Priorities

## What is the City already doing?

Existing City programs that support the goals of the Climate Action Plan include:

### Energy Efficiency
- Home Efficiency Loan Program
- Business Efficiency Loan Program
- Integrated Design Assistance Program
- Facility Energy & Water Assessments
- Electric & Water Rebates

### Renewable Energy
- Solar Rebates
- Green Energy Program
- Community Solar Garden

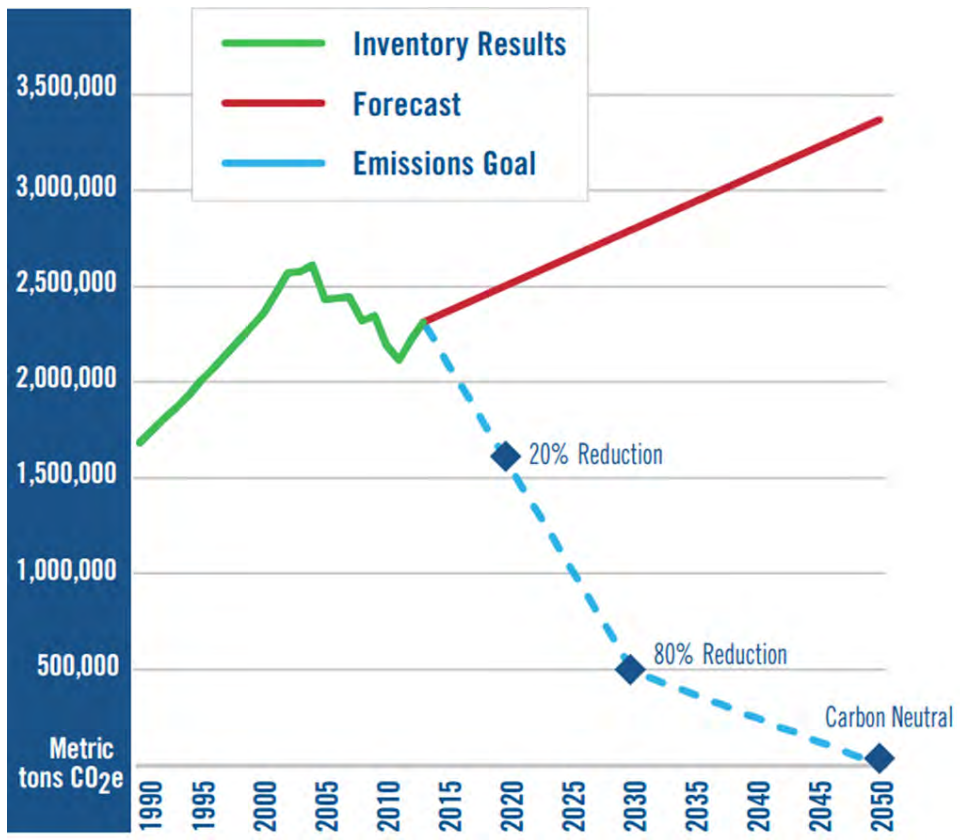
### Multi-Modal Transportation
- Transfort & MAX
- Pedestrian Infrastructure Improvements
- Low-Stress Bike Network Improvements
- Bicycling Education Programs
- Bike Share Program

### Other
- ClimateWise Program
- Lose-a-Watt Challenge
- Recycling Programs
- Electric Vehicle Parking Areas



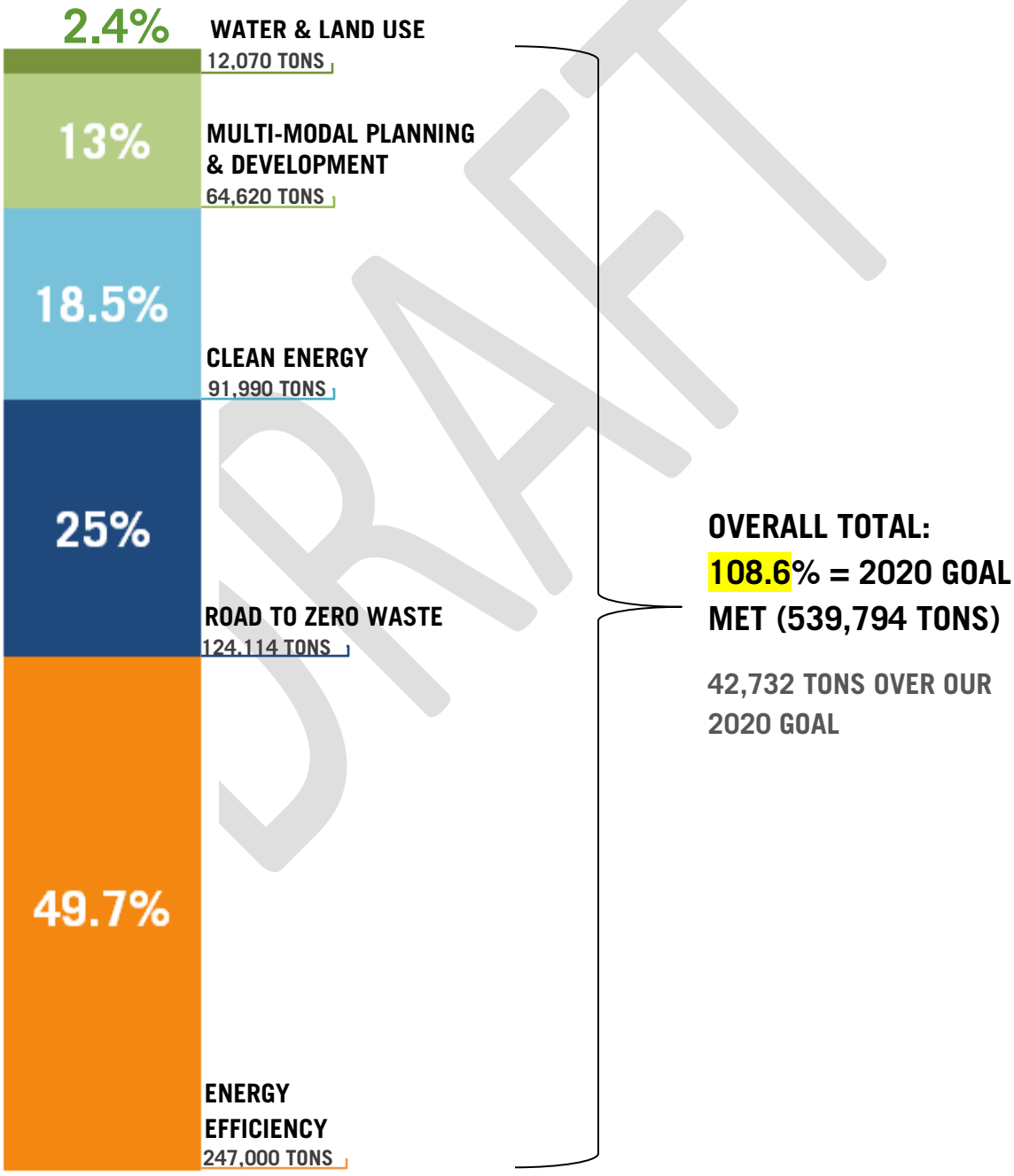

## What else can Downtown do to support the Climate Action Plan? How can the downtown lead the way in...

- Energy efficiency improvements
- Walking, biking, and riding transit downtown
- Use of electric vehicles
- Use of solar power and other renewable energy sources
- Recycling, composting, and waste reduction
- Other ideas?



# Fort Collins Climate Action Plan
# 2020 CAP Strategic Plan

**GOAL: REDUCE GREENHOUSE GASSES 20% BY 2020 (497,062 TONS)**



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## Executive Summary – Introduction to the CAP Strategies

**Background:** On March 3, 2015, the Fort Collins City Council unanimously adopted some of the most aggressive goals in the nation to reduce community greenhouse gas emissions:

- 20 percent below 2005 levels by 2020
- 80 percent below 2005 levels by 2030
- Carbon neutral by 2050

These aspirational goals speed up the City's original 2008 goals, which would have required reducing emissions to 20 percent below 2005 levels by 2020 and 80 percent by 2050. Council adopted the new goals after four Work Sessions, multiple public forums and nine months of work in 2014-2015 with a Citizen Advisory Committee that helped shape the overall 2015 Climate Action Plan (CAP) Framework.

**Table 1:** Brief history of climate action in Fort Collins and steps to develop the 2020 CAP Strategic Plan

| Timeframe | Action |
|---|---|
| **1999** | First goals around climate action adopted by City |
| **2008** | Council reaffirms commitment to address climate change locally with a new goal to reduce greenhouse gas emissions by 80% below 2005 levels by 2050 |
| **March 2015** | Council unanimously adopts updated climate action goals:<br>20% below 2005 levels by 2020, 80% below by 2030, carbon neutral by 2050 |
| **Summer 2015** | Staff teams form around Strategic Initiatives, begin identifying strategies to achieve 2020 goals |
| **Fall 2015** | 1) Citizens join Strategic Initiative teams, additional strategies are discussed through the teams and through the public open house<br>2) September 8 Council Work Session |
| **Winter 2016** | 1) Teams prioritize strategies for modeling based on a qualitative analysis<br>2) Strategic Initiative teams begin modeling their strategies based on estimated greenhouse gas reductions, estimated costs, and population projections, etc. |
| **Present** | Staff is prioritizing which strategies will best achieve the 2020 goals |
| **February 25** | First Community Advisory Committee Meeting – initial feedback on strategies |
| **March 10** | Council Work Session to review the draft roadmap to 2020 |
| **Spring 2016** | Open House and Business Engagement Workshop |
| **March – May 2016** | Staff will perform quality control and further review the impact data for prioritized strategies |
| **May 2016** | Strategic Plan online for public comment |
| **June 2016** | Status update to Council on the 2020 CAP Strategic Plan |

**Fort Collins' Progress:** Fort Collins has calculated and reported its community GHG emissions since 1999 and focused its reduction efforts on its largest emissions sources: electricity, natural gas, ground travel, and solid waste. Overall emissions are down 2.6% since the baseline year 2005; see Figure 1, with the largest improvement seen in reducing emissions from community-generated solid waste, see Figure 2. It is significant that these decreases occurred over a period of sizeable growth in population (18%) and economic prosperity (41% as measured by sales and use tax collections). For more information on how Fort Collins' reports and calculates its carbon emissions, review this presentation.

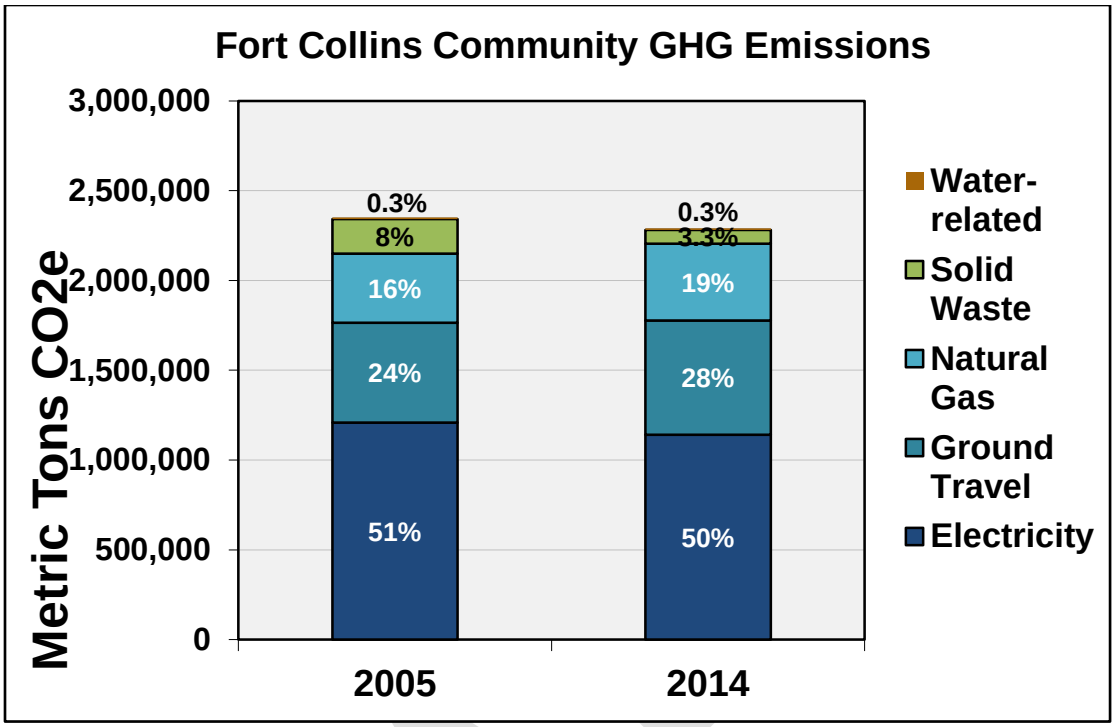



**Figure 1:** Fort Collins' greenhouse gas inventory, 2005 and 2014 comparison.

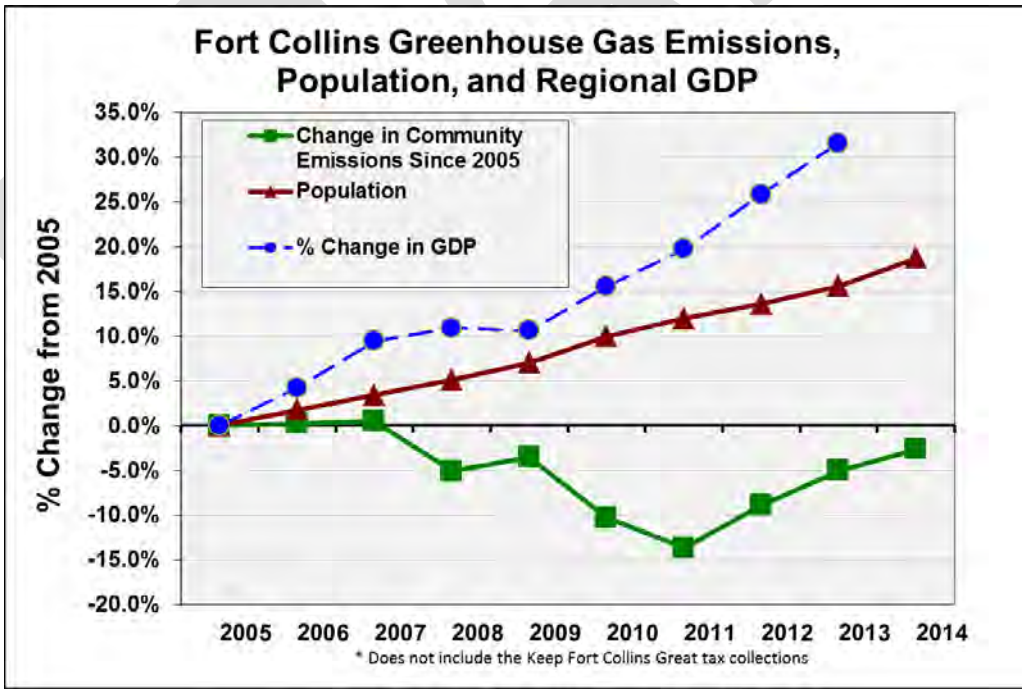



**Figure 2:** This chart illustrates Fort Collins' progress toward achieving its greenhouse gas reduction goals.

**2020 CAP Strategic Plan:** While the 2015 CAP Framework laid out high level initiatives to achieve the 2020, 2030, and 2050 goals, staff is now working developing the specific strategies needed to achieve the 2020 goal of a 20% reduction in greenhouse gas emissions below 2005 levels. To develop these strategies, 11 teams were formed in 2015:

**Table 2:** CAP Strategic Initiative Teams

| Project Teams | Support Teams |
|---|---|
| Energy Efficiency | Performance Measurement |
| Clean Energy | Financing Mechanisms |
| Multi-modal Planning and Development | Messaging and Engagement |
| Road to Zero Waste | Pilot Projects and District Scale Initiatives |
| Water and Land Use | Climate Economy and Partnerships |
| Preparation, Adaptation, and Resilience[1] | |

In addition to these teams, members of the Executive Lead Team within the City Organization, including the Deputy City Manager; Chief Financial Officer; Utilities Executive Director; Chief Sustainability Officer; and the Director of Planning, Development, and Transportation meet on a bi-weekly basis to review staff's progress and to provide high-level, strategic guidance to staff in the development of the 2020 CAP Strategic Plan.

## 2020 CAP Strategic Plan – Overview of the Strategies:

29 strategies are included within this summary document and represent six overall areas, see Table 3. The first five areas, e.g., energy efficiency, represent the 26 strategies identified by a strategic initiative team; all of these strategies have been modeled. The last area entitled "additional strategies," includes strategies that either take a more systems-based approach, e.g., the CAP Innovation/Pilot Project Fund, or are an initiative that is just in the initial stages of discussion, e.g., the electrification of commercial lawn and garden equipment. These three strategies have not been modeled at this time.

**Table 3:** CAP Strategic Initiative Teams

| Initiative Type | Number of Initiatives |
|---|---|
| Energy Efficiency | 7 |
| Clean Energy | 5 |
| Multi-modal Planning and Development | 6 |
| Road to Zero Waste | 7 |
| Water and Land Use | 3 |
| Additional Initiatives | 12 |
| ***Total initiatives*** | ***40*** |

### The Model and Key Assumptions:

To assess strategies across a common and transparent platform, Utilities' staff developed a model (essentially an excel spreadsheet) that allows users to enter their strategies. For each strategy that is entered, there are two types of variables:

[1] Note: this team was placed on hold while the 2020 CAP Strategic Plan was developed, as the Strategic Plan focuses on mitigation actions around climate change.

- Core variables – these variables are universal amongst all strategies, e.g., population growth, number of buildings in Fort Collins, miles per gallons assumptions, etc.
- Strategy-specific variables – these variables are dynamic and dependent upon specific inputs that relate to a given strategy, e.g., estimated uptake of a specific program.

Each strategy's assumptions and calculations of impact are based on either a reference document, e.g., Utilities data over a period of years, or best professional judgment where reference data are lacking. As assumptions and predictions inherently contain varying levels of uncertainty, staff is currently conducting a sensitivity analysis on each strategy to identify which assumptions are particularly central to that strategy's outcomes, e.g., GHGs reduced. Once those key data points are identified, staff will conduct another round of quality assurance/quality control on these variables to ensure the uncertainty is minimized to the best of our abilities.

## Staff Next Steps:

Staff is prioritizing the 29 strategies into a series of scenarios, for example:

- Least cost scenario - What is the lowest cost set of strategies to achieve the City's 2020 goals?
- Acceleration scenario - What is the fastest way to achieve the 2020 goals?
- Locally-driven scenario – What strategies achieve the 2020 goals with the least reliance on external factors, e.g., federal regulations (the Clean Power Plan) or action by others?

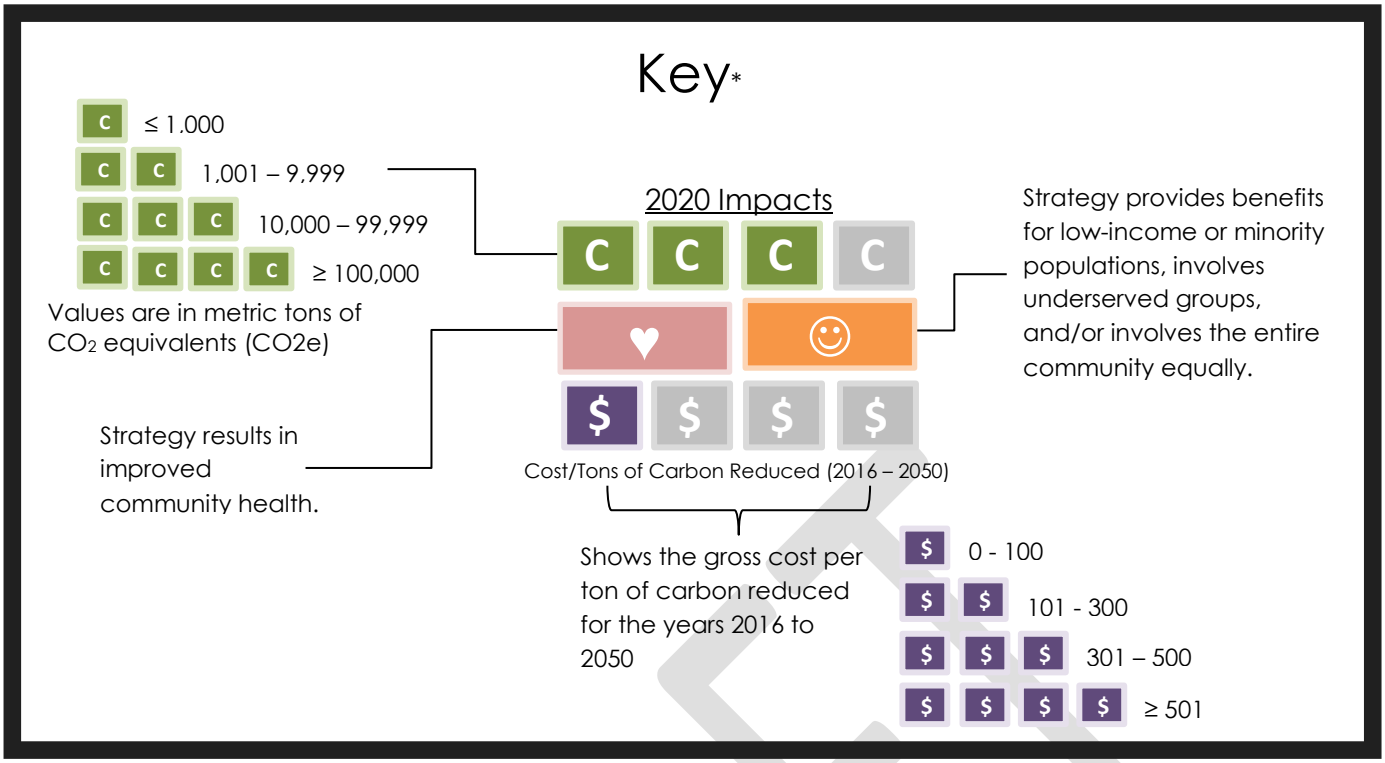
In addition to prioritizing strategies, staff is also exploring the benefits and challenges of implementing these strategies, e.g., how do these strategies benefit all residents, how do the strategies affect housing affordability, etc. These strategies, scenarios, and implications will be presented at the March 10 City Council Work Session.

## Feedback sought from the Community Advisory Committee:

This is the first time these strategies have been shared in totality, and we are excited to get your feedback! As you review these strategies, we ask for your feedback in the following ways:

- Which of these strategies would you like to discuss at our February 25 meeting?
    - Which of these strategies could present the biggest opportunities to Fort Collins? Why?
    - Which of these strategies could present the biggest challenges? Why?
    - Note that we will not have time to discuss every strategy in depth at the meeting, so your feedback in advance will help ensure we discuss the strategies of most interest.
- Can staff better explain these strategies or the overall organization of this document better? If so, how?

Please enter your feedback in this online survey no later than Wednesday, February 24 at noon in order for your feedback to guide the discussion on February 25. Note that if you cannot enter your feedback in advance – please plan to come prepared to review the strategies at the meeting.




*Graphic subject to change

# Energy Efficiency

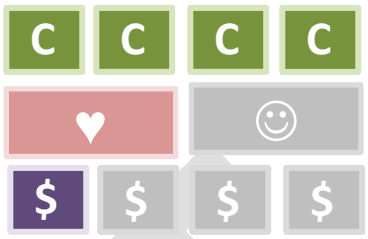
## 1. Business Efficiency Portfolio (Base)

**Lead:** Utilities Resource Conservation

**Key Partners**

- Platte River Power Authority
- Customers

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** The base business efficiency program portfolio continues the core programs and staffing for Efficiency Works – Business to provide incentives and technical assistance for all commercial and institutional customers.

**Assumptions** Projections for savings are forecasts based on the reference results of the ongoing Efficiency Works – Business program.

### Benefits

**Health:** These programs provide health and productivity co-benefits from improved indoor environmental quality via lighting, ventilation and comfort improvements.
**Other benefits:** Participating businesses achieve water and energy use reductions that can help manage their utility bills. These programs represent 32.9% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 153,000 | 653,000 | $39,246,000 | $17,959,000 | $25 | -$147 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

Road to Zero Waste

# 2. Community Recycling Ordinance Implementation

**Leads**: Private haulers
- Restaurants and grocers
- Single- and multi-family residents

**Key Partners**: City

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Implementation of the Community Recycling Ordinance, which includes: bundling yard trimmings and food scraps collection into the basic service for single-family residents; bundling recycling into trash service for multi-family and commercial locations; requiring food scraps collection from restaurants and grocers.

**Assumptions** Recycling would be bundled in with trash service for all businesses and apartment complexes, including the 32% of apartment complexes and 52% of businesses that don't currently have it; all single-family residents would have both yard trimmings and food scraps collection.

## Benefits

**Equity**: Would provide equal access to recycling where you live, no matter if you live in a single-family home or apartment complex. Initiative would also provide access to recycling for all businesses in Fort Collins.

**Other benefits**: Would make significant progress toward Council-adopted goals of recycling or composting 75% of the community's materials by 2020, 90% by 2025 and zero wastes by 2030; landfill space will be saved, GHG emissions reduced, and resources conserved.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 106,000 | 413,000 | $21,437,000 | $7,310,000 | $23 | $15 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

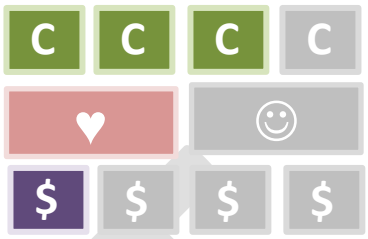
## Clean Energy

# 3. Platte River Renewables Purchase (Tariff 7)

**Lead**: Platte River Power Authority

**Key Partners**:
- City

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** A proposal to continue the partnership with Platte River to expand local investment in utility scale renewables on Fort Collins' behalf (under PRPA Tariff 7 or by some other agreement).

**Assumptions** Key assumption is approval of expanded annual (targeted) PRPA Tariff 7 purchases

### Benefits

**Health**: Non-fossil fuel power generation reduces atmospheric pollutants.
**Other benefits**: By investing in utility scale projects, all ratepayers benefit from greater cost effectiveness of the renewable projects involved. Initiative makes up 9.0% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| 2020 Impacts ($CO_2e$) | | Investments Required to Achieve Impacts – Cumulative 2016-2020 | | Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050) | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 42,000 | 211,000 | $6,176,000 | $0 | $22 | $22 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

## Multi-Modal Planning and Development

# 4. Expand Congestion Management System

**Lead**: City

**Key Partners**:
- CDOT
- NFRMPO

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Congestion management includes measures such as intersection capacity improvements, turn lanes, and signal timing changes that improve the flow of traffic, reduce idling, and GHG emissions.

**Assumptions** Expansion of existing efforts brings significant GHG benefit in near term, but impact peaks and fails to make continuing returns.

### Benefits

**Health**: Potential improvement in air quality (Volatile Organic Compounds, $NO_x$, Ozone).
**Other benefits**: In addition to reduced GHG emissions, congestion management saves the public's time and improves other air quality measures. Strategy makes up 13.1% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 36,000 | 146,000 | $7,802,000 | $38,639,000 | $35 | -$159 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Energy Efficiency

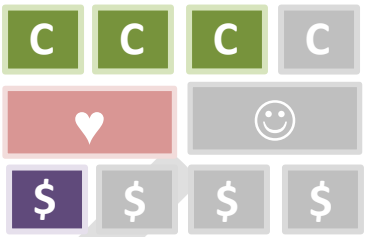
## 5. Business Efficiency Portfolio (Expanded)

**Lead:** Utilities Resource Conservation

**Key Partners**

- Platte River Power Authority
- Customers

2020 Impacts




Cost/Tons of Carbon Reduced (2016 –

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** The expanded business efficiency portfolio program provides additional funding for more participation by customers and supports new technology opportunities, enhanced targeting and segmentation, and new collaborations.

**Assumptions** Projections for savings are established by expert judgement based on the history of the ongoing Efficiency Works – Business program.

### Benefits

**Health:** These programs provide health and productivity co-benefits from improved indoor environmental quality via lighting, ventilation and comfort improvements.
**Other benefits:** Participating businesses achieve water and energy used reductions that can help manage their utility bills. These programs represent 6.5% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| 2020 Impacts ($CO_2e$) | | Investments Required to Achieve Impacts – Cumulative 2016-2020 | | Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050) | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 30,000 | 76,000 | $22,213,000 | $12,390,000 | $30 | -$135 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

Energy Efficiency

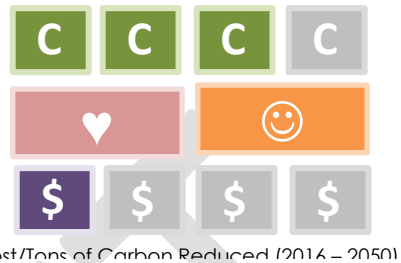
## 6. Home Efficiency Portfolio (Base)

**Lead**: Utilities Resource Conservation

**Key Partners**

- Platte River Power Authority
- Customers
- Retailers

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** The base home efficiency portfolio continues the core programs and staffing for comprised Efficiency Works – Home, consumer product rebate, appliance recycling and home energy reports for residential customers.

**Assumptions** Projections for savings are forecasts based on the reference results of the ongoing residential programs.

### Benefits

**Health:** These programs provide health and productivity co-benefits from improved indoor environmental quality via lighting, ventilation and comfort improvements.
**Equity:** These programs can be structured to provide additional support or benefits for income qualified customers.
**Other benefits:** Participating households achieve water and energy used reductions that can help manage their utility bills. These programs represent 5.6% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 26,000 | 102,000 | $7,809,000 | $5,533,000 | $23 | -$128 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

## Energy Efficiency

# 7. Home Efficiency Portfolio (Expanded)

**Lead**: Utilities Resource Conservation

**Key Partners**

- Platte River Power Authority
- Customers
- Retailers

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** The expanded home efficiency portfolio provides additional funding for more customer participation, greater public awareness, enhanced targeting and segmentation, neighborhood scale efforts and new retail partnerships.

**Assumptions** Projections for savings are forecasts based on the reference results of the ongoing residential programs history of the ongoing Efficiency Works – Home program.

### Benefits

**Health:** These programs provide health and productivity co-benefits from improved indoor environmental quality via lighting, ventilation and comfort improvements.
**Equity:** These programs can be structured to provide additional support or benefits for income qualified customers.
**Other benefits:** Participating households achieve water and energy used reductions that can help manage their utility bills. These programs represent 4.5% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 21,000 | 52,000 | $13,181,000 | $8,157,000 | $27 | -$118 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

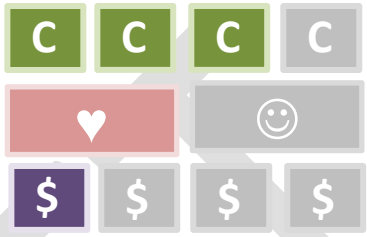
## Clean Energy

# 8. Power Purchase Agreement for Combined Heat and Power Project

**Lead**: CSU

**Key Partners**:
- City

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** This initiative is included to represent the possible impact of viable combined heat and power projects. A project in the 9MW size range at any of several candidate sites, funded in part by a long term power purchase contract, can be a substantial distributed energy and energy efficiency opportunity.

**Assumptions** A key assumption is that the project proves feasible under a power purchase agreement with PRPA and the City for on-site power production.

### Benefits

**Health**: Non-fossil fuel power generation reduces atmospheric pollutants

**Other benefits**: A combined heat and power project can reduce both natural gas and grid electricity consumption. Strategy makes up 4.6% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| 2020 Impacts ($CO_2e$) | | Investments Required to Achieve Impacts – Cumulative 2016-2020 | | Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050) | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 21,000 | 32,000 | $4,605,000 | $0 | $94 | $94 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

## Multi-Modal Planning and Development

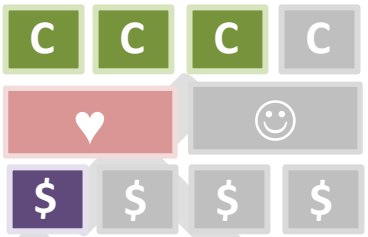
# 9. Change Land Use Patterns

**Lead**: City

**Key Partners**:

- Business, housing, & community groups

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Update City Plan, the Transportation Master Plan, and subsequent area and corridor plans to create compact, mixed-use and transit-oriented community development.

**Assumptions** Assumptions about travel patterns in new mixed use developments derived from study by the Rocky Mountain Institute. Assumes an ongoing rate of continued redevelopment.

### Benefits

**Health**: Significant contribution to public health and obesity prevention.
**Other benefits**: Reductions in VMT (60,000,000 miles in 2020, 200,000,000 miles in 2030, and 300,000,000 miles in 2050). Strategy makes up 6.4% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 18,000 | 45,000 | $1,143,000 | $11,661,000 | $3 | -$172 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

## Clean Energy

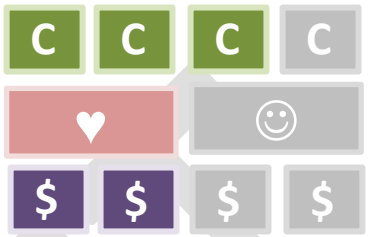
# 10. Solar Power Purchase Program

**Lead**: City

**Key Partners**:

- Platte River Power Authority

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** A proposal to expand the City's successful solar power purchase program (SP3) program to encourage businesses to host onsite solar projects.

**Assumptions** A key assumption is the approval of expanded SP3 power purchase agreement funding over a 20 year contract period.

### Benefits

**Health**: Non-fossil fuel power generation reduces atmospheric pollutants.
**Other benefits**: SP3 provides an attractive ROI encouraging larger scale solar investments. Initiative makes up 2.4% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 15,000 | 47,000 | $33,892,000 | $12,411,000 | $180 | $56 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

Energy Efficiency

## 11. Energy Code Performance

**Lead**: Utilities Resource Conservation

**Key Partners**:

- Building Services

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** This program is comprised of periodic updates to energy codes and includes a compliance function coordinated by a new staff position for 2016 created by a CAP mid-cycle Budgeting for Outcomes (BFO) offer.

**Assumptions** Savings and cost estimates are based on forecast number of building permits and square footage of residential and commercial building, and expert judgement from past performance and building performance modeling.

### Benefits

**Health:** Components of this program directly address indoor air quality at the code level and will promote overall health.
**Equity:** This program will apply to all new construction and will benefit all new building occupants in Fort Collins.
**Other benefits**: This program represents 2.9% of the 2020 CO2e reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 13,000 | 53,000 | $29,269,000 | $8,267,000 | $190 | $51 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Road to Zero Waste

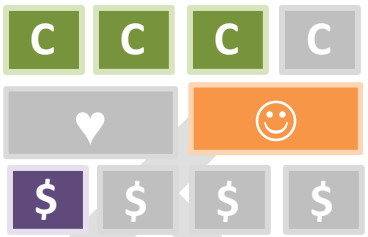
# 12. Construction and Demolition Sorting Facility

**Lead**: City

**Key Partners**:

- Larimer County
- City of Loveland
- Construction industry
- Building Inspection Dept.

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** Develop, model, and construct a regional facility for sorting and recycling mixed debris from construction and demolition projects.

**Assumptions** Assumes 50% of material going to Larimer County landfill consists of C&D material (including drywall, concrete, etc.), i.e., high volume but comparatively low GHG emission. More research needed to understand lifecycle costs before stronger conclusions can be drawn. Asphalt shingling is no longer a recyclable commodity.

## Benefits

**Equity**: The facility will make it easier and less expensive for small construction companies to recycle their waste and achieve compliance with Building Codes.

**Other benefits**: Construction and demolition waste from Fort Collins will be diverted from landfill disposal; landfill space will be saved, GHG emissions reduced, and resources conserved. Strategy makes up 2.4% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 11,000 | 56,000 | $10,364,000 | $1,818,000 | $51 | $33 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Clean Energy

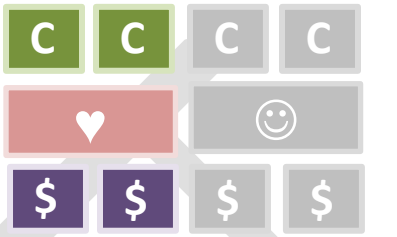
## 13. Utilities Rooftop Solar Incentives

**Lead**: City

**Key Partners**:

- Platte River Power Authority

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Administrative expansion of existing residential and commercial rooftop solar incentives on a non-lapsing basis.

**Assumptions** Key assumption is approval of expanded non-lapsing funding of solar incentives.

### Benefits

**Health**: Non-fossil fuel power generation reduces atmospheric pollutants.
**Other benefits**: With incentives customer energy bills over 20 years should be reduced. Strategy makes up 2.4% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 9,000 | 31,000 | $22,225,000 | $10,869,000 | $148 | -$67 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

## Water and Land Use

# 14. Carbon Sequestration through Enhanced Tree Health

**Lead**: City

**Key Partners**:
- Arborists
- Growers
- Developers
- Property Owners

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** Enhance carbon sequestration by expanding the urban forest in new development, enhancing pruning rotation, which in turn improves tree health and longevity, and proactive replacement of around 150 ash trees per year.

**Assumptions** i-Tree Eco Survey: Field data were collected along with local air pollution and meteorological data to quantify urban forest structure, forest value, and environmental benefits.

### Benefits

**Health**: Yes, stormwater control, air pollution removal

**Other benefits**: Urban forest cover protection and management offers a potentially cost-effective mechanism to reduce energy use and to store/sequester carbon. Strategy makes up 1.8% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts $CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 8,000 | 43,000 | $6,995,000 | $4,209,000 | $94 | -$3 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Clean Energy

## 15. Community Shared Solar

**Lead**: City

**Key Partners**:

- Platte River Power Authority

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Develop community shared solar for both the commercial and residential sectors.

**Assumptions** A key assumption is the approval of incentives for projects in the next five years that essentially brings the cost of shared ownership to parity with prevailing electric prices.

### Benefits

**Health**: Non-fossil fuel power generation reduces atmospheric pollutants
**Equity**: In addition to projects open to residential and commercial entities, a shared solar project will be part of the portfolio supporting a low-income electric rate.
**Other benefits**: With incentives, customer energy bills over 20 years should be reduced. Initiative makes up 0.9% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 5,000 | 13,000 | $13,480,000 | $4,829,000 | $132 | -$13 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

## Multi-Modal Planning and Development

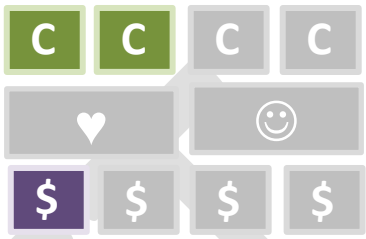
# 16. Trip Reduction Programs

**Lead**: City

**Key Partners**:

- CDOT
- NFRMPO/Smart Trips
- Car share providers

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Reduce single occupancy vehicle use by implementing a Transportation Demand Management program, adopting a ridesharing platform to connect commuters, and expanding car sharing.

**Assumptions** Assumes reductions from corporate engagement, car and ride share, and parking management strategies from research conducted by Rocky Mountain Institute.

### Benefits

**Equity**: Trip reduction and ride sharing is a highly cost effective form of transportation and can supplement transit services for people with disabilities.
**Other benefits**: Reductions in VMT (15,000,000 miles in 2020, 80,000,000 miles in 2030, 140,000,000 miles in 2050). Strategy makes up 1.6% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 4,000 | 11,000 | $886,000 | $2,850,000 | $7 | -$164 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

## Water and Land Use

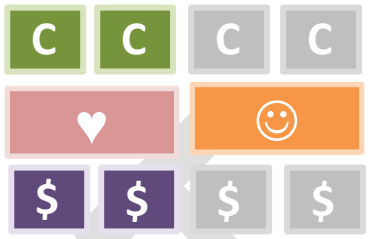
# 17. Carbon Sequestration through Land Conservation

**Lead**: City

**Key Partners**:

- Legacy Land Trust
- Colorado Water Trust
- Ditch companies
- Private landowners
- Farmers
- Developers

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** Reduce the rate at which high carbon lands (i.e., existing grassland and forested land) are converted to developed uses. Improve carbon sequestration through land restoration and improved soil health.

**Assumptions** Natural Areas Master Plan: Active farmland conservation and open space restoration; Nature in the City: land & soil conservation; Park & Recreation Policy Plan: park land build out; Low Impact Development (LID): green infrastructure development.

### Benefits

**Health**: Yes, Research suggests that nearby parks and open space, bike trails, and programming can help people increase their level of physical activity and reduce their medical expenses. Open space can help with water supply protection and flood control.
**Equity**: Parks and open spaces are key social gathering places that can make a neighborhood stronger, safer and more successful
**Other benefits**: Potential for carbon sequestration

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 4,000 | 9,000 | $68,189,000 | $0 | $106 | $106 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

Road to Zero Waste

# 18. Neighborhood Food Scraps Composting

**Lead**: City

**Key Partners**:

- Neighborhood groups
- Community gardens
- Schools

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | 2017 - 2018 | 2019 - 2020 | 2020 +

**Description** Work with community partners to establish neighborhood composting projects that provide opportunities for neighboring residents to compost their household food scraps.

**Assumptions** Assumes an additional 5% of residents begin composting annually.

## Benefits

**Health**: Compost will be available for use in gardening and farming applications that helps avoid use of chemically based fertilizers, herbicides and pesticides.
**Equity**: Compost projects may be available to low-income neighbors, providing opportunities to use compost to supplement garden soils and avoid use of chemical products.
**Other benefits**: Households within project areas will be able to compost food scraps, diverting waste from landfill disposal. Strategy makes up 0.6% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 3,000 | 9,000 | $166,700 | $275,000 | $2 | -$11 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

## Multi-Modal Planning and Development

# 19. Bicycle Network & Ridership Improvements

**Lead**: City

**Key Partners**:
- Local nonprofits
- City departments
- CDOT
- Private bike share hosts

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** Increase bicycle ridership and miles traveled by building out the 2020 Low Stress Bicycle Network, advancing bicycle programming, and launching automated bike share.

**Assumptions** Assumes a mode shift over time to best in North America by 2020, comparable to European cities by 2030, and a world leader by 2050. Only shorter vehicle trips are replaced.

### Benefits

**Health:** Significant contribution to public health and obesity prevention.
**Equity**: Equity is a key component of the 2014 Bicycle Master Plan. Bicycling is a low cost and highly accessible form of transportation.
**Other benefits**: Reductions in vehicle miles traveled (VMT) (10,000,000 miles in 2020, 50,000,000 miles in 2030, and 110,000,000 miles by 2050). Strategy makes up 1.2% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 3,000 | 8,000 | $5,756,000 | $2,129,000 | $69 | -$100 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

## Multi-Modal Planning and Development

# 20. Fuel Efficient and Electric Vehicles

**Lead:** City & EV/Automotive Industry

**Key Partners**

- State of Colorado
- Drive Electric Northern Colorado (DENC)
- Northern Colorado Clean

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** This initiative is focused on improving the performance of vehicles so that when people do drive, there are fewer resulting carbon emissions and decreased impacts to local air quality. Tactics under considerations include a campaign to provide decision makers and the public opportunities to drive an EV and experience the benefits, provide incentives that benefit users and owners of alternative-fuel vehicles, and facilitating access to third-parties who can provide EVs, maintenance, charging, and financing in one cost-effective package.

**Assumptions** Assumes continued support for existing state rebates and incentives. Efficiency of EV vehicles increases over time as the electric utility fuel mix becomes cleaner. The model assumes an increase in EV purchases above current trends and non-EV efficiency improvements greater than those required by CAFE standards.

### Benefits

**Other benefits:** Initiative increases the ease and convenience for electric vehicle ownership. Savings accrue to the public in the form of gasoline savings. GHG reduction ability increases as fuel mix improves.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 3,000 | $12,271,000 | $7,197,000 | $1 | $0 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Energy Efficiency

## 21. Street Lighting Upgrades

**Lead**: Utilities Light and Power

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** The street lighting upgrade program will replace all of the City-operated street lighting with LED lights and fixtures.

**Assumptions** All data are based on actual costs for materials and labor to perform the work involved and engineering estimates of savings.

### Benefits

**Other benefits:** This program will enable the redesign of all street lighting and optimize the lighting for comfort and safety. This program is a key component of dark skies. This program represents 0.5% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 6,000 | $4,488,000 | $406,000 | $69 | -$5 |

Key:

- C — Magnitude of carbon emissions reduction
- $ — Magnitude of cost per tons of carbon reduced
- ♥ — High potential to improve health
- ☺ — High potential to advance equity

Energy Efficiency

## 22. Building Energy Disclosure and Scoring

**Lead:** Utilities Resource Conservation and Sustainability Services

**Key Partners**

- Property management
- Real Estate
- Development

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** This program is designed to make energy efficiency a part of the decision process in the purchase, rental or lease of homes and commercial buildings and is based on energy benchmarking and disclosure (commercial) and energy scoring (home). The intent is for efficiency to add value for the buyer or occupant, including appraisal value. Over time the information would proceed from voluntary to required. Incentives for improvements are available and education is an essential element.

**Assumptions** Forecasts are based on real estate sales, discounted for estimates of participation levels. Rental and lease benefits are not (yet) included in modeling.

### Benefits

**Health:** This program will have an indoor air quality element that is inherent to efficiency.
**Equity:** A financing element can be used to fund improvements prior to sale so that all building owners can participate equally.
**Other benefits:** This program represents 1.5% of the 2020 CO2e reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 4,000 | $3,247,000 | $543,000 | $101 | -$18 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Road to Zero Waste

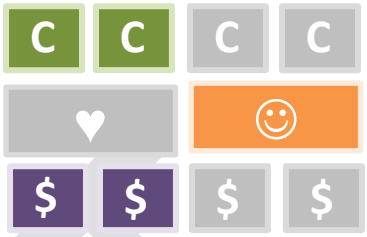
# 23. Municipal Biomass Burner

**Lead**: City

**Key Partners**:

- Colorado State Forest Service
- Larimer County
- Private arborists
- Host site (TBD)
- Citizens

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | 2017 - 2018 | **2019 - 2020** | 2020 +

**Description** Establish a biomass burner at a local government facility such as a recreational facility or municipal workshop to meet the community's needs for disposing of Emerald Ash Borer-killed trees along with other woody debris, and provide "waste-to-energy" source for heating/cooling.

**Assumptions** Assumes 70,000 trees will be impacted by the Emerald Ash Borer, each weighing at least 1 ton each. Assumes Operations Services can participate in the research. Assumes Forest Service can provide low to no cost analysis once the study is drafted.

## Benefits

**Equity**: Provides critical services to citizens under potential emergency conditions.
**Other benefits**: Organic waste is diverted from landfills that would otherwise have emitted methane. Project creates alternative source of energy. City is able to use other waste woods after Emerald Ash Borer (EAB) threat is gone. Helps prevent spread of EAB infestation and conforms to best practices to quarantine EAB. Strategy makes up 0.4% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 8,000 | $5,168,000 | $248,000 | $111 | $93 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Road to Zero Waste

# 24. Drake Water Reclamation Facility Co-Generation Site

**Lead**: City

**Key Partners**:

- Colorado State University
- Food production and retail entities
- Private haulers

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

| Immediate | 2017 - 2018 | 2019 - 2020 | 2020 + |
|---|---|---|---|

**Description** A new project to create a system that produces energy and heat from on-site generated biogas at the Drake Water Reclamation Facility. Generated heat and power would supplement onsite electricity and natural gas needs at the Drake Water Reclamation Facility.

**Assumptions** Assumes construction of "base" level co-gen system scheduled for 2016.

## Benefits

**Other benefits**: Renewable electricity and heat is generated, thereby reducing non-renewable resource use. Strategy makes up 0.4% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 7,000 | $3,529,000 | $452,000 | $119 | $46 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

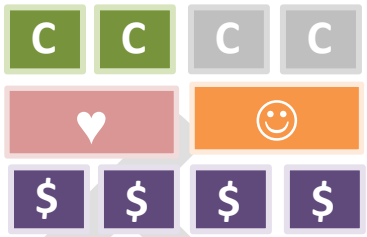
## Multi-Modal Planning and Development

# 25. Transit System Expansion

**Lead**: Transfort

**Key Partners**:
- Northern Colorado communities
- CDOT
- NFRMPO

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Full buildout of the transit network

**Assumptions** Assumes continued investment in the transit system to build out the Transfort Strategic Operating Plan.

### Benefits

**Health**: Studies show that transit use correlates to increased walking, which promotes a healthy lifestyle.
**Equity**: Transit offers low cost transportation solutions and accessibility for people with disabilities or who are otherwise unable to use an automobile.
**Other benefits**: Reductions in VMT (6,000,000 miles in 2020, 45,000,000 miles in 2030, and 135,000,000 miles in 2050). Strategy makes up 0.7% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 2,000 | 5,000 | $43,785,000 | $1,183,000 | $591 | $427 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

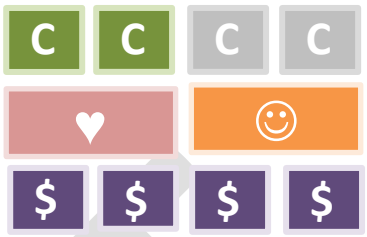
## Multi-Modal Planning and Development

# 26. Improve Pedestrian Network

**Lead**: City

**Key Partners**:
- Poudre School District
- CDOT
- Local nonprofits

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Maximize opportunities to improve the pedestrian network by building out the pedestrian network, beginning in school zones and by Transfort stops. Implement an FC Walks program.

**Assumptions** Assumes a full buildout of the network by 2050. Only trips under 0.5 miles are assumed to be replaced by walking.

### Benefits

**Health**: Significant contribution to public health and obesity prevention.
**Equity**: Buildout of the pedestrian network achieves ADA compliance and provides access to transit, schools, and other key destinations.
**Other benefits**: Reductions in vehicle miles traveled (VMT) (10,000,000 miles in 2020, 50,000,000 miles in 2030, and 110,000,000 miles by 2050). Strategy makes up 0.2% of the 2020 reduction goal.

### Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 1,000 | 2,000 | $18,084,000 | $421,000 | $1,815 | $1,640 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Road to Zero Waste

# 27. Drake Water Reclamation Facility Co-Generation Site (Expanded)

**Lead**: City

**Key Partners**:

- Colorado State University
- Food production and retail entities
- Private haulers

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** Augment/expand upon an existing new project to create a system that creates energy and heat from on-site generated biogas. Generated heat and power would supplement onsite electricity and natural gas needs at the Drake Water Reclamation Facility.

**Assumptions** Assumes construction of "base" level co-gen system scheduled for 2016.

## Benefits

**Other benefits**: Renewable electricity and heat is generated, thereby reducing non-renewable resource use. Recognizing opportunity to augment "base" level co-gen project provides best use of funding (existing construction/installation of co-gen equipment currently slated for 2016) compared to if decision is made to expand system post-construction. Strategy makes up 0.4% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 700 | 3,000 | $2,446,000 | $226,000 | $129 | $55 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Water and Land Use

# 28. Water Treatment Facility Hydropower

**Lead**: City

2020 Impacts


Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement:

**Immediate** | 2017 - 2018 | 2019 - 2020 | 2020 +

**Description** Create Water/Energy nexus innovations through resource/energy recovery from water and wastewater operations. Install a small hydropower turbine on the Horsetooth raw water pipeline.

**Assumptions** Strategy was a 2014 BFO Offer 96.1: Utilities Capital Project: Energy Optimization

## Benefits

**Other benefits**: Will provide utility electricity savings. Strategy makes up 0.1% of the 2020 reduction goal.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 400 | 2,000 | $762,000 | $177,000 | $64 | -$8 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

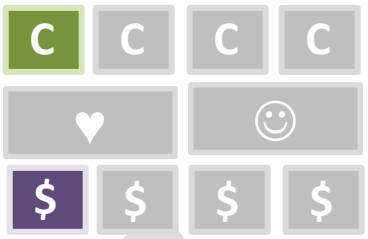
Road to Zero Waste

# Municipal Departments Green-waste Composting Sites

**Lead**: Interdepartmental Waste Stream Team

**Key Partners**:
- Environmental Services Dept. (ESD)
- Streets Dept.
- Parks & Natural Areas
- Utilities

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | 2017 - 2018 | 2019 - 2020 | 2020 +

**Description** The City will build two municipal composting sites, including one at the Hoffman Mill Crushing Facility, to compost green waste generated by municipal activities on City property. Funding for one composting site is available from a Waste Innovation Program (WIP); additional funding would be needed to support the second site. WIP is used to fund internal waste reduction programs; the budget resides in ESD but the program is overseen by a team of representatives from departments that "self-haul" waste to the landfill.

**Assumptions**: This strategy will use a recent interpretation by Colorado Department of Health & Environment permitting small-scale composting by municipalities.

**Benefits**

**Health**: Compost will be used in City-owned landscape and garden applications, which helps avoid using chemically based fertilizers, herbicides and pesticides.

**Other benefits**: This strategy will reduce the City's reliance on landfill disposal (and lower its landfill fees), reduce costs of buying commercially produced compost as well as avoid costs for using chemically based fertilizers, pesticides, and herbicides.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 100 | 100 | $95,000 | $3000 | $14 | $13 |

Key:

C — Magnitude of carbon emissions reduction

$ — Magnitude of cost per tons of carbon reduced

♥ — High potential to improve health

☺ — High potential to advance equity

Water and Land Use

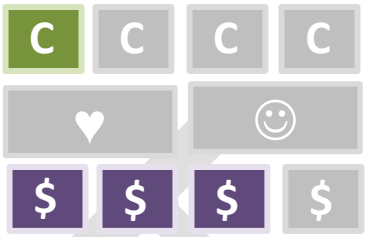
# 30. Utilities Landscape Irrigation Incentives

**Lead**: City

**Key Partners**:

- Fort Collins Utilities water customers
- Potential expansion city-wide to include water districts.

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | **2017 - 2018** | **2019 - 2020** | **2020 +**

**Description** This initiative involves Fort Collins Utilities-sponsored educational workshops, online resources, and rebates of $0.75/sq. ft. to assist citizens in installing water-friendly xeriscape gardens at their homes.

**Assumptions** Assumes maximum water usage of 10 gallons per sq. ft. per season.

## Benefits

**Other benefits**: This will reduce water consumption and therefore water treatment. Landscape efficiency has many co-benefits, not the least of which is making the landscape more climate adaptive. Reduced run-off supports the goals of low-impact development and provides more habitat benefits for wildlife.

## Impacts and Investments – At a Glance

| 2020 Impacts ($CO_2e$) | | Investments Required to Achieve Impacts – Cumulative 2016-2020 | | Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050) | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 60 | 100 | $862,000 | $225,000 | $552 | -$607 |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

Road to Zero Waste

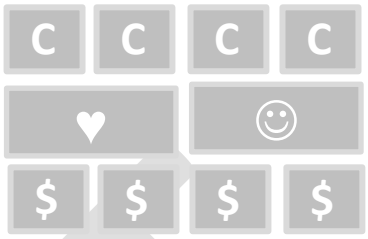
# 31. Municipal Biomass Burner Feasibility Study

**Lead**: City

**Key Partners**:

- Colorado State Forest Service
- Larimer County Private sector arborists
- Citizens

2020 Impacts




Cost/Tons of Carbon Reduced (2016 – 2050)

Time Frame to Implement: **Immediate** | 2017 - 2018 | 2019 - 2020 | 2020 +

**Description** Evaluate location and facilities suited for a biomass burner that would meet the community's needs for disposing of Emerald Ash Borer-killed trees along with other woody debris.

**Assumptions** Strategy further develops research/data from City forestry Dept. investigations.

**Benefits**

**Other benefits**: Sets the stage for future reductions through a biomass burner.

## Impacts and Investments – At a Glance

| **2020 Impacts ($CO_2e$)** | | **Investments Required to Achieve Impacts – Cumulative 2016-2020** | | **Cost Effectiveness (Cumulative Dollars Invested 2016 – 2050/Cumulative Emission Reductions 2016 – 2050)** | |
|---|---|---|---|---|---|
| GHG Impact in 2020 | GHG Impact 2016-2020 | City & Community Costs | City & Community Savings | Gross Cost/GHG | Net Cost/GHG |
| 0 | 0 | $75,000 | $0 | | |

Key:

C Magnitude of carbon emissions reduction

$ Magnitude of cost per tons of carbon reduced

♥ High potential to improve health

☺ High potential to advance equity

# ADDITIONAL STRATEGIES

**Strategy:** CAP Innovation & Pilot Projects Fund
**Team:** Pilot Projects & District Scale Initiatives
The purpose of the Climate Action Plan Innovation/Pilot Projects Fund is to foster locally innovative and relevant approaches to objectives outlined in the City's CAP goals. The aim of the program is to lower barriers to funding important projects not accounted for in a department's annual budget, to allow the City to act nimbly when presented with CAP-related opportunities (i.e., cash match for grants), and to test focused concepts in the community that might later be replicated throughout the city. Initially, this fund would be open to projects developed within City departments and through collaborations with other agencies. In the future, it could be extended to projects from residents and the local business community. Examples of projects the fund could support include:

- A 2016 pilot of the HEAL (Home Energy Affordability Loan) program initiated by the Clinton Climate Initiative, in advance of a full launch in 2017-2018 (if funded in the BFO process).
- A carbon sequestration analysis to better understand the impact that sequestering carbon on a local basis can have on the City's greenhouse gas emission reduction goals.
- A net zero development pilot to explore incentives, policies, and regulations to encourage energy-efficient buildings where the actual annual delivered energy is less than or equal to the on-site renewable exported energy.

Other cities have incorporated similar funding tools into their Climate Action Plans. Portland, OR, for example, uses a Clean Energy Fund focused on making GHG-reducing efforts accessible to households and building owners throughout the community. Additionally, Minneapolis, MN offers a Community Innovation Fund available to neighborhood organizations for innovative and scalable projects that meet the City's overall strategic goals, one being protection of the environment through waste and energy reduction

**Strategy**: Municipal Departments Green-waste Composting Site
**Team**: Road to Zero Waste
The City will build two municipal composting sites—including one at the Hoffman Mill Crushing Facility—to compost green waste generated by municipal activities on City property. Funding for one composting site is available from the Waste Innovation Program (WIP), a fund used for internal waste reduction programs; additional funding would be needed to support the second site. The budget for WIP resides in the City's Environmental Service Department, but the program is overseen by a team of representatives from departments that "self-haul" waste to the landfill. This strategy will use a recent interpretation by Colorado Department of Health & Environment permitting small-scale composting by municipalities.

Compost will be used in City-owned landscape and garden applications, which helps avoid using chemically based fertilizers, herbicides, and pesticides. This strategy will lower the City's landfill fees (and reduce the City's reliance on landfill disposal), reduce costs of buying commercially produced compost, and avoid costs for using fertilizers, pesticides, and herbicides.

**Strategy**: Commercial Lawn and Garden Equipment
**Team**: TBD
Accelerate the purchase and use of alternative fuel (i.e., electric or propane) commercial lawn and garden equipment by the City (e.g., Parks, Forestry, and Cemetery), and additionally explore the possibility of adding requirements or incentives for use of alternative fuel commercial lawn and garden equipment for work contracted by the City. Parks, Forestry, and Cemetery currently own a number of electric hand blowers, chain saws and hedge trimmers, and a mid-sized propane operated turf mower. This strategy aligns with efforts by the Regional Air Quality Commission (RAQC) to target voluntary measures to reduce ozone precursor emission from this type of equipment. The RAQC may be developing a market assessment for this equipment, which will be useful as this strategy evolves. As the City develops its own Municipal Sustainability Plan to achieve the carbon reduction goals of 20% below 2005 levels by 2020 for the Municipal Organization, this is a strategy that should be evaluated against other potential strategies, e.g., renewable energy, energy efficiency, etc.

**Strategy:** Colorado Communities for Climate Action
**Team**: Not applicable

Many Colorado communities with climate-protection goals, including Fort Collins, are grappling with the reality that local actions alone will not achieve long-term climate goals. Local governments need a better framework of state and federal climate policies to enable effective local climate actions. In 2016, a new coalition of Colorado local governments, *Colorado Communities for Climate Action*, formed to collaboratively advocate for state and federal actions that support and complement local climate-protection actions. As of mid-February 2016, six local governments have joined the coalition, including Fort Collins. Recognizing how important federal policies such the Corporate Average Fuel Economy Standards (CAFE) and the proposed Clean Power Plan, and state policies that address waste, transportation and energy will be, this coalition will play an important role in supporting action at other levels of government that will enhance progress on Fort Collins' own goals.

**CAP Program Support**

Already Funded
**Strategy:** Energy Code Performance Program
**Team:** Energy Efficiency
The purpose of this initiative is to provide resources and one FTE (full-time equivalent) staff position to provide technical expertise and verify that expected performance levels are achieved as the Fort Collins building code is implemented. The initiative will provide resources targeting energy code and related building performance compliance through education, verification field testing, and during permit application review.

**Strategy:** Climate Economy Advisor (Contractual FTE)
**Team:** Climate Economy and Partnerships
The purpose of the Climate Economy contract position to is to provide additional expertise and capacity related to aid in identifying, obtaining, and implementing private sector capital and novel financing sources in service of CAP initiatives. In addition, they will find mechanisms for leveraging City funds in conjunction with grant opportunities, public-private partnerships, and other innovative financing solutions.

Immediate

**Strategy:** Sustainability Services Area (SSA) Financial Analyst
This initiative focuses on additional staff support for the Sustainability Services Area to enable the development of business plans and financial analysis around CAP strategies, as well as other initiatives led by SSA. The strategy consists of 1 FTE staff position that can provide technical assistance and advice to the CAP teams on developing business plans, revenue and expense forecasts that include initial investment and on-going operations, decision support analyses, alternative evaluations, cost benefit analyses, and guide the understanding of threats and opportunities. This staff position will work closely with the Climate Economy Advisor and the Financial Services Area.

**Strategy:** Asset Management/Electrical Engineer
This initiative consists of one FTE staff position that will respond to electric grid planning challenges for substantial additions of distributed generation and storage projects.

**Strategy:** CAP Program Manager
This initiative supports one FTE staff position to take on the full-time management of the City's climate action planning efforts. The staff member will lead, plan, and organize all climate action planning with the support of the CAP Executive Team and a CAP Program Assistant.

Long Term

**Strategy:** Cost of Carbon Policy Taskforce
**Team:** Clean Energy
Significant adoption of renewable energy, energy efficiency and transportation measures is closely tied to a "cost of carbon" policy. A strong recommendation of the Clean Energy team is to convene a serious community conversation about local policy to counteract the market failure that assigns no direct cost to the detrimental impact of atmospheric carbon. Initiative assumes a broad conversation including community stakeholders and PRPA (including Clean Power Plan impacts) will occur.

**Strategy:** Energy Program Coordinator, FC Utilities
**Team:** Clean Energy
This initiative entails one FTE staff to deliver existing and expanded renewables programs.

**Strategy:** Permitting Staff Plan Reviewer/Technician, Neighborhood Services
Team: Clean Energy

This initiative entails one FTE staff to respond to the review and permitting of expanding residential and commercial renewables projects.

**Strategy:** Municipal Solar Leasing Initiative
**Team:** Clean Energy Team
Consider the feasibility of entering into leases for larger solar projects on municipal facilities (coordinated with municipal energy efficiency initiatives).

**Abbreviations**

- GHG – Greenhouse gases
- $MTCO_2e$ – Metric tons of $CO_2$ equivalent
- BFO – Budgeting for Outcomes, the City's budgeting process
- NFRMPO – The North Front Range Metropolitan Planning Organization
- CDOT – Colorado Department of Transportation
- CSU – Colorado State University
- PRPA – Platte River Power Authority
- ESD – Environmental Services Department (City of Fort Collins)
- CHP – Combined Heat and Power plant
- ROI – Return on Investment

**CAP Initiatives - Ranking by Scenario**
**Working Document - DRAFT Data as of 2.29.2016**
Note: Bold Line indicates where reductions needed (with CAFÉ standards) has been achieved

| Rank | Accelerated Pathway (Fastest to 2020) | | | | | Rank by Impact | Least Cost Pathway (sorted by gross cost/GHG) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SI Team | Initiatives | Impact (tons) | Impact (%) | | | SI Team | Initiatives | Gross Cost/GHG | Net Cost/GHG |
| 1 | EE | Business Efficiency Portfolio - Base | 153,000 | 30.8% | | 19 | RZW | Neighborhood Food Scraps Composting | $19 | ($12) |
| 2 | RZW | Community Recycling Ordinance Implementation | 106,290 | 21.4% | | 9 | MM | Change Land Use Patterns | $21 | ($240) |
| 3 | CE | Platte River Power Generation - Renewables (Tariff 7) | 41,660 | 8.4% | | 3 | CE | Platte River Power Generation - Renewables | $29 | $29 |
| 4 | MM | Expand congestion management system | 35,530 | 7.1% | | 2 | RZW | Community Recycling Ordinance Implementation | $52 | $34 |
| 5 | EE | Business Efficiency Portfolio - Expanded | 29,900 | 6.0% | | 4 | MM | Expand congestion management system | $53 | ($211) |
| 6 | EE | Home Efficiency Portfolio - Base | 25,800 | 5.2% | | 1 | EE | Business Efficiency Portfolio - Base | $60 | ($106) |
| 7 | CE | Power Purchase Agreement for CSU CHP | 21,300 | 4.3% | | 6 | EE | Home Efficiency Portfolio - Base | $77 | ($83) |
| 8 | EE | Home Efficiency Portfolio - Expanded | 20,800 | 4.2% | | 16 | MM | Trip Reduction Programs | $81 | ($180) |
| 9 | MM | Change Land Use Patterns | 17,520 | 3.5% | | 12 | RZW | Construction and Demolition Sorting Facility | $127 | $127 |
| 10 | CE | Solar Power Purchase Program | 14810 | 3.0% | | 7 | CE | Power Purchase Agreement for CSU CHP | $144 | $144 |
| 11 | EE | Energy Code Performance | 13,400 | 2.7% | | 14 | L&W | Carbon Sequestration through Enhanced Tree Health | $165 | $66 |
| 12 | RZW | Construction and Demolition Sorting Facility | 11,000 | 2.2% | | 8 | EE | Home Efficiency Portfolio - Expanded | $255 | $97 |
| 13 | CE | Utilities Rooftop Solar Incentives | 9,100 | 1.8% | | 5 | EE | Business Efficiency Portfolio - Expanded | $294 | $130 |
| 14 | L&W | Carbon Sequestration through Enhanced Tree Health | 8,400 | 1.7% | | 28 | CE | Water Treatment Facility Hydropower | $456 | $350 |
| 15 | CE | Community Shared Solar | 4,720 | 0.9% | | 11 | RZW | Drake Water Reclamation Facility Co-Generation Site - base | $536 | $468 |
| 16 | MM | Trip Reduction Programs | 4,280 | 0.9% | | 21 | EE | Energy Code Performance | $544 | $388 |
| 17 | L&W | Carbon Sequestration through Land Conservation | 3,200 | 0.7% | | 25 | RZW | Municipal Biomass Burner | $667 | $635 |
| 18 | MM | Bicycle Network & Ridership Improvements | 2,900 | 0.6% | | 18 | MM | Bicycle Network & Ridership Improvements | $708 | $446 |
| 19 | RZW | Neighborhood Food Scraps Composting | 2,400 | 0.6% | | 10 | CE | Solar Power Purchase Program | $723 | $458 |
| 20 | EE | Street Lighting Upgrades | 1,900 | 0.5% | | 13 | CE | Utilities Rooftop Solar Incentives | $728 | $372 |
| 21 | RZW | Municipal Biomass Burner | 1780 | 0.4% | | 26 | RZW | Drake Water Reclamation Facility Co-Generation Site - expanded | $744 | $675 |
| 22 | MM | Transit System Expansion | 1,700 | 0.4% | | 20 | EE | Street Lighting Upgrades | $748 | $680 |
| 23 | EE | Building Energy Scoring | 1,680 | 0.3% | | 15 | CE | Community Shared Solar | $1,018 | $653 |
| 24 | MM | Fuel Efficient and Electric Vehicles | 1300 | 0.3% | | 29 | RZW | Municipal Departments Green-waste Composting Sites | $1,077 | $1,044 |
| 25 | RZW | Drake Water Reclamation Facility Co-Generation Site - Base | 650 | 0.3% | | 23 | EE | Building Energy Scoring | $3,239 | $3,089 |
| 26 | RZW | Drake Water Reclamation Facility Co-Generation Site - expanded | 630 | 0.1% | | 24 | MM | Fuel Efficient and Electric Vehicles | $4,662 | $1,928 |
| 27 | MM | Improve pedestrian network | 400 | 0.1% | | 17 | L&W | Carbon Sequestration through Land Conservation | $7,432 | $7,432 |
| 28 | CE | Water Treatment Facility Hydropower | 74 | 0.1% | | 22 | MM | Transit System Expansion | $9,689 | $9,427 |
| 29 | RZW | Municipal Departments Green-waste Composting Sites | 3670 | 0.0% | | 27 | MM | Improve pedestrian network | $11,240 | $10,978 |
| 30 | RZW | Municipal Biomass Burner Feasibility Study | 0 | 0.0% | | 30 | RZW | Municipal Biomass Burner Feasibility Study | - | - |
| 31 | L&W | Utilities Landscape Irrigation Incentives | | | | 31 | L&W | Utilities Landscape Irrigation Incentives | - | - |
| **2020 Reductions Needed (without CAFÉ) - 552,647** | | | | | | **Total Cost of all Strategies -** $414,096,000 (Gross) | | | **Gross Cost/GHG** | **Net Cost/GHG** |
| **2020 Reductions Needed (with CAFÉ) - 497,062** | | | **539,794** | **108.6%** | | **Total Cost of all Strategies** - $154,576,000 (Net) | | | **reduced - $203** | **reduced - $76** |
| | | | | | | **Cumulative Gross Cost of the Accelerated Pathway - $235,811,000** | | | | |
| | | | | | | **Cumulative Gross Cost of the Least Cost Pathway - $182,481,000** | | | | |

**Notes:**
1. All cost estimates are currently being vetted by the teams and are provided for estimate purposes only.
2. Yellow boxes indicatefull dataset not yet entered into the model.
2. Assumed discount rate is 5%
3. In this spreadsheet, costs include City and Community Costs