

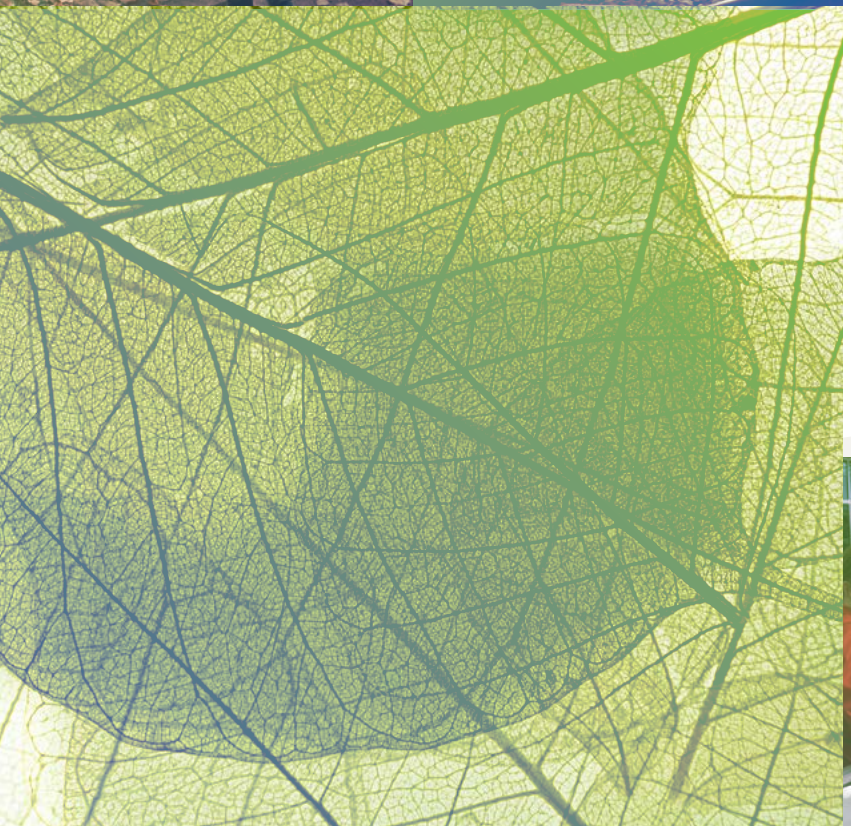


CITY OF LAKEWOOD

SUSTAINABILITY PLAN
2015

Lakewood
Full of Possibilities.





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RESOLUTION OF CITY OF LAKEWOOD PLANNING COMMISSION

On April 1, 2015, the Lakewood Planning Commission held a public hearing at the Lakewood Civic Center, 480 South Allison Parkway, Lakewood, Colorado, to consider the *City of Lakewood Sustainability Plan*.

Motion was made by COMMISSIONER MESCH and seconded by COMMISSIONER MILLER to ADOPT AND RECOMMEND APPROVAL of the *City of Lakewood Sustainability Plan* by City Council. The roll having been called, the vote of the Lakewood Planning Commission was as follows:

Johann Cohn	Aye
Stuart Crawford	Aye
Robert Eadie	Aye
Henry Hollender	Aye
Julia Kirkpatrick	Absent
Carrie Mesch	Aye
Dale Miller	Aye

FINDINGS OF FACT AND ACTION

The Planning Commission finds that:

A. The City of Lakewood has prepared a document entitled the *City of Lakewood Sustainability Plan*.

B. The Sustainability Plan guides the City in efforts to achieve sustainability through goals and targets that ensure we balance environmental, social, and economic well-being.

C. Six work groups were formed to develop the Sustainability Plan's goals, targets, objectives, and strategies. Work groups consisted of Lakewood residents, City staff, community stakeholders, and industry experts. In total, 24 work group meetings were attended by 87 work group participants.

D. Four joint study sessions were held with the Planning Commission and City Council to update the City Council on the status of the development of the Sustainability Plan.

E. Eight open houses were held to gain input from residents. In addition, drafts of the Sustainability Plan were placed on the website and the opportunity for the public to comment on the draft Sustainability Plan was made available on the website.

F. The Sustainability Plan complements and expands upon the goals of the draft City of Lakewood Comprehensive Plan, *Moving Forward Together: 2025* through measurable targets and specific strategies.

NOW, THEREFORE, BE IT RESOLVED by the City of Lakewood Planning Commission on April 1, 2015:

1. The *City of Lakewood Sustainability Plan*, dated March 24, 2015, is hereby ADOPTED AND RECOMMENDED FOR APPROVAL to the Lakewood City Council.

Julia Kirkpatrick, Chair

Henry Hollender, Secretary of the Planning Commission

CERTIFICATION

I, WALTER M. JAUCH, Secretary to the City of Lakewood Planning Commission, do hereby certify that the foregoing is a true copy of a resolution duly adopted by the Lakewood Planning Commission at a Public Hearing held in Lakewood, Colorado, on the 1st day of April, 2015, as the same appears in the minutes of said meeting.

April 1, 2015
Date approved

Walter M. Jauch, Secretary to the Planning Commission

2015-39

A RESOLUTION

APPROVING THE CITY OF LAKEWOOD SUSTAINABILITY PLAN

WHEREAS, the City Council has the authority to review and approve the City of Lakewood Sustainability Plan (the "Sustainability Plan") as adopted by the Lakewood Planning Commission; and

WHEREAS, six (6) work groups, which consisted of Lakewood residents, City staff, community stakeholders and industry experts, were formed to develop goals, targets, objectives and strategies for the Sustainability Plan; and

WHEREAS, a total of twenty-four (24) work group meetings were held and attended by eighty-seven (87) work group participants; and

WHEREAS, eight (8) open houses were held to gain input from residents; and

WHEREAS, drafts of the Sustainability Plan were placed on the City's website, and the opportunity for the public to comment on drafts of the Sustainability Plan was also made available on the City's website; and

WHEREAS, the Sustainability Plan complements and expands upon the goals of the Lakewood Comprehensive Plan, *Lakewood 2025: Moving Forward Together*, through measurable targets and specific strategies; and

WHEREAS, the Lakewood Planning Commission unanimously adopted the Sustainability Plan at a public hearing held on April 1, 2015.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Lakewood, Colorado, that:

SECTION 1. The City of Lakewood Sustainability Plan as presented to City Council and adopted by Planning Commission on April 1, 2015, is hereby APPROVED.

SECTION 2. The Mayor and City Clerk are hereby authorized and directed to affix their signatures to the Sustainability Plan as evidence of the approval and adoption of the same by the City Council.

SECTION 3. This Resolution shall become effective immediately upon its adoption.

INTRODUCED, READ AND ADOPTED by a vote of 8 for and 2 against at a regular meeting of the City Council on May 11, 2015, at 7 o'clock p.m. at Lakewood City Hall, 480 South Allison Parkway, Lakewood, Colorado.

ATTEST:

CITY OF LAKEWOOD SEAL COLORADO

Margy Greer, City Clerk

Bob Murphy, Mayor

APPROVED AS TO FORM:

Tim Cox, City Attorney

ACKNOWLEDGEMENTS

The City of Lakewood Sustainability Plan would not have been possible without the support and dedication of City of Lakewood leadership, staff, and the Sustainability Plan Work Group Participants.

CITY COUNCIL

Mayor Bob Murphy
Ramey Johnson
Karen Kellen
Scott Koop
Cindy Baroway
Shakti
Pete Roybal
David Wiechman
Adam Paul
Karen Harrison
Tom Quinn

PLANNING COMMISSION

Stuart Crawford
Julia Kirkpatrick
Johann Cohn
Jay Goldie
Dale Miller
Henry Hollender
Carrie Mesch

CITY OF LAKEWOOD STAFF

Travis Parker, *Planning Department Director*
Jonathan Wachtel, *Sustainability Manager*
Lynn Coppedge, *Sustainability Planner*

TECHNICAL ASSISTANCE

Emily Artale, *Lotus Engineering & Sustainability, LLC*
Ligature Creative Group

SUSTAINABILITY PLAN WORK GROUP STAFF PARTICIPANTS

CITY MANAGER'S OFFICE

Mary Ruther, *Strategic Initiatives Manager*
Rachel Griffin, *Economic Development Specialist*

COMMUNITY RESOURCES DEPARTMENT

Allison Scheck, *Marketing and Communications Relations Manager*
Drew Sprafke, *Regional Parks Supervisor*
John Paliga, *Landscape Architect*
Peggy Boccard, *Recreation Manager*
Robert Buck, *Fitness/Wellness Programs Administrator*
Steve Carpenter, *Urban Parks Manager*

EMPLOYEE RELATIONS

Lauren Briggs, *Employee Wellness Coordinator*

FINANCE DEPARTMENT

Terri Kindsfather, *Purchasing/Mailroom Supervisor*

INFORMATION TECHNOLOGY DEPARTMENT

Pieter Bruintjes, *Telecommunications Engineer*

PLANNING DEPARTMENT

Alexis Moore, *Associate Planner*
Amy Deknikker, *Associate Planner*
Kara Mueller, *Associate Planner*
Mallory Bettag, *Associate Planner*

POLICE DEPARTMENT

Gail Spencer, *Code Enforcement Coordinator*

PUBLIC WORKS DEPARTMENT

Alan Searcy, *Stormwater Quality Coordinator*
Bill Clayton, *Codes Administrator*
Ken Hargrave, *Civil Engineer III*
Kyle Beck, *Special Project Manager*
Nina Hoffert, *Fleet Manager*
Pat Matthews, *Environmental Services Technician*

SUSTAINABILITY PLAN WORK GROUP RESIDENTS & STAKEHOLDERS

Adam Paul, *City Council, Ward 4*
Angelo Minuti
Bonnie Kelnberger
Brian Nicholson
Cabell Hodge
Cara Hartsen
Carol Marsala
Carol Quinn
Carrie Mesch, *Planning Commission, at-large*
Carrie Sonneborn
Christy Cerrone
Dana Gutwein
Darlene Boord
David Anderson
Deb Phenice
Derek and Kamise Mullen
Diane Frei
Dylan Anderson
Edie Bryan
Eleanor Jefferson
Ellen Kennedy
Emily Artale
Emily Freeman
Frank Rukavina

Gary Harty
Gay Dugan
Henry Hollender, *Planning Commission, at-large*
Janan Platt
Jen Teeuwen
Jessica Prosser
Johann Cohn, *Planning Commission, Ward 3*
John Peters
Julia Kirkpatrick, *Planning Commission, Ward 2*
Julie Byerlein
Kathi Hasfjord
Ken Bagstad
Ken Boden
Maddie Nichols
Marjorie Griek
Max Gibson
Mel Johnston
Mike Seibert
Molly Hanson
Nichole Goodman
Padma Polepeddi
Patricia Merkel
Rob Smith
Robert Brayden
Robert Melvin
Robin Smith
Ron Chard
Ran McCaw
Sarah Davis
Shakti, *City Council, Ward 3*
Stephen Alley
Susan Franklin
Taylor Jones
Theresa Worsham
Thomas Slabe
Tim Galloway
Tim Rehder
Tom Figel
Tom Quinn, *City Council, Ward 5*
Tricia Lee
Yvette Alley
Zachary Vigil

SPOTLIGHT CONTRIBUTORS

Dana Gutwein, ***Southern Gables Neighborhood:***
Southern Gables Sustainable Neighborhood, Page 100

Derek and Kamise Mullen,
Addenbrooke/Belmar Park Neighborhood:
Everitt Farms: A Vision for Change, Page 59

Doug Wells, ***Belmar Neighborhood:***
Walk / Run / Bike Belmar, Page 107

Drew Sprafke, ***Regional Parks Supervisor, City of Lakewood:***
Lakewood's Natural Systems and Regional Parks, Page 131

GRID Alternatives: *Renewable Energy for Everyone, Page 37*

John Paliga, ***Landscape Architect, City of Lakewood:***
Morse Park Rain Garden, Page 138

Julie Elam, ***Heritage Center Visitor Services Coordinator, City of Lakewood:***
Zero Waste at Lakewood Heritage Center, Page 75

Ken Bagstad, ***U.S. Geological Survey:***
Ecosystem Services, Page 126

Kenneth Boden, ***Denver Regional Council of Governments:***
Way to Go: A Better Way to Build Community, Page 154

Rob Smith, ***Rocky Mountain MicroFinance Institute:***
Microfinancing, Page 60

SustainAbility: *Learning from Neighboring Communities, Page 89*

Thomas Slabe, ***Eiber Neighborhood:***
Garden for Wildlife: A Sustainable Thing to Do in the City, Page 129

Tom Quinn, ***City Council, Ward 5:***
Foreword: Climate Change and the City of Lakewood, Page 16

DESIGN ACKNOWLEDGEMENTS

Ligature Creative Group
www.ligcreative.com

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Lakewood
Colorado

Office of the Mayor
Bob Murphy

480 South Allison Parkway
Lakewood, Colorado 80226-3127
303.987.7047 Voice
303.987.7057 TDD

MAY 28, 2015

I AM PROUD TO INTRODUCE THE CITY OF LAKEWOOD'S FIRST SUSTAINABILITY PLAN. This is a remarkable milestone that will ensure Lakewood's leadership and excellence in sustainability. Sustainability is a subject we must all care about because it helps us consider the impacts of our decisions and behaviors so that we can achieve a balance among the natural environment, social values, and the economy.

This document offers ambitious goals, detailed strategies, and concrete measurements aimed at advancing a culture of permanence where community leaders, businesses, and residents work together to ensure that Lakewood remains a healthy and vibrant place for generations to come.

Over the past several years, the City of Lakewood has taken large strides toward sustainability within our municipal operations and throughout our community from expanding opportunities for solar access to enabling residents to lead sustainable initiatives within their own neighborhoods. It is evident that our community cares deeply about sustainability.

I invite you to view this plan as a living document, reflecting our community's vision and accelerating our progress toward sustainability. Please delve into this plan to see where we need to head in the coming years.

This plan wouldn't be possible without our community. Thank you to the hundreds of residents, businesses and community partners who generously donated their time, knowledge, and passion to create a sustainable vision and strategy for Lakewood. Now that our goals are before us, it is time for each and every one of us to do our part to turn this vision into a reality and ensure that Lakewood remains a great city for generations to come.

Sincerely,

Bob Murphy

Bob Murphy
Mayor

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TABLE OF CONTENTS

WHAT IS SUSTAINABILITY?

SUSTAINABILITY MEANS creating balance among the environment, the economy, and society to ensure that practices and decisions do not compromise the quality of life for future generations. Sustainability is not an end goal, but an approach that recognizes the interplay between natural, economic, and social interests. As our population and economy continue to grow, we depend on the resources and services that our surrounding ecosystems provide. Sustainable development requires an understanding of these systems and how we can survive and thrive within the patterns and cycles of the natural world.

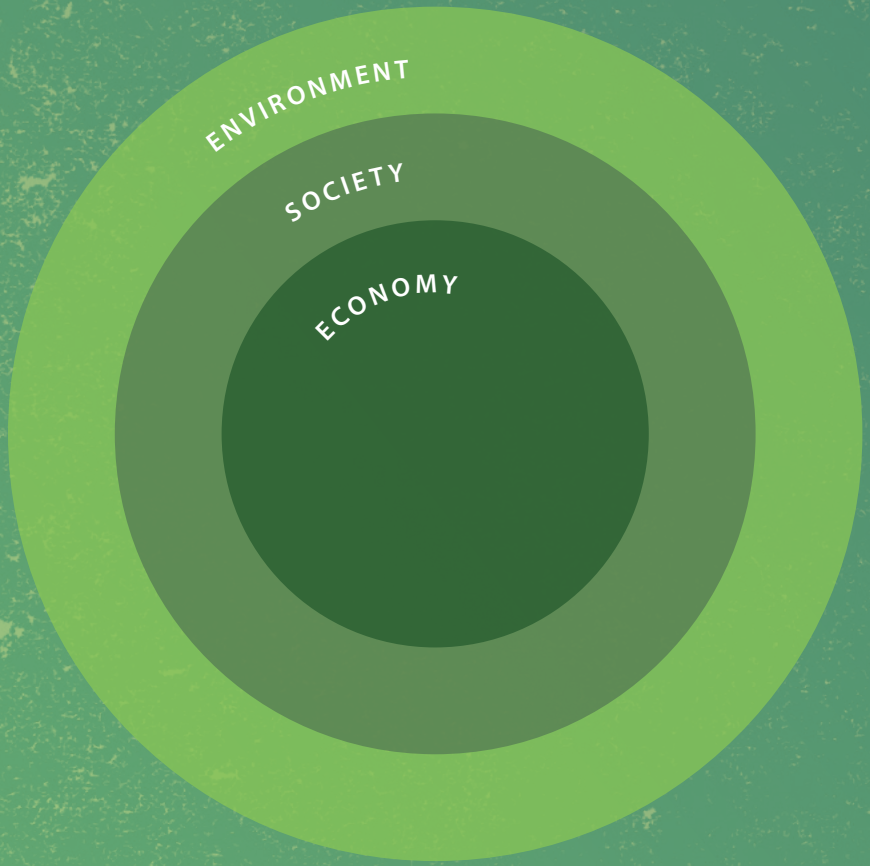
In Lakewood, the term sustainability made its first appearance in the 2003 Comprehensive Plan, which included a chapter on Community Sustainability. Since then, support for sustainability has grown throughout the Lakewood community and City organization:

- 2003 – City of Lakewood Comprehensive Plan included a chapter on Community Sustainability.
- 2007 – Employees from each City department formed the Employees Committee for a Sustainable Lakewood (ECSL) to provide education and outreach and launch employee-led sustainability events and initiatives.
- 2008 – The ECSL hosted the first annual Sustainability Awards ceremony to recognize community, youth, and employee initiatives.
- 2009 – City Council approved funding for the ECSL.
- 2010 – The sustainability coordinator position was funded through federal grants and placed in the City Manager's Office.
- 2012 – The Sustainability Division was formed and relocated to the Planning Department.
- 2013 – The Community Sustainability Framework was endorsed by City Council.
- 2013 – The Sustainability Plan process began, gathering community input through open houses, work groups, and the City website.

ILLUSTRATING THE CONCEPT OF SUSTAINABILITY

The concept of sustainability can be illustrated through two different models. First, the "nested model" illustrates our dependence on a healthy environment to support social well-being, which in turn enables us to sustain a robust economy. In other words, without a healthy environment, a community would be unable to achieve social well-being and economic success.

Second, the "overlapping-circles model" illustrates the importance of considering equally the environmental, social, and economic impacts of our decisions and behaviors. It is the goal of sustainability to achieve balance between the natural environment, social values, and the economy.



WHAT IS A SUSTAINABILITY PLAN?

COMMUNITIES TODAY FACE A WIDE VARIETY OF CHALLENGES that affect their ability to move toward a vibrant future, including natural resource availability, pollution, social isolation, public health concerns, and climate change. Local governments are uniquely suited to address these complex challenges through sustainability planning, which incorporates strategic assessments of challenges, development of creative solutions, and tracking progress toward community goals. Successful implementation of sustainability plans support the long-term resilience of communities.

The first step in developing the City of Lakewood Sustainability Plan was the formation of the Sustainability Division in 2012 and subsequent development of the Community Sustainability Framework, which states Lakewood's commitment to creating a culture of permanence where community leaders, businesses, and residents recognize that the vibrancy of our social, economic, and environmental systems are interdependent and work together to ensure that Lakewood and the surrounding region remains a healthy and vibrant place for generations to come.

The formal planning process for the City of Lakewood Sustainability Plan began in the fall of 2013 with a series of community open houses and was developed over the past year and a half through a series of working groups consisting of residents, City staff, community partners, and industry experts. In total, the planning process included 33 meetings and engaged more than 400 residents, representing more than 450 hours of community support and dedication. The City of Lakewood is grateful to all the residents and stakeholders who contributed to the development of this plan.

The planning process engaged more than 400 residents, representing more than 450 hours of community support and dedication.

HOW DO WE READ IT?

The City of Lakewood Sustainability Plan was developed to improve the social, environmental, and economic conditions of the Lakewood community through seven chapters that address topics identified through community outreach and best practices from sustainability leaders and organizations around the country.

The first chapter, **Climate Change and Adaptation**, focuses on reducing our greenhouse gas emissions; protecting and preserving our social, economic, and environmental well-being; and preparing for future challenges associated with a changing climate, thereby laying the foundation for the six subsequent chapters in the plan, which include the following topics:

- **Energy, Water, and the Built Environment**
- **Sustainable Economy**

- **Zero Waste**
- **Community Cohesion and Public Health**
- **Natural Systems**
- **Transportation**

Each chapter is organized around **Goals, Targets, Objectives, Indicators,** and three types of **Strategies.**

- **Goals** reflect the ultimate desired state or condition of the community related to each chapter.
- **Targets** are measurable results that indicate whether or not we are achieving our goals.
- **Objectives** are clear desired results intended to move the community toward the broader goal.
- **Indicators** are measurable pieces of information that demonstrate whether or not we are trending in the right direction.
- **Strategies** are actions that our community can take to achieve our goals, targets, and objectives. There are three types of strategies included in the Sustainability Plan:
  - **Implementation Strategies** outline a series of action steps, including assessments, policies, operational improvements, infrastructure projects, and programs and services. The benefits and feasibility of each implementation strategy are assessed through two tables located at the end of each chapter that serve to inform decision making and prioritization.
  - **Supporting Strategies** are actions that are common to each chapter and support multiple implementation strategies with minor variations depending on the topic. The four types of supporting strategies found throughout the plan include collaboration, education and promotion, tools and technology, and research and tracking.
  - **Crosscutting Strategies** leverage the cross-benefits of multiple implementation strategies. There are three crosscutting strategies in the Sustainability Plan: **the Sustainable Energy and Water Resource Center, the Sustainable Business Hub, and the Sustainable Neighborhoods Program.** These strategies are introduced as implementation strategies in the Energy, Water, and Built Environment; Sustainable Economy; and Community Cohesion and Public Health chapters, but are incorporated into each of the plan's goals in order to enhance the scope and effectiveness of implementation.

Supplemental content providing data, illustrating concepts, and highlighting community and City initiatives are found throughout the plan.

HOW DOES IT INTERACT WITH THE COMPREHENSIVE PLAN?

The Sustainability Plan expands and complements the existing communitywide vision and sustainability efforts of the Lakewood community. It will build upon the recommendations contained in the City of Lakewood Comprehensive Plan, Lakewood 2025: Moving Forward Together, which was adopted in 2015 as a guide for physical and economic development in the city over the next 10 to 20 years. Distinct from the Comprehensive Plan, the Sustainability Plan will set measurable targets that will be tracked and updated on a regular basis. In this regard, the Sustainability Plan will be a flexible document that will be regularly adjusted based on new data and information.

HOW DO WE USE IT?

The Sustainability Plan is intended to be an interactive document that City leadership, staff, and the community can use to launch, expand, and track sustainability initiatives. The Sustainability Plan can be applied in several ways.

- Readers can use it to better understand sustainability topics through chapter introductions and supplemental information scattered throughout the document.
- City leadership can use it to prioritize implementation and resource allocation by reviewing strategies and their associated costs and benefits.
- City staff can use it to prioritize and guide implementation by referring to strategy details.
- Community members, City staff, and City leadership can track the City's progress through measurable targets and indicators.

The Sustainability Plan does not include a specific implementation schedule because many of the strategies require multiple steps of implementation, each of which may be ongoing, short-term or long-term in nature. The implementation strategies contained in the plan should be viewed as a menu of opportunities to achieve the community's goals and targets. Implementation of each strategy is dependent upon resource availability, windows of opportunity, and community support.

Strategy Benefits and Strategy Feasibility tables included in each chapter summarize the potential environmental, economic, and social benefits of each strategy as well as implementation costs, potential for payback or revenue, and communitywide financial impacts for each strategy. This analysis provides residents, stakeholders, City staff, and elected officials with an overall summary of the range of benefits and cost associated with each strategy and can be used to assist in identifying funding and implementation priorities. ■

The Sustainability Plan will set measurable targets that will be tracked and updated on a regular basis. In this regard, the Sustainability Plan will be a flexible document that will be regularly adjusted based on new data and information.

SUSTAINABILITY PLAN STRUCTURE

GOAL

TARGETS

OBJECTIVES

- INDICATORS

IMPLEMENTATION STRATEGIES

SUPPORTING STRATEGIES

CROSSCUTTING STRATEGIES

SUPPLEMENTAL INFORMATION

- CONCEPTS
- SPOTLIGHTS
- DATA

DEFINITIONS

- **GOAL:** desired state or condition of the community
- **TARGET:** Numeric representation of the goal
- **OBJECTIVE:** Clear desired results intended to move the community toward the goal
- **INDICATOR:** Measurable pieces of information that demonstrate trends
- **IMPLEMENTATION STRATEGY:** Series of action steps that help the community achieve the goal
- **SUPPORTING STRATEGY:** Common actions that support multiple implementation strategies and achievement of the goal
- **CROSSCUTTING STRATEGY:** Implementation Strategies that are incorporated into multiple chapters to enhance implementation
- **CONCEPT:** Explanation of complex topics
- **SPOTLIGHT:** Features sustainability initiatives by a community member or City employee
- **DATA:** Charts and graphics that illustrate information and statistics

FOREWORD

CLIMATE CHANGE AND THE CITY OF LAKEWOOD

BY TOM QUINN, CITY COUNCIL, WARD 5

OF ALL THE SUSTAINABILITY CHALLENGES facing Lakewood and other Colorado cities, climate change stands out as a truly global issue with negative impacts on environmental, economic, and social systems locally and throughout the world. There is now overwhelming scientific evidence of climate warming, most recently noted in the 2013 report of the Intergovernmental Panel on Climate Change (IPCC), which concludes, "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and oceans have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased."

Most recently, the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center concluded 2014 was the warmest year on record across global land and ocean surfaces since record keeping began in 1880. Furthermore, according to NOAA, the 10 warmest years have all occurred since 1997.

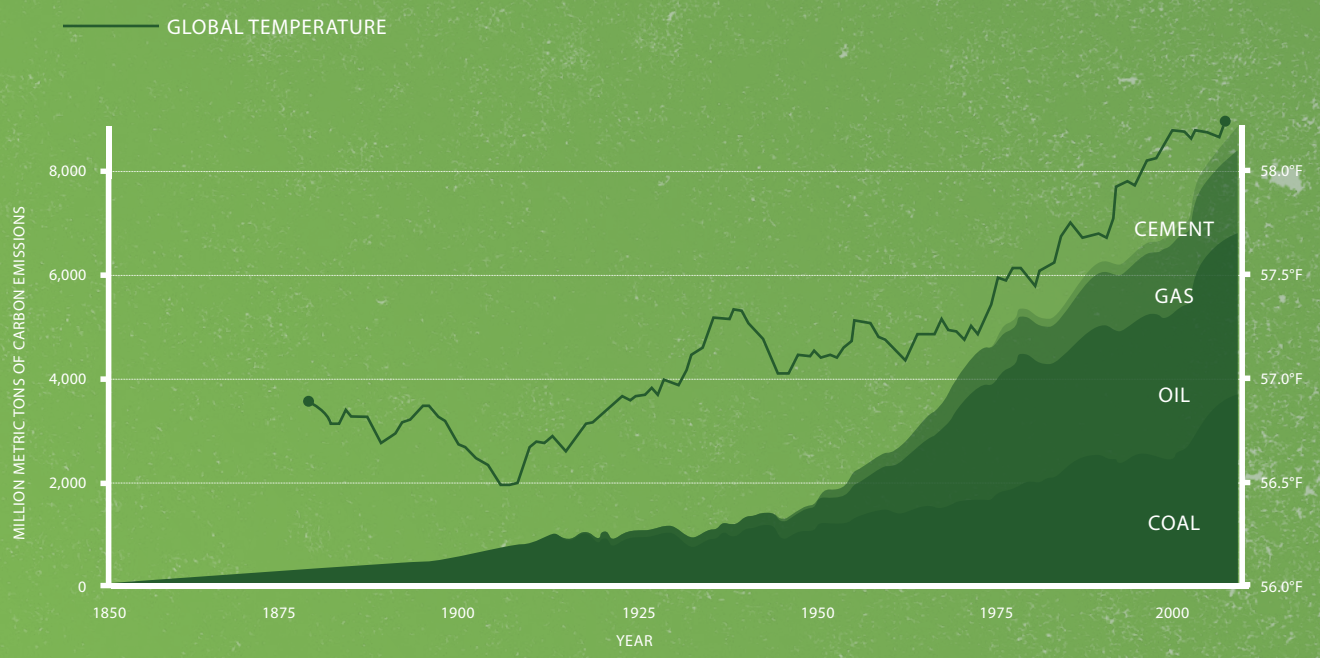
Since the onset of the Industrial Revolution in the 1750s, local atmospheric concentrations of the greenhouse gases carbon dioxide, methane and nitrous oxide have all dramatically increased. According to the IPCC, levels of carbon dioxide currently are higher than at any time in at least the past 800,000 years. There is widespread scientific consensus that increases in emissions by human activity are primarily the result of burning fossil fuels such as coal, natural gas, and gasoline and industrial agriculture and large-scale land use changes; and that the increase in greenhouse gases is the dominant cause of global climate change.

In Colorado, statewide average temperatures have increased 2 F over the past 30 years. The consequences of this warming are already being felt in communities on the Front Range. Extreme heat has increased, with one study showing that in the first 14 years of this century, the City of Fort Collins averaged nearly three times the number of 95 F days per year as in the last four decades of 20th century. There has also been an increase in the frequency and severity of drought and wildfires. In Colorado, the three wildfires causing the greatest amount of property damage have all occurred since 2010. Moreover, previously burned areas of the state have experienced more extreme flash flooding, including some of the flooding in Colorado's costliest natural disaster, the September 2013 floods that caused $3 billion in damages. Higher temperatures and drought also have allowed for the spread of bark beetle outbreaks resulting in millions of dollars in damages to forests and increasing the risk of wildfires. These developments are all consistent with scientific projections of the impacts of climate change, and these impacts are expected to become more severe as the climate continues to warm. This is particularly true if future emissions of greenhouse gases continue to increase.

Lakewood and other Colorado communities can play a vital role in showing emissions can be reduced in ways that lead to consumer savings, economic prosperity, and a healthy living environment.

The risks to Colorado's economy posed by climate change are potentially severe and will likely reverberate throughout the state. These include reduced snowpack, affecting water supply and the state's thriving tourism industry as well as agricultural economics. Extreme heat events and degraded air quality from wildfires may result in increased health care costs and a lower quality of life.

TEMPERATURE AND CARBON EMISSION TRENDS



Climate related risks cut across all governmental boundaries. The world's cities are the cornerstone of effective collaborative action to address climate change. Lakewood can set an example by acting decisively to both mitigate the impacts of climate change on its residents and plan for climate adaptation. Lakewood and other Colorado communities can play a vital role in reducing emissions in ways that lead to consumer savings, economic prosperity, and a healthy living environment.

Efforts to slow climate change are critical to avoid its most severe impacts. If climate change is not sufficiently mitigated, the best efforts of state and local governments to prepare for its effects may be completely ineffective. Along Colorado's Front Range, the consequences of climate change would be far greater from unchecked emissions of greenhouse gases.

The strategies and actions recommended in this plan to reduce greenhouse gas emissions can only be achieved in Lakewood with strong public support from an engaged citizenry and determined civic commitment from elected leaders and the business community. While some of the recommended actions will require the investment of financial resources, they will ultimately lead to cost savings and will be small in comparison to the cost of inaction on climate change. It is possible to find common ground in certain unifying principles including the desire of all residents to live in a healthy and resilient community with a prosperous economy in which we conserve and make more efficient use of energy, water, and other natural resources, and leave to future generations a legacy of stewardship.

This Sustainability Plan outlines realistic, measureable goals and targets with strategies for reducing Lakewood's greenhouse gas emissions accomplished through collaborative pathways, which allow us to work together to build a thriving, prosperous, and resilient community. ▪

CHAPTER **01**

CLIMATE CHANGE AND ADAPTATION

GOALS

- Minimize Lakewood's communitywide greenhouse gas emissions and prepare and adapt to ongoing climate change impacts.

TARGETS

- Reduce communitywide greenhouse gas emissions by 20 percent below 2007 levels by 2025.
- Reduce communitywide greenhouse gas emissions by 50 percent below 2007 levels by 2050.
- Reduce municipal greenhouse gas emissions annually through 2025.

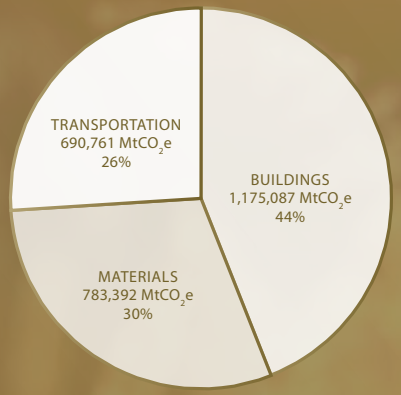
SUSTAINABILITY PLAN STRATEGIES: GREENHOUSE GAS (GHG) EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,646,240**	**100%**

2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			**CHANGE**
BUILDINGS	1,053,368	42%	–121,719
MATERIALS	903,600	36%	+120,209
TRANSPORTATION	539,165	22%	–151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			**CHANGE**
BUILDINGS	792,499	38%	–260,869
MATERIALS	791,443	38%	–112,157
TRANSPORTATION	504,655	24%	–34,510
TOTAL GHG	**2,088,598**	**100%**	**– 407,535**

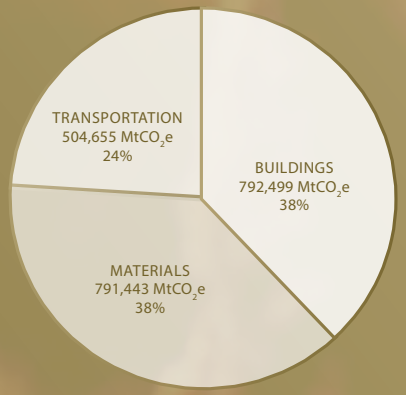
2007 BASELINE EMISSION BREAKDOWN



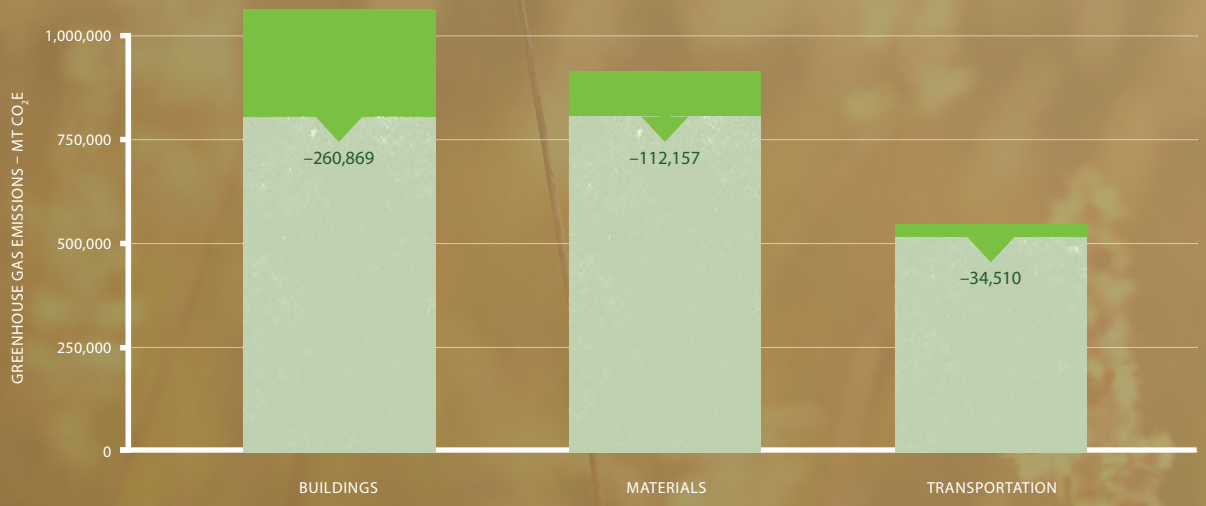
BUSINESS AS USUAL (BAU)

The term "business as usual (BAU)" is an emission value defined in a future year to represent emissions that would occur if an attempt had not been made to reduce emissions. The BAU considers changes to population and changes in emission factors. While the City of Lakewood's population and material sector emission factors are expected to increase annually, the emission factors for electricity and transportation are expected to decrease annually as a result of the state of Colorado's Renewable Portfolio Standard and improvements to vehicle fuel efficiency required by the Federal Corporate Average Fuel Economy (CAFE) emission standards.

2025 – TARGET YEAR EMISSION BREAKDOWN



IMPACT OF GREENHOUSE GAS (GHG) REDUCTION STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



SCIENTISTS CHARACTERIZE EARTH'S CLIMATE SYSTEM BY MEASURING THE AVERAGE METEOROLOGICAL CONDITIONS—INCLUDING TEMPERATURE, PRECIPITATION, AND WIND.

UNLIKE THE WEATHER WE EXPERIENCE EVERY DAY, Earth's climate changes relatively slowly, varying from year to year and over centuries and millennia. Climate scientists studying past and present climate trends have found that over the past several decades, the dynamics of the Earth's atmosphere have been changing significantly, affecting all parts of our climate system. Some of the most evident and observable changes can be seen in increasing surface and ocean temperatures, rising sea levels, decreasing snow and ice cover, and increasing intensity of storms. While fluctuations in Earth's climate have occurred over the course of the planet's history, scientific evidence overwhelmingly points to human activity as the primary driver of these current rapid and dramatic changes.

One of the most direct lines of evidence linking human activity to climate change is the effect that certain gases, such as carbon dioxide (CO_2), have when released into the atmosphere. Referred to as greenhouse gases (GHG), CO_2, methane, and several other gases, act like a blanket in the lower levels of Earth's atmosphere, causing the greenhouse gas effect, which blocks radiant heat (heat generated by the sun and reflected off of the Earth's surface) from escaping the Earth's atmosphere.

Green house gases, CO_2, methane, and several other gases, act like a blanket in the lower levels of Earth's atmosphere, causing the greenhouse gas effect.

Beginning with the Industrial Revolution in the in the late 1700s, human civilization has increasingly emitted CO_2 and other greenhouse gases into the atmosphere. Using historic data from tree rings, ice cores, and coral reefs, scientists have determined that preindustrial levels of CO_2 in the atmosphere were around 275 parts per million (ppm). Currently levels of CO_2 in the atmosphere exceed 400 ppm, a 40 percent increase from historic levels. This steady and rapid increase in GHG emissions, unprecedented in Earth's history, has been shown to directly correlate with rising surface and ocean temperatures. Since 1880, the global annual average temperature on Earth has increased 1.5 F. Consensus from the world's leading climate scientists estimate that at current emission rates, temperatures will increase between 6.7 and 8.4 F by the end of the century.[1] In 2014, the average temperature across global land and ocean surfaces was the highest among all 135 years in the 1880–2014 record. Including

[1] IPCC. Summary for Policymakers. "Climate Change 2014: Mitigation of Climate Change." Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. 2014. http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf.

THE RISE OF SEA LEVEL

Global sea level has risen 8 inches since 1880.

2014, nine of the 10 hottest years have occurred in the 21st century.[2]

While there has been past debate over the role of human activity on climate change, there is mounting evidence from studies examining alternative theories that the cause is directly related to human GHG emissions. These studies examine naturally occurring factors that have historically contributed to variation in the planet's climate. For example, climate scientists looking at the impact of increased solar output on climate change have found that temperatures in upper layers of the Earth's atmosphere are cooling, despite the warming of lower atmosphere layers. This reinforces the conclusion of more than 97 percent of the world's climate scientists that GHG emissions and the greenhouse effect are responsible for our current climate trends.[3]

CLIMATE CHANGE IMPACTS

The planet is experiencing unprecedented changes in all parts of the global climate system. These changes have impacts both locally and worldwide. Understanding how these changes are affecting our community and how they might affect us in the future is critical to ensuring our long-term sustainability and prosperity.

OCEANS

Oceans cover more than 70 percent of the Earth's surface. Oceans play a significant role in determining Earth's climate by absorbing CO_2, strongly influencing weather patterns across continents. As heat-trapping gases, primarily CO_2, have increased, ocean surface temperatures and levels of acidity have also increased. Rising ocean temperatures and acidification are having significant impacts on ocean circulation (currents), chemistry, and ecosystems.

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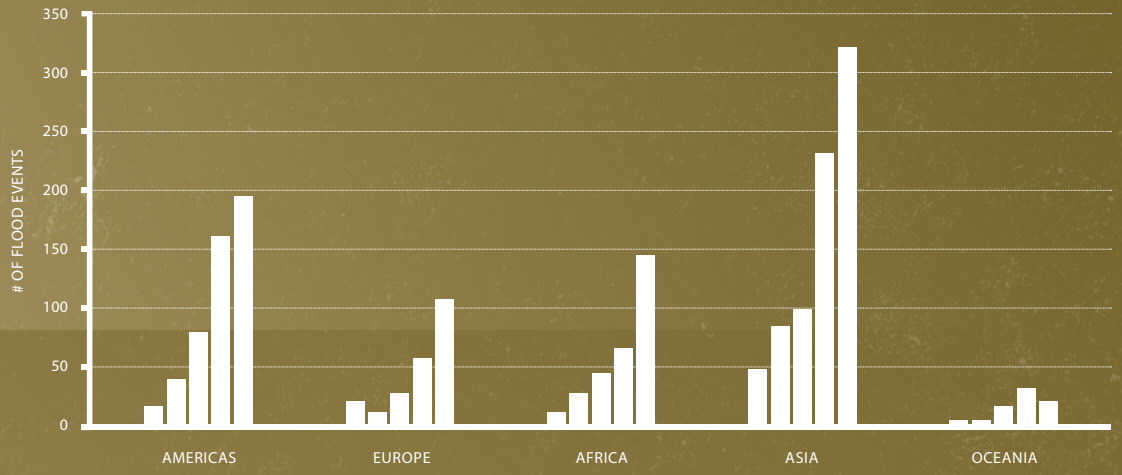
[3] U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.

[2] NOAA. "Global Analysis – Annual 2014." National Climatic Data Center. http://www.ncdc.noaa.gov/sotc/global/2014/13.

ARE WE EXPERIENCING MORE FREQUENT EXTREME WEATHER EVENTS?

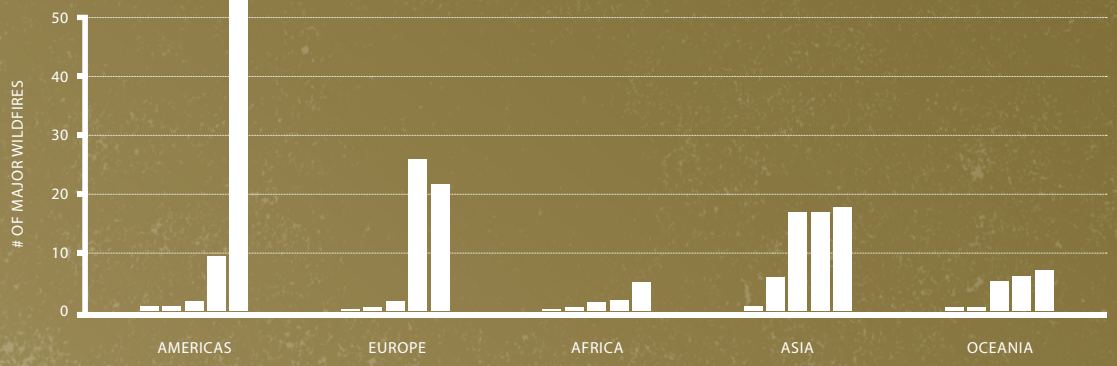
NUMBER OF FLOOD EVENTS 1950-2000

Data plotted by decade



NUMBER OF MAJOR WILDFIRES 1950-2000

Data plotted by decade



Source: Millenium Ecosystem Assessment

SEA LEVEL

Another critical ocean-related impact of climate change is the rise in sea level due to warming ocean temperatures, which causes water to expand, and from melting sea ice. Arctic sea ice has decreased in every decade since 1979. Global sea level has risen 8 inches since 1880 and is projected to rise another 1 to 4 feet by the end of the century. In the United States, more than 5 million people live within four feet of the local high-tide level.[4] The potential impacts of rising sea levels along with rising high tides and storm surges are far reaching and include impacts to infrastructure, local and national economies, personal property loss, and population displacement. A 2009 assessment for the state of California on the impacts of seal level rise estimated that a 4.6 feet sea-level rise would put nearly $100 billion worth of property at risk if no adaptation actions were taken.[5]

EXTREME WEATHER EVENTS

The most common way people experience climate change is through extreme weather events, such as heat waves, droughts, wildfires, hurricanes, heavy downpours, and floods. The intensity, frequency, and duration of heat waves have increased in recent decades, making it the leading weather-related cause of death in the United States.[6] Heat waves also contribute to droughts and wildfires because rising temperatures and evaporation rates increase the drying of vegetation. Since 2000, Arizona, Colorado, Utah, California, and New Mexico have experienced record-breaking wildfires.[7] The frequency and intensity of extreme weather and prolonged drought could also have significant impacts on U.S. crop yields, which supply more than 30 percent of all wheat, corn, and rice on the global market.[8] Projections indicate that the normal state for most of the nation at the end of this century will be what is considered moderate to severe drought conditions today.[9]

Heavy precipitation events and floods are also increasing and are projected to intensify in the coming decades,[10] affecting agriculture

and property. Between 1959 and 2005, floods in the U.S. caused 4,586 deaths,[11] and in September 2013 flooding in Colorado resulted in an estimated 2,000 damaged or destroyed homes.[12]

WATER

Drought and subsequently reduced groundwater, combined with changing precipitation patterns and earlier spring snowmelt, all affect water supply. Climate change impacts are projected to reduce Colorado's water supply, which is already constrained under current climate conditions. Strained water supplies affect our ability to meet consumption demands of cities and agriculture, significantly influencing our economy, water quality, and ecological health.

HUMAN AND ECOSYSTEM HEALTH

The environment also directly affects human health and well-being. Existing health risks, such as respiratory and cardiovascular diseases, infectious diseases, mental health, and stress-related disorders are all amplified by extreme weather, air pollution, and altered infectious disease transmission cycles. Vulnerable populations, such as children, older adults, low-income groups, and those with chronic illnesses, will disproportionately suffer from the added stresses of climate change impacts.

Human health is strongly connected to ecosystem health and biodiversity. The current rate of global species extinction is estimated to be 1,000 to 10,000 times higher than the rate of extinction across our planet's history. Scientists estimate that 25 percent or more of all terrestrial species will be threatened with extinction by 2050.[13] When we lose a gene or species, we lose it forever, and along with the loss of each species we lose the contribution or services that it provided.

Collectively, the impacts of climate change pose serious threats to our physical systems and social well-being. Potential financial impacts are just as devastating, causing disruption and recovery costs to our infrastructure, agricultural productivity, water and energy prices, and human health. In order to capture the costs to our society from increasing concentrations of CO_2, the U.S. government developed the "Social Cost of Carbon" (SCC), which is intended to monetize damages associated with an incremental increase in carbon emissions in a given year. Measuring the costs of climate change allows communities to devote the necessary attention and resources to the greatest challenge of the 21st century.

SOCIAL COST OF CARBON (SCC)

Monetizes damages associated with CO_2 emissions (see p. 28).

Strained water supplies affect our ability to meet consumption demands of cities and agriculture, significantly impacting our economy, water quality, and ecological health.

A PATHWAY FORWARD

As GHG emissions increase and changes to climate systems escalate, so do the risks of severe and sometimes irreversible impacts to our natural and human systems. Collectively, our actions as individual nations and cities contribute to the resilience and vibrancy of our future. Solutions cannot be achieved independently, as GHG emissions accumulate over time in our planet's atmosphere. A coordinated approach is critical to limiting current damages and successfully adapting to future conditions.

MITIGATION

Mitigation means limiting the magnitude and rate of climate change and associated impacts. Mitigation strategies largely consist of preventing or reducing GHG emissions. As communities assess and prioritize potential mitigation strategies, many refer to the "carbon budget" or the

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4 U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.

5 California Climate Change Center. "The Impacts of Sea-Level Rise on the California Coast." 2009. http://pacinst.org/wp-content/uploads/sites/21/2014/04/sea-level-rise.pdf.

6 U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.

7 J.D. Walsh, et al. "Appendix 3: Climate Science Supplement." Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program. 2014. doi:10.7930/J0KS6PHH.

8 U.S. EPA. "Agriculture and Food Supply." Climate Change. Last Updated September 9, 2013. http://www.epa.gov/climatechange/impacts-adaptation/agriculture.html.

9 J.D. Walsh, et al. "Appendix 3: Climate Science Supplement." Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program. 2014. doi:10.7930/J0KS6PHH.

10 U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.

11 U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.

12 Kevin Duggan. "Recovering after rivers rage." The Coloradoan. http://www.coloradoan.com/story/news/local/2014/09/05/september-flood-anniversary-colorado/15151647.

13 UNEP and UN-HABITAT. "Ecosystems and Biodiversity The Role of Cities." Nairobi, 2005. http://www.unep.org/urban_environment/PDFs/Ecosystems_and_Biodiversity_Role_of_Cities.pdf.

amount of carbon dioxide that can be emitted in order to avert the most dangerous climate change impacts. The carbon budget was identified by the International Panel on Climate Change (IPCC), a scientific body established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). The carbon budget was established to reflect the amount of atmospheric carbon that would hold global temperature increases to 2 C (3.6 F) above pre-industrial temperatures, which was identified by the international community as the upper limit in order to avert the most dangerous climate change impacts.

Maintaining the carbon budget will require 40 percent to 70 percent reductions in GHG emissions by 2050 compared to 2010[14] and require cities, which account for more than half of global GHG emissions and two-thirds of energy production, to lead the way in mitigation efforts. Well-planned, resource-efficient cities can reduce GHG emissions through simple improvements, such as proper insulation and energy efficient technologies. Cities are uniquely positioned to facilitate policy changes and bottom-up initiatives, leading to immediate results.

ADAPTATION

Adaptation means preparing for new conditions, reducing vulnerabilities, and leveraging changes to create new opportunities for growth and sustainability. Even if all GHG emission from human activity ceased, global temperatures are still expected to rise by 0.5 F over the next few decades.[15] In Colorado, moderate to aggressive efforts to mitigate CO_2 emissions would still lead to increased average annual temperatures of 2.5 F by 2025 and 4 F by 2050.[16]

The cumulative effect of the proposed strategies in the plan is projected to decrease Lakewood's emissions by 20 percent by 2025.

With the majority of the world's population living in cities, the impacts of extreme weather call for a proactive plan for responding to future climate variability in order to increase resilience. In order to fully understand these impacts, many local governments and agencies are conducting climate vulnerability assessments to identify their specific climate-related risks and vulnerabilities. These assessments can be used to inform policy decisions, infrastructure investments, and resource allocations based on anticipated climate change impacts.

Preparing for the impacts of changing global and local climate systems necessitates both a comprehensive and local strategy, as well as coordination between neighboring jurisdictions, all levels of government, and partners within the community. Action today will lead to a more resilient tomorrow.

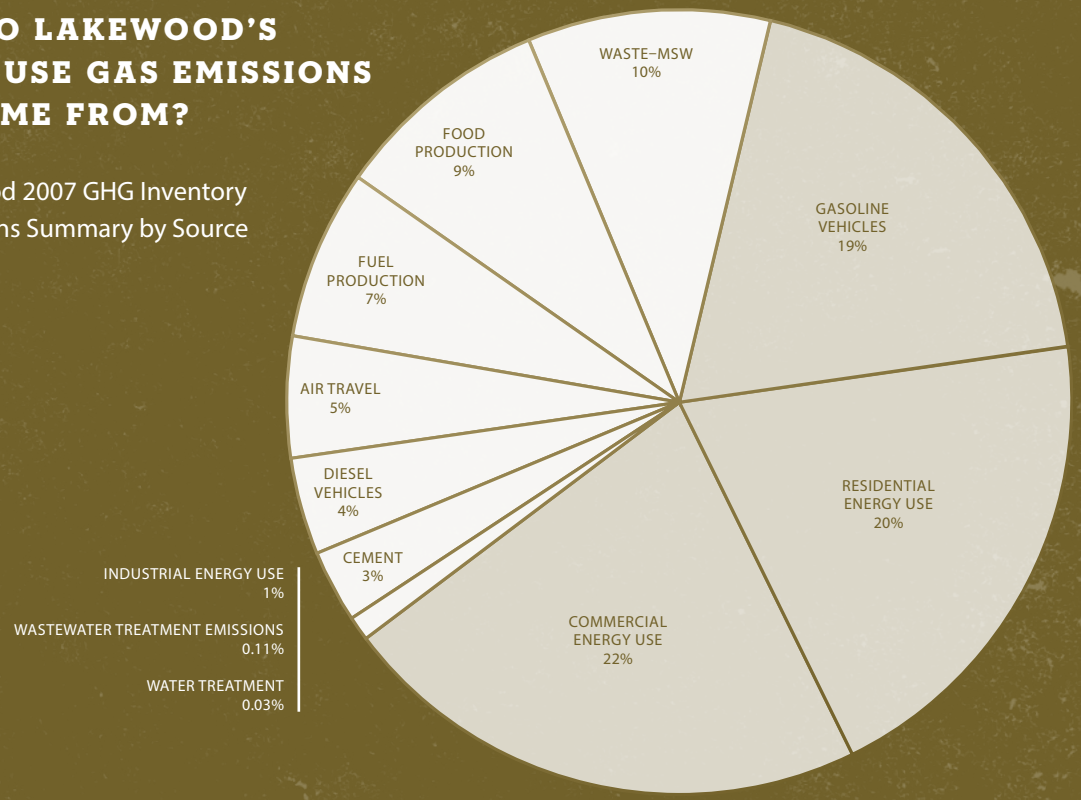
CITY OF LAKEWOOD

In Lakewood, drought, reduced snowpack, strained water supply, disaster recovery costs, and other impacts are already influencing municipal operations and household economies. These impacts will continue to challenge our community in years and decades to come. Our ability to adapt and ensure a resilient future will be largely determined by today's actions.

[14] IPCC. "Climate Change 2014 Synthesis Report." 2014. http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_SPMcorr1.pdf.
[15] U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov http://nca2014.globalchange.gov.
[16] Jeff Lukas, et. al. "Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation." Second Edition. University of Colorado, August 2014. http://cwcb.state.co.us/environment/climate-change/Pages/main.aspx.

WHERE DO LAKEWOOD'S GREENHOUSE GAS EMISSIONS (GHG) COME FROM?

City of Lakewood 2007 GHG Inventory Report: Emissions Summary by Source



In 2007, the City of Lakewood completed a greenhouse gas inventory, which measured our communitywide annual GHG emissions. The inventory reported GHG emissions totaling 2,646,593 metric tons of CO_2 equivalent ($MtCO_2e$). The results are broken down by sector and source, allowing us to measure and track change over time. Residential and commercial energy use are the largest contributors, accounting for 44 percent of total emissions, compared with a national average of 38 percent. Vehicle gasoline use and waste management processes follow behind, contributing 19 percent and 10 percent, respectively. Understanding where our GHG emissions come from and what might be driving their growth is critical in order to mitigate our contribution to global GHG emissions.

This Sustainability Plan uses this GHG data as a baseline from which to measure future emission reductions. The strategies included in this plan aim to reduce the community's overall greenhouse gas emissions and achieve its sustainability goals.

Recommendations from leading organizations urge cities to reduce GHG emission by 80 percent by 2050 through comprehensive strategies, as proposed in the STAR Community Rating System. STAR provides a sustainable community framework, developed by technical experts, sustainability leaders, and local government officials across the country in order to move communities toward sustainable practices, programs, and policies.[17] Tacoma, Washington, a similarly sized city, aims to reduce GHG emissions by 40 percent below 1990 levels by 2020. Evanston, Illinois, a first-ring suburb like Lakewood, set a target of 17 percent below 2007 levels by 2020. Our neighbor, the City and County of Denver, set a 20 percent reduction goal below 1990 levels by 2020. For additional examples see Appendix B: Target Methodology.

The cumulative effect of the proposed strategies in the plan is projected to decrease Lakewood's communitywide emissions by 20 percent by 2025. ■

[17] STAR Communities. http://www.starcommunities.org.

GOAL **CCA1**

MINIMIZE LAKEWOOD'S COMMUNITYWIDE GREENHOUSE GAS EMISSIONS AND PREPARE AND ADAPT TO ONGOING CLIMATE CHANGE IMPACTS.

TARGETS

- Reduce communitywide greenhouse gas emissions by 20 percent below 2007 levels by 2025.
- Reduce communitywide greenhouse gas emissions by 50 percent below 2007 levels by 2050.
- Reduce municipal greenhouse gas emissions annually through 2025.

OBJECTIVES

- **OBJECTIVE:** Contribute to national and global efforts to reduce and report greenhouse gas emissions.
- **OBJECTIVE:** Implement City of Lakewood Sustainability Plan strategies in order to achieve greenhouse gas emission reduction targets.
- **OBJECTIVE:** Ensure long-term community resilience by preparing for future impacts of climate change.

IMPLEMENTATION STRATEGIES

CCA1-A GREENHOUSE GAS DATA COLLECTION, TRACKING, AND REPORTING

Regularly monitor Lakewood's greenhouse gas emissions. Specifically:

- Regularly update the "City of Lakewood Greenhouse Emissions Inventory";
- Conduct and regularly update a municipal operations greenhouse gas inventory;
- Identify appropriate national or international emission tracking entities and regularly report data; and
- Develop tools and standards for tracking Lakewood emissions.

CCA1-B GREENHOUSE GAS REDUCTION STRATEGIES

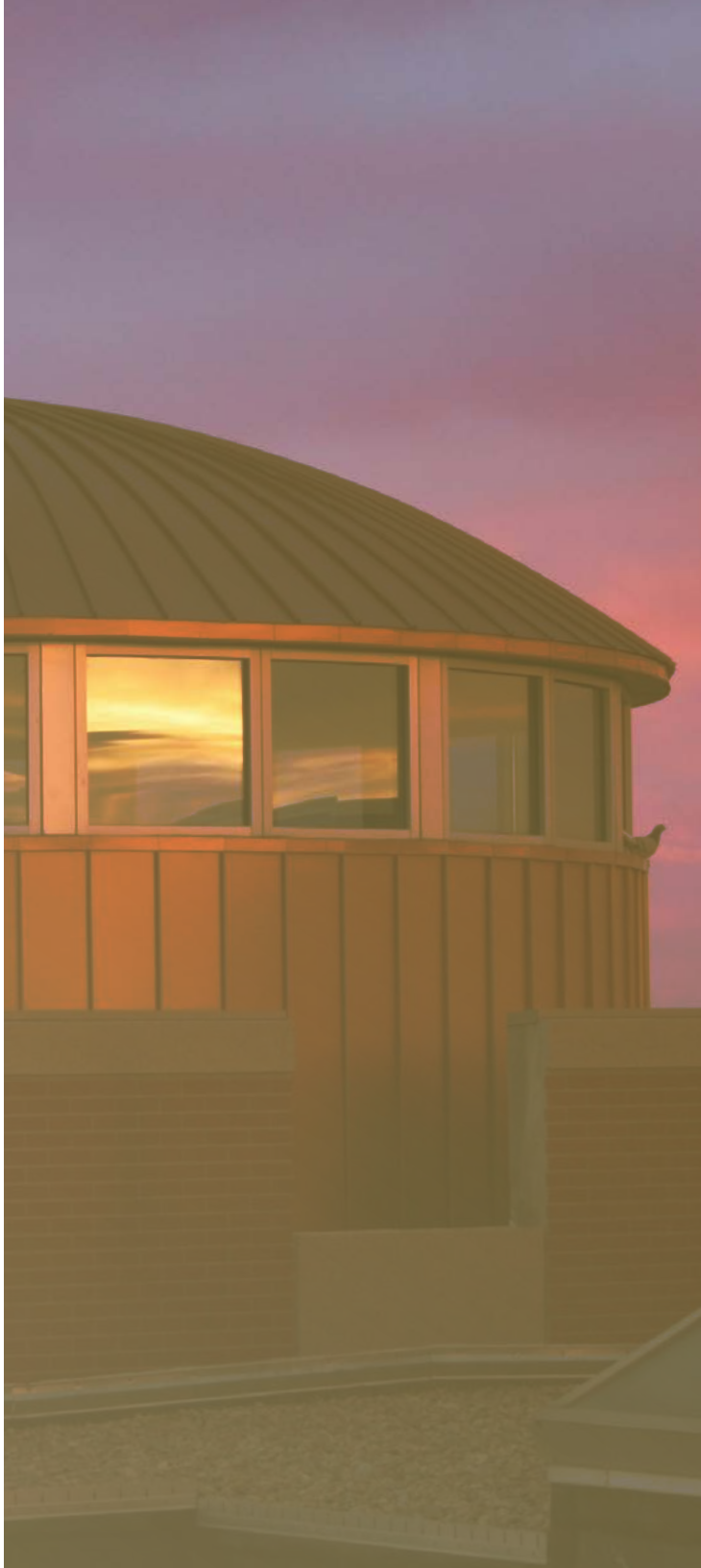
Utilize emission reduction assessments to prioritize and implement greenhouse gas reduction strategies. Specifically:

- Use emission reduction assessments contained in the Sustainability Plan to inform implementation efforts; and
- Consider impacts of all future City actions on emission reduction goals.

CCA1-C CLIMATE CHANGE VULNERABILITY STUDY

Conduct a climate change vulnerability assessment, recognizing that future conditions and threats will be different from current or historical conditions. Specifically:

- Identify potential changes to Lakewood's climate including potential future climate scenarios;
- Identify vulnerabilities and potential impacts of each scenario on Lakewood's infrastructure, natural resources, ecosystems, public safety, economic well-being, population, and overall resiliency.



CONCEPT

SOCIAL COST OF CARBON: $38/TON

THE SOCIAL COST OF CARBON (SCC) is a monetary estimate of the economic damages associated with a small increase in carbon dioxide (CO_2) emissions and can be used to determine the benefit of policies that reduce carbon emissions. The SCC considers the costs to society of a range of climate impacts like agricultural productivity, human health, property, and infrastructure damage from extreme weather events and sea level rise, diminished biodiversity, and loss of ecosystem services. The Social Cost of Carbon is reported in dollars per metric ton of carbon dioxide.

The most recent SCC estimates were calculated in 2013 by a federal interagency working group consisting of representatives from 12 federal agencies. To determine the SCC, the working group used three assessment models that each assume different climate change processes, economic growth scenarios, and variations in the interactions between the economy and climate impacts.

Using the average results of all three of the assessments, the SCC for 2015 is $38 per metric ton of CO_2. The working group also published an additional value that is intended to represent the potential for higher-than-average damages. Rather than using the average of all three assessment models, this number represents the most severe outputs (95th percentile) of the assessment models. This number places the SCC at $109 per metric ton of CO_2.

The City of Lakewood Sustainability Plan sets a target of reducing greenhouse gas emissions by 20 percent by 2025. Based on the SCC estimates, if the city met its reduction target, it would save $26.5 million in the year 2025 alone. ■

LEARN MORE ABOUT THE SOCIAL COST OF CARBON:

www.epa.gov/climatechange/EPAactivities/economics/scc.html
www.epa.gov/climatechange/Downloads/EPAactivities/scc-fact-sheet.pdf
www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf

CCA1-D CLIMATE PREPAREDNESS PLAN

Based on the climate change vulnerability study, develop a climate preparedness plan to prepare for multiple climate futures. Specifically:

- Expand existing emergency preparedness plans to encompass the full range of climate-related risks that could lead to emergencies;
- Upgrade existing infrastructure and update standards to minimize vulnerability;
- Develop economic, social, and natural resource management policies that address vulnerabilities and potential impacts;
- Incorporate climate change preparedness into all municipal operations, programs, planning efforts, and policies;
- Monitor impacts of climate change and effectiveness of adaptation strategies in order to adapt strategies and plans as necessary.

CHAPTER **02**

ENERGY, WATER, AND THE BUILT ENVIRONMENT

THE CITY OF LAKEWOOD and its residents recognize the role of energy, water, and the built environment in fostering a vibrant and sustainable community. Lakewood's residents envision a collective future where low-impact development, renewable energy sources, and resource-efficient buildings protect local ecosystems, enhance water quality, reduce man-made greenhouse gas emissions, and ensure energy availability and affordability.

GOALS

- Ensure affordable energy for Lakewood while transitioning to renewable energy sources.
- Significantly enhance resource efficiency in Lakewood buildings.
- Encourage development in Lakewood that values the natural environment and supports public health and community cohesion.

TARGETS

- Generate 45 percent of municipal energy from renewable sources by 2025.
- Generate 45 percent of residential energy from renewable sources by 2025.
- Generate 45 percent of commercial and industrial energy from renewable sources by 2025.
- Reduce municipal building and facility energy use intensity by 30 percent by 2025.*
- Reduce citywide building** energy use intensity by 20 percent by 2025†.
- Reduce citywide water use by 20 percent by 2025†.
- Increase the percentage of certified†† green buildings (new construction and renovations receiving occupancy permits) each year from 2015 to 2025.

* Baseline: 2008–2010 normalized data
** Includes resource use for the entire site
† Baseline: 2007
†† Certifications systems include Green Globes, USGBC LEED, and Living Building Challenge

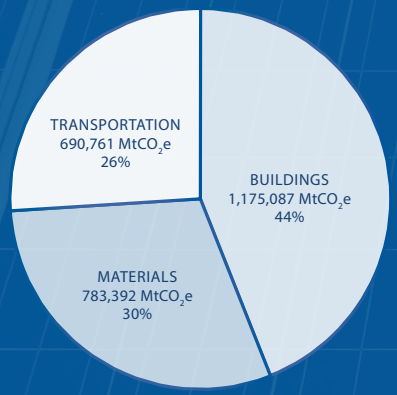
ENERGY, WATER, THE BUILT ENVIRONMENT: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,649,240**	**100%**

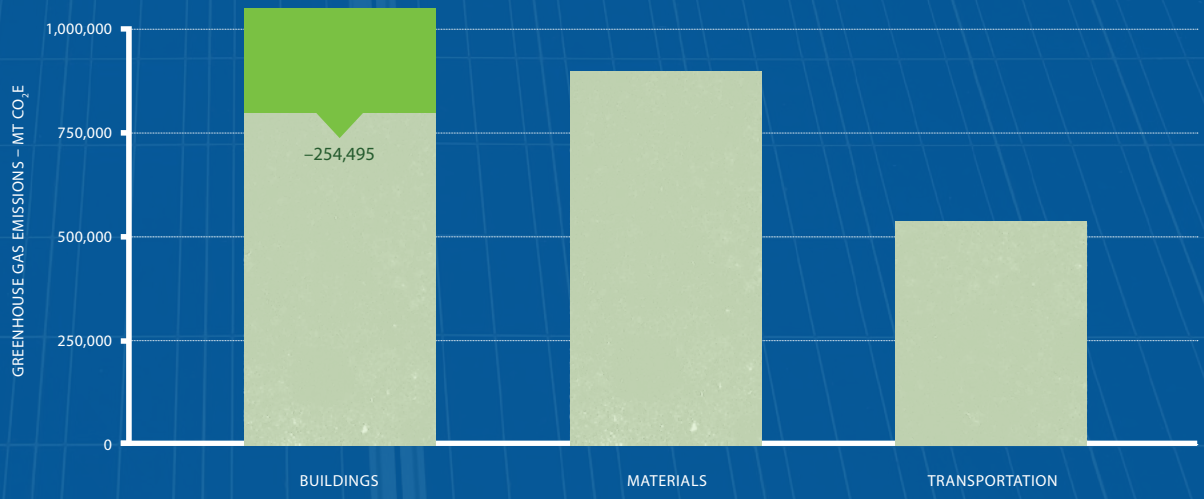
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER ENERGY, WATER, AND THE BUILT ENVIRONMENT STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	798,873	36%	– 254,495
MATERIALS	903,600	40%	0
TRANSPORTATION	539,165	24%	0
TOTAL GHG	**2,241,638**	**100%**	**– 254,495**

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF ENERGY, WATER, AND THE BUILT ENVIRONMENT STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



ENERGY AFFECTS EVERYONE.

IT POWERS OVER 65,000 Lakewood homes and 14,000 Lakewood businesses.[1] As Lakewood continues to grow, so does our reliance on nonrenewable resources. Currently, our nation gets 90 percent of its energy from nonrenewable sources. Over 80 percent of those are fossil fuels,[2] which include petroleum, natural gas, and coal. In Colorado, 56 percent of our energy comes from coal, which releases CO_2 emissions, smog, acid rain, and other toxic air pollutions.

Conserving energy and transitioning to renewable energy sources provide an enormous opportunity for reducing greenhouse gas emissions. The energy supply sector is the largest contributor to global emissions, comprising 35 percent[3] of total man-made emissions, and is the main contributor to the growth of emissions over the past 20 years due to increasing demands of energy use and the high share of fossil fuels in global and local fuel mixes.

In order to address energy, we must turn our focus to the built environment. Buildings are responsible for 44 percent of Lakewood's greenhouses gases, making it the largest contributing sector. If business continues as usual, with minor increases in building efficiency, U.S. building energy use is projected to increase by 30 percent.[3] By investing in a resource-efficient built environment with clean energy sources, we can reduce greenhouse gas emissions, increase our energy security, and add high-quality buildings to our community.

Our built environment also plays a large role in water use and water quality. The building sector is responsible for 12 percent of total water use in the U.S.,[4] widening the gap between our water supply and water demand. In Colorado, even with the completion of proposed water projects, projected 2050 shortfalls could total more than 500,000 acre-feet statewide.[5]

By investing in a resource efficient built environment with clean energy sources, we can reduce greenhouse gas emissions and add high-quality buildings to our community.

[1] U.S. Census Bureau. "State and County QuickFacts." Last Revised: December 4, 2014. http://quickfacts.census.gov/qfd/states/08/0843000.html.

[2] U.S. Energy Information Administration. "What are the major sources and users of energy in the United States?" Last Updated: May 30, 2014. http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm.

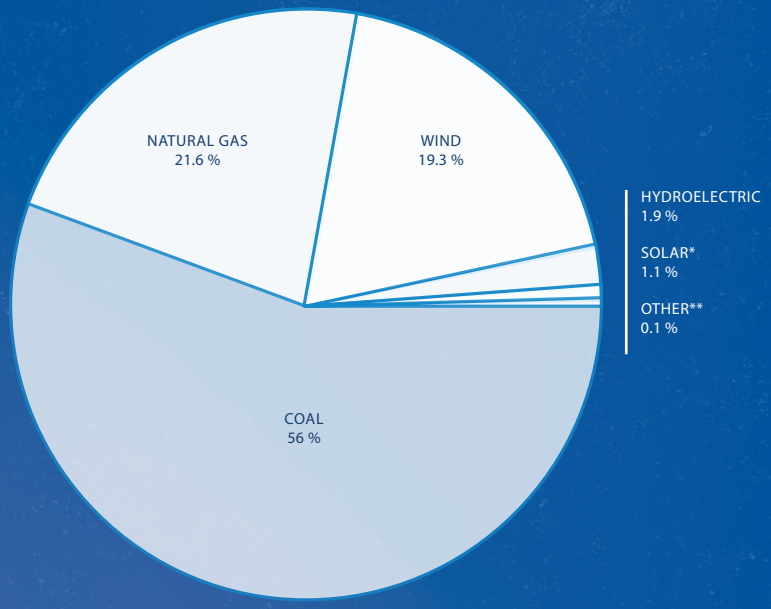
[3] U.S. Energy Information Administration. Annual Energy Outlook. Washington DC: U.S. Energy Information Adminstration.

[4] McGraw Hill Construction. "Green Outlook 2011: Green Trends Diving Growth. 2010." http://aiacc.org/wp-content/uploads/2011/06/greenoutlook2011.pdf.

[5] Colorado Water Conservation Board. "SWSI 2010 Mission Statement, Key Findings, and Recommendations. 2011." http://cwcb.state.co.us/water-management/water-supply-planning/documents/swsi2010/swsi2010factsheet.pdf.

WHERE DOES LAKEWOOD GET ITS ENERGY?

Public Service Company of Colorado (Xcel) Energy Mix



*Includes solar energy generated by customer-owned systems through Solar Rewards.
**Includes purchased biomass, oil, and nuclear power.

Our existing built environment also affects water quality. As our city developed and natural landscapes were replaced with buildings and pavements, the ability of our landscapes to absorb rainwater decreased, increasing demand for irrigation and vulnerability to flooding.

These issues are further exacerbated by our changing climate. Future warming is projected to cause early snowmelt and runoff and increase water demand for irrigation of crops, landscaping, and natural vegetation.[6] These changes not only affect water availability, but could also increase the concentration of pollutants flowing through our water. Moving forward we need to design and construct our built environment to reduce consumption, protect water quality, and reduce our vulnerability to climate change.

TRENDS AND OPPORTUNITIES

RENEWABLE ENERGY

Renewable energy opportunities are exploding across the nation. New technology and policies are enabling the construction of renewable energy generation facilities, including solar, wind, hydropower, biomass, and geothermal. In addition, many industries are transitioning to the use of natural gas, which produces half as much[7] carbon dioxide as coal-fired generation.

In order to keep up with this development, we must ensure our infrastructure has the capacity for alternative energy generation and transmission. A 2008 study from the National Renewable Energy Laboratory found that only 22–27 percent of residential rooftop area is suitable for hosting an on-site solar photovoltaic system. This has two implications: First, we must ensure future buildings and sites are capable of hosting and advancing renewable energy generation and distribution. Second, we must find alternative options for those who cannot access renewable

[6] Jeff Lukas, et al. "Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation." University of Colorado Boulder, 2014. http://wwa.colorado.edu/climate/co2014report/Exec_Summary_Climate_Change_CO_Report_2014_FINAL.pdf.

[7] U.S. Environmental Protection Agency. "Natural Gas." Last Updated: September 25, 2013. http://www.epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html.

SUSTAINABLE BUILT ENVIRONMENT

Eighty percent of Lakewood homes were built before 2000, presenting an enormous opportunity for energy and cost savings through retrofits.

energy. One alternative is a community sharing model, which allows people to pool their resources into a shared system that delivers financial payback and educational value.

RESOURCE EFFICIENCY

Energy and water efficiency upgrades are one of the simplest and most effective ways to conserve resources, save money, and reduce greenhouse gas emissions. New resource-efficient building techniques have decreased energy consumption dramatically. Although newer U.S. homes are 30 percent larger,[8] they consume about as much energy as older homes. These improvements ensure higher efficiency for new construction, but it means that our older buildings have a lot of catching up to do. According to the 2010 U.S. Census, 80 percent of Lakewood homes were built before 2000, presenting an enormous opportunity for energy and cost savings through retrofits.

Retrofits and upgrades provide opportunities to conserve water by fixing leaks, capturing rainwater, and using water-wise landscaping. Buildings account for 12 percent of all water use in the U.S., and heating water is responsible for 12 percent of a building's energy consumption. On average, water efficiency efforts decrease water use by 15 percent, energy use by 10–11 percent, and operating costs by 11–12 percent.[9]

GREEN BUILDINGS AND SUSTAINABLE SITE DESIGN

The demand for green buildings is increasing nationwide. Not only have green construction techniques been shown to save energy and water, they have also demonstrated improvements to the health and well-being of occupants. Certain building features, such as daylight, natural features, and spaces for social interaction and physical activity have positive psychological and social benefits. Other features, like improved ventilation and low-VOC furniture and paints enhance occupant health. The green building market demand is rapidly accelerating, and by 2035 approximately 75 percent[10] of the built environment will be either new or renovated. Now is the time to take advantage of the savings and benefits that green buildings can provide.

A sustainable built environment goes beyond buildings to encompass the entire building site. As we continue to develop and redevelop, we must do so in a way that honors and enhances our natural environment. This includes considering stormwater drainage, biodiversity, and microclimate regulation in order to ensure healthy functioning landscapes. Sustainable landscapes strengthen our ability to withstand and recover from floods, droughts, wildfires, and other climate threats. ■

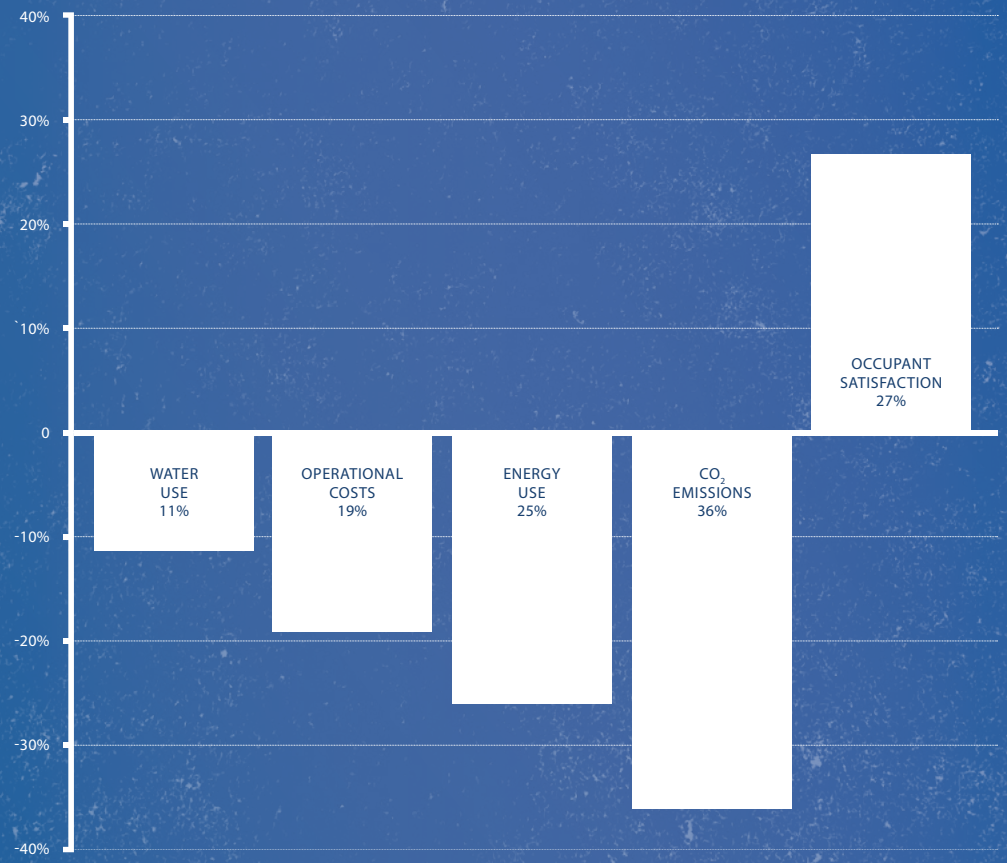
[8] U.S. Energy Information Administration. Residential Energy Consumption Survey 2009. http://www.eia.gov/consumption/residential/index.cfm.

[9] McGraw Hill Construction. "Green Outlook 2011: Green Trends Diving Growth." 2010. http://aiacc.org/wp-content/uploads/2011/06/greenoutlook2011.pdf.

[10] Architecture 2030. "A Historic Opportunity." 2011. http://architecture2030.org/the_solution/buildings_solution_how.

WHAT ARE THE BENEFITS OF GREEN BUILDINGS?

Compared with the average commercial buildings, LEED* certified buildings can offer considerable performance in terms of resource savings and positively affect the health of occupants.



*The Leadership in Energy & Environmental Design (LEED) building rating system was developed by the U.S. Green Building Council to recognize sustainable building strategies and practices. Learn more about the LEED system at http://www.usgbc.org/leed.

GOAL **BE1**

ENSURE AFFORDABLE ENERGY FOR LAKEWOOD WHILE TRANSITIONING TO RENEWABLE ENERGY SOURCES

TARGETS

- Generate 45 percent of municipal energy from renewable sources by 2025.
- Generate 45 percent of residential energy from renewable sources by 2025.
- Generate 45 percent of commercial and industrial energy from renewable sources by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Increase the ability of Lakewood's infrastructure to support the expanded use and transmission of renewable energy.
  - INDICATOR: Kilowatts of on-site solar energy installed

- **OBJECTIVE:** Ensure that all Lakewood residents have opportunities to access renewable and affordable energy.
  - INDICATOR: Number of residential subscribers to community solar projects and windsource
  - INDICATOR: Annual energy resource mix as reported by Xcel Energy
  - INDICATOR: Residential electricity and gas costs

- **OBJECTIVE:** Ensure that Lakewood businesses, industry, and institutions have opportunities to access renewable and affordable energy.
  - INDICATOR: Number of business subscribers to community solar projects and windsource
  - INDICATOR: Commercial electricity and gas costs

- **OBJECTIVE:** Expand the use of renewable and affordable energy in municipal buildings and infrastructure.
  - INDICATOR: Kilowatts of energy generated from on-site renewable energy systems
  - INDICATOR: Kilowatts of energy purchased from off-site renewable energy systems

IMPLEMENTATION STRATEGIES

BE1-A RENEWABLE ENERGY TRANSMISSION AND GENERATION

Expand renewable energy generation and access while ensuring necessary transmission infrastructure. Specifically:

- Work with Xcel to analyze existing infrastructure to understand capabilities and limitations;
- Identify potential opportunities for public and private renewable energy access and development, including on-site, community shared, and centralized systems;
- Assess public policies to identify barriers and facilitate implementation;
- Actively encourage residents and businesses to install renewable energy systems or to purchase shares or credits in off-site renewable energy projects; and
- Prioritize future investments for municipal generation and transmission.

COMMUNITY SPOTLIGHT

RENEWABLE ENERGY FOR EVERYONE

BY GRID ALTERNATIVES

GRID ALTERNATIVES, a nonprofit solar installer, brings together community partners, volunteers, and job trainees to implement solar power and energy efficiency for families that need it most, providing energy cost savings, valuable hands-on job training experience, and a source of clean, local energy that benefits us all.

GRID Alternatives' Colorado office opened its doors officially in January 2013, after a 2012 kickoff event in Lakewood that included installations for 12 local families. Since then, GRID has installed solar electric systems for another five Lakewood families. These 17 installations will produce over two million kWh of clean solar energy over the solar systems' lifetimes, saving these Lakewood families over $350,000 in electricity costs and mitigating over 2,000 tons of greenhouse gas emissions. The installations also have provided more than 700 hours of job training opportunities for students, job trainees, and community volunteers looking for experience in the solar industry.

GRID Alternatives plans to complete more solar installations in Lakewood as it expands its Colorado program services and is also piloting community solar projects in 2015 in order to reach renters and other qualified clients that may not have suitable roofs for residential solar. ■

CONCEPT

DISTRICT-SCALE SUSTAINABILITY

DISTRICT-SCALE SUSTAINABILITY is an innovative concept that applies the latest sustainable technologies and best practices in a specific geographic area. New technologies and creative solutions are constantly emerging in the field of sustainability. However, it is not often economically or politically feasible to implement these strategies across the entire city. For example, the FortZED initiative in Ft. Collins, Colo., is piloting crowdsourced thermostats to increase energy efficiency through slight, automated adjustments to HVAC controls in residences. Although it would be impractical to fund this type of technology replacement for all households, testing it in a unique district could demonstrate the effectiveness of the device to justify a rebate program or other funding mechanism.

Although the leadership, strategies, and funding varies from project to project, one characteristic remains: The level of implementation is a defined district, rather than the entire city. This enables experimentation and testing of the latest and greatest sustainability concepts to identify what works best for the broader community.

Approaches to district-scale sustainability are in development and implementation in cities across the country. Some use certifications to prescribe specific elements, and others provide a broader framework that lay out goals, principles, or guidelines that could be implemented at various stages in the project's development. In Oberlin, Ohio, public and private partners joined together to develop a Green Arts Zone (GAZ), which meets LEED-ND Platinum standards, commits to carbon neutrality, and aims to source 70 percent of its food from local sources. These ambitious goals have already spread in the community, where surrounding properties are already planning projects to expand the GAZ impact. ■

The FortZED initiative in Ft. Collins, Colo., is piloting crowdsourced thermostats to increase energy efficiency through slight, automated adjustments to HVAC controls in residences.

LEARN MORE ABOUT DISTRICT-SCALE SUSTAINABILITY:

http://ecodistricts.org
http://fortzed.com
http://www.oberlinproject.org

BE1-B DISTRICT-SCALE SUSTAINABILITY

Establish unique districts within Lakewood where community sustainability goals are achieved through customizable guidelines. Specifically:

- Assess and identify potential locations and appropriate district-scale models;
- Develop location-specific guidelines around green building, district energy and microgrid projects, transportation infrastructure, natural resource and ecosystem protection, waste diversion, and community cohesion and wellness; and
- Transfer lessons learned and successful practices from district-scale sustainability projects into citywide policies.

BE1-C SUSTAINABLE ENERGY AND WATER RESOURCE CENTER

CROSSCUTTING STRATEGY

Establish a resource center to provide information and consulting services to residents and businesses related to energy and water conservation and renewable energy generation. Specifically:

- Gather and distribute information on available educational resources, assessments and audits, technical and design support, rebates, tax incentives, and financing mechanisms;
- Provide supportive services to facilitate use of resources; and
- Use the resource center to incorporate specific strategies from other Sustainability Plan goals. These can be found throughout the Sustainability Plan under "Crosscutting Strategies."

BE1-D MUNICIPAL RENEWABLE ENERGY GENERATION

Develop a municipal renewable energy generation strategy to increase the percentage of municipal energy and fuel generated from renewable sources such as wind, solar, advanced biofuels, and other alternatives to fossil fuels.

CITY SPOTLIGHT

COMMUNITY SOLAR

IN 2014, after years of evaluating the feasibility of solar on top of municipal buildings and parking structures, the City of Lakewood found a new and creative way to increase renewable energy usage and save money. The City purchased 40 percent of a community-owned solar garden developed by Clean Energy Collective. The City will purchase 274 kilowatts of solar energy over a 20-year period, after which the contract can be renewed.

The purchase was the result of a thorough assessment and strategic planning by City staff, who identified the project as a way to meet the City's financial and sustainability goals. The City is able to apply solar energy credits from the project to peak energy times when electricity rates are higher because of the demand. This opportunity for savings will enable the City to repay its loan for the panels in only 10 years. After the repayment, the City will be generating savings from the solar energy credits and renewable energy certificate payments.

This success story accounts for 2.3 percent of the City's total power usage, leaving the City eager for more opportunities to invest in renewable energy. As community solar gardens continue to develop across Colorado, both the City and its residents will be able to participate in the clean energy revolution. ■

SUPPORTING STRATEGIES

COLLABORATION	■ Work with Front Range communities in Xcel territory to increase collaboration and stay informed about energy regulatory issues and opportunities, share best practices, speak with a unified voice (when applicable), and reduce energy costs.
EDUCATION & PROMOTION	■ Promote the benefits of renewable and affordable energy and provide information and resources to support access. ■ Educate residents and businesses on energy issues including where and how energy is generated and how regional and state policies impact energy systems and costs.
TOOLS & TECHNOLOGY	■ Develop an interactive sustainability dashboard that demonstrates progress toward goals and provides real time data, including renewable energy generation. Identify opportunities to provide interactive displays in public buildings.
RESEARCH & TRACKING	■ Monitor communitywide energy data including overall energy use, renewable energy generation, participation in demand-side management programs, and energy costs. ■ Research the impact of renewable energy systems and energy-efficiency upgrades on property values. ■ Monitor policies, requirements, fees, and obligations included in Lakewood's franchise agreement with Xcel Energy.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Explore opportunities to integrate energy and water systems and upgrades into appraisal, assessments, inspections, and property listings. ■ Utilize the hub network to support successful district-scale sustainability efforts and share district scale sustainability guidelines and successful practices. ■ Collaborate with the Sustainable Energy and Water Resource Center BE1-C | P. 39 to share information and available resources.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Solicit recommendations and ongoing feedback from participating neighborhoods to strengthen the Sustainable Energy and Water Resource Center BE1-C | P. 39 ■ Recognize the role of the Sustainable Neighborhoods Program as a district-scale sustainability program and work to enhance the program in order to realize outcomes that support community sustainability goals. ■ Share the Sustainable Neighborhoods Program model with other communities interested in adopting resident-driven district-scale sustainability programs.

TABLE BE1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
BE1-A: Renewable Energy Transmission and Generation	🍃🍃🍃🍃🍃🍃🍃🍃🍃🍃🍃🍃🍃	■	■	■	⊘	■
BE1-B: District-Scale Sustainability	🍃🍃	■■■	■■■	■■■	■■■	■■■
BE1-C: Sustainable Energy and Water Resource Center	🍃🍃🍃🍃🍃	■■	■■	■■	⊘	■
BE1-D: Municipal Renewable Energy Generation	🍃	■	■■	⊘	⊘	■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE BE1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
BE1-A: Renewable Energy Transmission and Generation	$$	–	✓	✓	✓
BE1-B: District-Scale Sustainability	$$$$	–	✓	✓	✓
BE1-C: Sustainable Energy and Water Resource Center	$	✓	–	✓	✓
BE1-D: Municipal Renewable Energy Generation	$$$$	✓	✓	–	–

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **BE2**

SIGNIFICANTLY ENHANCE RESOURCE EFFICIENCY IN LAKEWOOD BUILDINGS.

TARGETS

- Reduce municipal building and facility energy use intensity by 30 percent by 2025.*
- Reduce citywide building** energy use intensity by 20 percent by 2025.†
- Reduce citywide water use by 20 percent by 2025.†

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Enhance citywide building energy efficiency.
  - INDICATOR: Energy use intensity by sector
  - INDICATOR: Municipal energy use intensity
- **OBJECTIVE:** Enhance citywide building water efficiency.
  - INDICATOR: Water use by sector
  - INDICATOR: Municipal water use

* Baseline: 2008–2010 normalized data

** Includes resource use for entire site

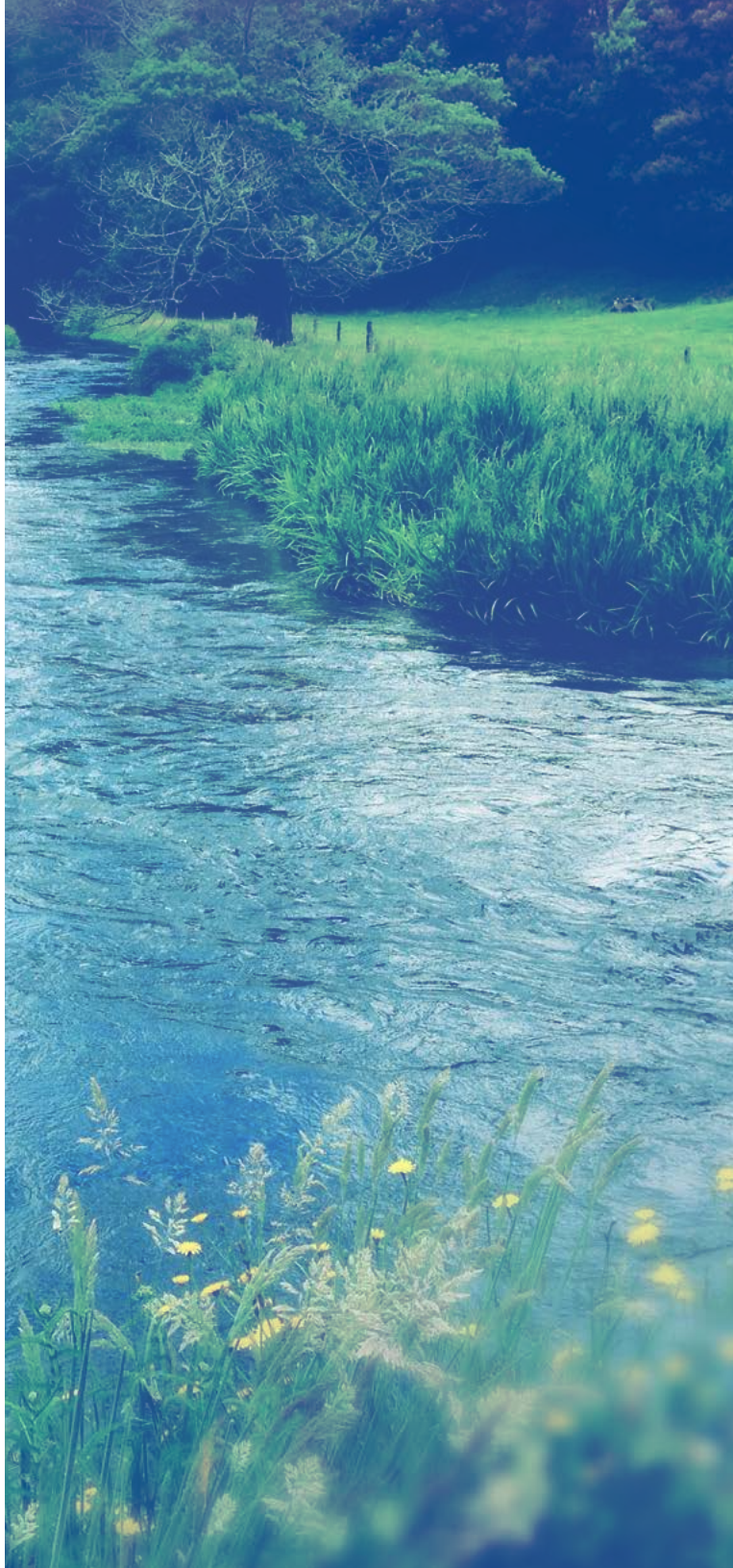
† Baseline: 2007

IMPLEMENTATION STRATEGIES

BE2-A EFFICIENCY IN RESOURCE INTENSIVE BUILDINGS

Target resource intensive buildings for efficiency improvements. Specifically:

- Identify buildings likely to have high-intensity resource use based on available data, building age, type of construction, use, and occupancy;
- Assemble customized tools, resources, and financing mechanisms for energy and water efficiency upgrades; and
- Employ a targeted outreach strategy to engage facility managers and property owners.



CONCEPT

ENERGY STAR PORTFOLIO MANAGER

STRATEGIC ENERGY and water management starts with understanding current and past usage. Through benchmarking, organizations can identify opportunities for efficiency improvements and set goals that will save money and reduce their environmental impact. ENERGY STAR Portfolio Manager is an interactive energy management tool that enables users to track and assess energy and water consumption and greenhouse gas emissions across their entire portfolio of buildings. The U.S. Environmental Protection Agency (EPA) created the Portfolio Manager to be available at no cost to all users. Forty percent of U.S. commercial building space is already benchmarked in Portfolio Manager, making it easier to compare building performance, gain recognition, and share best practices.

Cities have used Portfolio Manager in a variety of ways. Over forty local governments currently use the tool to compete in the EPA ENERGY STAR National Building Competition. Others, such as Beaverton, Ore., and Atlanta, Ga., host a local buildings competition for their community. Boston, Seattle, and New York have passed mandatory benchmarking laws for buildings over a certain size and help organizations use Portfolio Manager through guides, checklists, and other supportive materials.

According to 2012 ENERGY STAR data trends, buildings that consistently benchmark energy performance experience an average annual 2.4 percent in energy savings.

According to 2012 ENERGY STAR data trends, buildings that consistently benchmark energy performance experience an average annual 2.4 percent in energy savings. In fact, if all buildings in the U.S. participated, over 18 million metric tons of CO_2e could be saved each year. ■

LEARN MORE ABOUT ENERGY STAR PORTFOLIO MANAGER:

http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

BE2-B REPORTING & BENCHMARKING ENERGY AND WATER USE

Develop a campaign to encourage voluntary benchmarking of energy and water consumption at the building or site scale through the use of utility data tracking software.* Specifically:

- Assess existing utility data tracking software to identify preferred options;
- Employ a targeted outreach strategy to encourage participation by commercial and multifamily buildings;
- Encourage the use of submetering to more efficiently manage energy and water use; and
- Consider a building square footage threshold for required reporting and benchmarking.

* Potential utility data tracking software include Energy Star, Wegowise, Bright Power, and Scope 5.

BE2-C RESOURCE EFFICIENT MUNICIPAL FACILITIES

Effectively manage and reduce municipal energy and water use. Specifically:

- Collect and track energy and water use data for all municipal operations using utility data tracking software;
- Prioritize facilities for energy and water audits based on existing resource use data;
- Secure funding for facility improvements through the City budgeting process and grant programs, and consider utilizing performance-based programs where future cost savings fund efficiency improvements;
- Set facility-specific efficiency targets when appropriate;
- Implement facility audit recommendations with consideration of resource limitations and other constraints;
- Increase accountability for resource use through reporting mechanisms that attribute use to each building, City department or division; and
- Develop facility and job specific behavior modification strategies.

BE2-D RESOURCE EFFICIENT BUILDING CODES

Conduct a review of the newest edition of building and energy codes on a regular basis to ensure the best fit for protecting life and safety, economic climate, and support of City sustainability goals. Specifically:

- Include participation by the Sustainability Division during standard review process for energy related codes;
- Provide necessary resources to train staff; and
- Conduct community outreach on updated code requirements.

SUPPORTING STRATEGIES

COLLABORATION	■ Leverage programs and resources from state, federal, and nonprofit agencies, such as the Colorado Energy Office, the Department of Energy, and Environmental Protection Agency. ■ Work with the state of Colorado to support the goals and strategies included in the Colorado State Water Plan. ■ Work with Denver Water and Lakewood water and sewer providers to coordinate conservation efforts, programs, and policies.
EDUCATION & PROMOTION	■ Promote the importance of conserving water resources and reducing energy consumption. Develop specific communication strategies for various audiences throughout the Lakewood community, specifically including educational institutions. ■ Promote the importance of both efficiency retrofits and behavior modification strategies in achieving significant levels of resource conservation. ■ Promote opportunities and strategies for energy and water efficiency to neighborhoods through workshops, neighbor-to-neighbor challenges, DIY classes, partnerships, and other assorted resources. ■ Educate planners, plan reviewers, building inspectors, and developers on updates to building and energy codes and available design and green building resources.
TOOLS & TECHNOLOGY	■ Develop an interactive sustainability dashboard that demonstrates progress toward goals and provides real-time data, including energy and water usage. Identify opportunities to provide interactive displays in public buildings. ■ Utilize mobile and online technology to assist residents and property owners in tracking energy and water usage. ■ Utilize behavior-learning smart control technologies to increase resource efficiency in buildings and landscapes.
RESEARCH & TRACKING	■ Monitor communitywide energy data including overall energy use, renewable energy generation, participation in demand-side management programs, and energy costs. ■ Research the impact of renewable energy systems and energy-efficiency upgrades on property values.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER BE1-C | P. 39	■ Provide information on demand-side management programs from Denver Water and Xcel Energy. ■ Provide information on financing mechanisms, low-interest loan programs, and fee incentives for resource efficiency retrofits. ■ Provide tips and strategies for resource conservation through behavior modification. ■ Provide consultation services for goal setting and tracking.
SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Celebrate and recognize achievements in resource efficiency. ■ Provide technical assistance to businesses through the program's network.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Solicit recommendations and ongoing feedback on how to utilize resource-efficient technologies and practices in homes. ■ Work with neighborhoods to pilot resource-efficiency programs.

TABLE BE2-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
BE2-A: Efficiency in Resource Intensive Buildings	🍃🍃🍃🍃🍃	■■	■■	■■	⊘	■
BE2-B: Reporting & Benchmarking Energy and Water Use	🍃	■	■■	■■	⊘	⊘
BE2-C: Resource Efficient Municipal Facilities	🍃	■■	■	⊘	⊘	■
BE2-D: Resource Efficient Building Codes	🍃	■■	■■	■■	⊘	■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE BE2-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
BE2-A: Efficiency in Resource Intensive Buildings	$	✓	–	✓	✓
BE2-B: Reporting & Benchmarking Energy and Water Use	$	✓	–	✓	✓
BE2-C: Resource Efficient Municipal Facilities	$$$$	✓	✓	–	–
BE2-D: Resource Efficient Building Codes	$	✓	–	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **BE3**

ENCOURAGE DEVELOPMENT IN LAKEWOOD THAT VALUES THE NATURAL ENVIRONMENT AND SUPPORTS PUBLIC HEALTH AND COMMUNITY COHESION.

TARGET

- Increase the percentage of certified* green buildings (new construction and renovations receiving occupancy permits) each year from 2015 to 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Promote green building construction and retrofits that use sustainable materials and enhance occupant well-being.
  - INDICATOR: Number of certified* green building projects
  - INDICATOR: Number of indoor air quality investigations and/or complaints filed with Jefferson County Public Health

- **OBJECTIVE:** Promote sustainable site design in order to create harmony between the built and natural environments.
  - INDICATOR: Number of certified sites through the Sustainable Sites Initiative

* Certifications systems include Green Globes, USGBC LEED, and Living Building Challenge

IMPLEMENTATION STRATEGIES

BE3-A LEED STANDARDS FOR MUNICIPAL BUILDINGS

Adopt an ordinance requiring that all newly constructed municipal buildings with year-round occupancy meet at least LEED Silver standards from the USGBC.†

BE3-B GREEN BUILDING CONSTRUCTION AND RETROFITS

Target significant developments for green building and sustainable site design support, including minimizing hazardous materials, creating healthy indoor spaces, using resource efficiency, and using locally and sustainably sourced materials. Specifically:

- Establish reporting and tracking mechanism for green building certifications;
- Train staff involved in the development process on the benefits and principles of green buildings practices and the resources available to applicants;
- Identify and secure funding and grant opportunities to be used to provide technical assistance to developers; and
- Employ a targeted outreach strategy to engage developers.

BE3-C SUSTAINABLE SITE PLANNING AND DEVELOPMENT

Integrate key elements of the Sustainable Sites Initiative (SSI) to integrate into the City's site planning standards. Specifically:

- Conduct a comprehensive assessment of the Sustainable Sites Initiative to identify key concepts and requirements applicable to Lakewood; and
- Incorporate sustainable site planning requirements and guidelines into the City's Zoning Ordinance with consideration of the benefits and costs.

† U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED)

CONCEPT

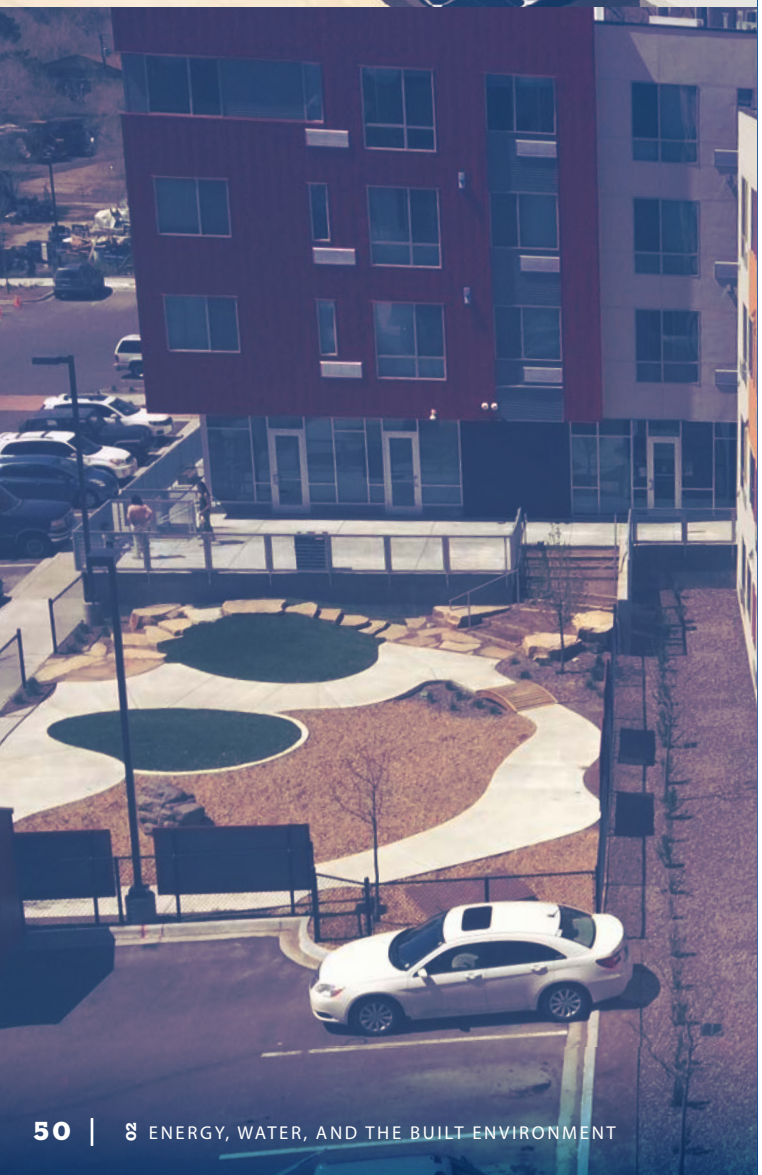
SUSTAINABLE SITES INITIATIVE

THE SUSTAINABLE SITES INITIATIVE™ (SITES™) is a program based on the understanding that built landscapes have the capacity to protect and restore our natural systems. Developed by the American Society of Landscape Architects, the United States Botanic Garden, and the Lady Bird Johnson Wildflower Center at the University of Texas at Austin, SITES offers a rating system and guidelines to define land development and management practices that complement the functions of healthy ecosystems. The program lays out requirements and recommended strategies to achieve sustainable concepts, such as reducing energy and water use, restoring native plant communities, reducing urban heat island effects, using recycled and regional materials, and supporting social connections.

The current rating system, SITES v2, was informed by the SITES Pilot Program, which certified 34 projects across the country, including the National Renewable Energy Lab (NREL) South Table Mountain campus, which is adjacent to the Lakewood community. The campus includes a 175-acre conservation easement to protect native habitats and provide a recreational amenity to staff and community members. It also incorporates natural drainage for stormwater and provides incentives for alternative commuting options. The project demonstrates the holistic approach that SITES uses to protect and leverage the benefits of nature. ■

LEARN MORE ABOUT THE SUSTAINABLE SITES INITIATIVE:

http://www.sustainablesites.org



SUPPORTING STRATEGIES

COLLABORATION

- Work with the American Society of Landscape Architects, U.S. Green Building Council, and other similar organizations that may be able to provide technical support for green building and sustainable site design.
- Work with the Urban Drainage and Flood Control District to coordinate water quality efforts, programs, and policies.

EDUCATION & PROMOTION

- Promote the benefits of green building and sustainable site design, including benefits to public health, community cohesion, and the natural environment.

TOOLS & TECHNOLOGY

- Monitor emerging technologies and best practices for green building and sustainable site development.

RESEARCH & TRACKING

- Research opportunities to develop financial incentives for sustainable site design, such as variable stormwater fees dependent on the type of landscaping and water quality features on-site.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER

BE1-C | P. 39

- Provide information on green building and sustainable site design.

SUSTAINABLE BUSINESS HUB

SE1-E | P. 61

- Recognize achievements in green building and sustainable site design.
- Provide technical assistance to businesses through the program's network.

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Work with neighborhoods to identify public or private spaces in their neighborhoods suitable for sustainable site improvements.

TABLE BE3-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
BE3-A: LEED Standards for Municipal Buildings	🍃	■■■	■■	■	■■	■■■
BE3-B: Green Building Construction and Retrofits	🍃	■■■	■■■	■■	■	■■
BE3-C: Sustainable Site Planning and Development	🍃	■■■	■■	■	■■	■■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE BE3-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
BE3-A: LEED Standards for Municipal Buildings	$$	–	✓	–	–
BE3-B: Green Building Construction and Retrofits	$$	✓	✓	✓	✓
BE3-C: Sustainable Site Planning and Development	$	–	✓	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

CHAPTER 03

SUSTAINABLE ECONOMY

THE CITY OF LAKEWOOD and its residents recognize the importance of a thriving local economy in fostering a vibrant and sustainable community. Lakewood's residents envision a collective future where local businesses are resource efficient, provide high quality jobs, and provide locally sourced goods and services; where community organizations, government, businesses, and residents build cooperative relationships; and where educational opportunities, job training, and the cost of living contribute to secure household economies and upward mobility.

GOALS

- Cultivate a sustainable, prosperous, and self-reliant local economy.
- Foster self-sufficiency and upward mobility of Lakewood households.

TARGETS

- Increase local food assets annually through 2025 (baseline to be established after the completion of Implementation Strategy SE1-A).
- Achieve participation from 20 local businesses in the first three years of implementing a green business certification program.
- Increase the percentage of households in CDBG qualified neighborhoods spending less than 45 percent of income on housing and transportation costs to 60 percent by 2025.
- Increase number of households above Living Wage Standard by 15 percent by 2025.*
- Increase number of housing units within a designated Complete Neighborhood by 25 percent by 2025.

* Baseline: 2010

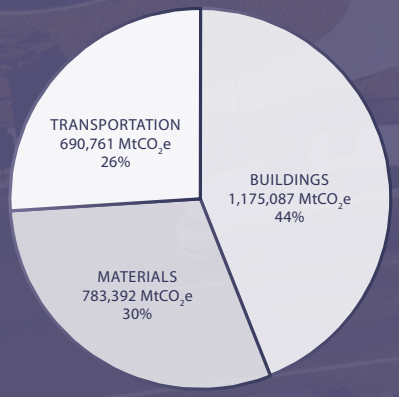
SUSTAINABLE ECONOMY: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,649,240**	**100%**

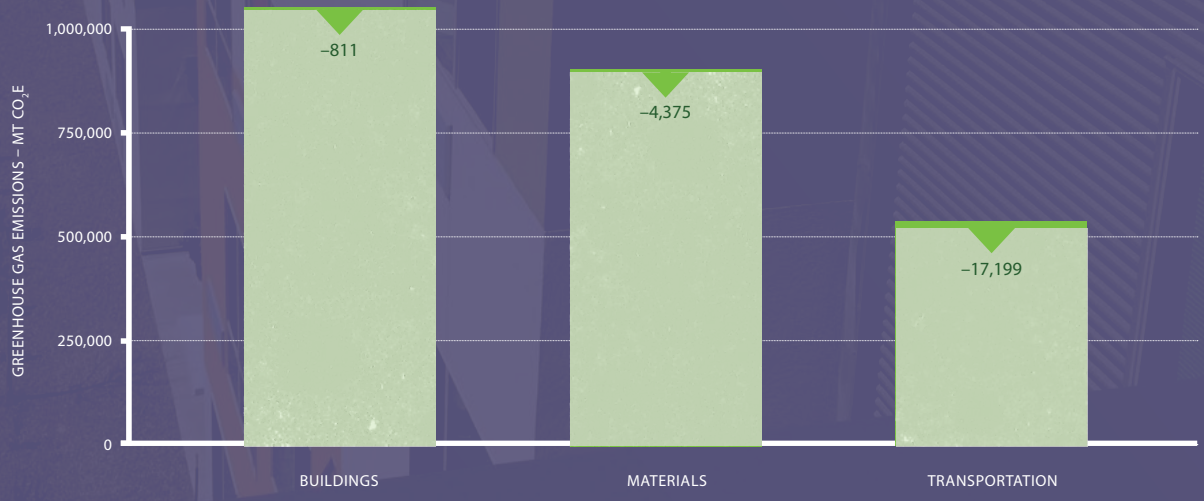
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER SUSTAINABLE ECONOMY STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,052,557	43%	– 811
MATERIALS	899,225	26%	– 4,375
TRANSPORTATION	521,966	31%	– 17,199
TOTAL GHG	**2,473,748**	**100%**	**–22,385**

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF SUSTAINABLE ECONOMY STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



A SUSTAINABLE ECONOMY CONSIDERS ALL ASPECTS OF A VIBRANT COMMUNITY, INCLUDING FINANCIAL STABILITY, SOCIAL WELL-BEING, AND ENVIRONMENTAL HEALTH.

SUSTAINABLE ECONOMIES consist of a strong, connected local business community, employment and professional development opportunities, and a sufficient tax base and revenue to support public infrastructure and services. A thriving local economy can propel a society toward resiliency, growth, health, and equity. It has the power to create and attract businesses that are able to meet the community's needs for quality jobs, goods, and services.

Projected increases in Lakewood's population and employment present an opportunity to shape our economy into one that supports a self-reliant, prosperous local economy. According to the Denver Regional Council of Governments (DRCOG), Lakewood's population is expected to increase by almost 25 percent and employment by over 30 percent.

Connecting existing and new businesses to each other and additional resources can help direct this growth toward an expanded local economy to meet the demand for sustainable business practices. Partnership between the business community and community leaders can also provide opportunities to improve individual household well-being through quality jobs and career development.

The business community itself is uniquely poised to provide leadership in sustainability. Changes in business policies and practices can have a ripple effect on the entire community, reducing the consumption of natural resources and enabling residents to make smart household economic choices. These changes often require a shift in the traditional view of business toward a triple-bottom-line business model that measures how well an organization affects profit, people, and the planet. Businesses have a large footprint on the city's overall resource usage. Commercial energy use alone was responsible for 22 percent of Lakewood's greenhouse gas emissions in 2007, representing enormous opportunities for energy cost savings for Lakewood businesses. The triple-bottom-line approach can also provide other economic benefits for the business itself, such as reduced waste disposal costs, increased employee satisfaction, and new marketing opportunities. In 2011, 94 percent of Gallup poll respondents agreed that is important for companies to be environmentally responsible,[1] and in 2013 over half of respondents prioritized the protection of the environment over economic growth.[2]

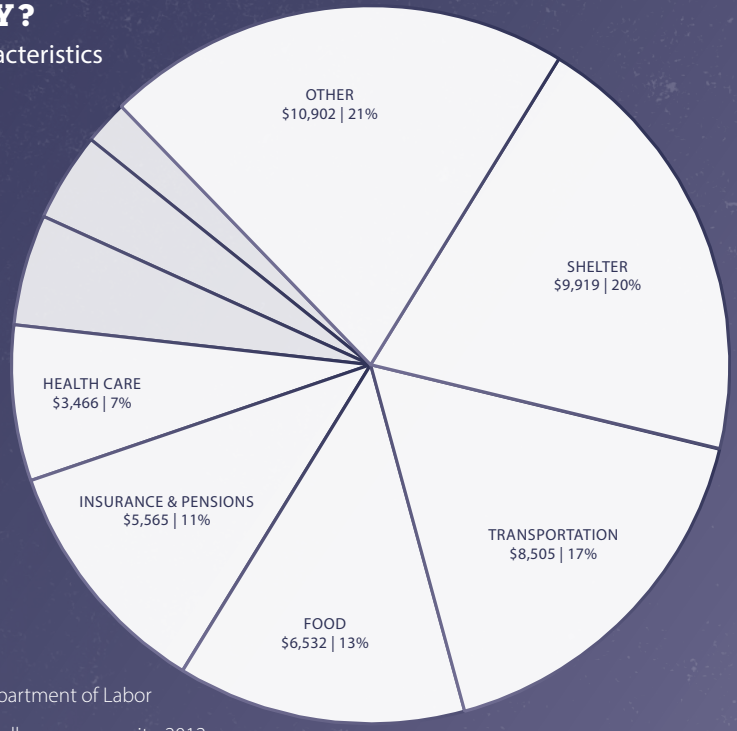
"According to the DRCOG, Lakewood's population is expected to increase by almost 25 percent and employment by over 30 percent."

[1] Bryant Ott. "Time to Green Your Business." Gallup Business Journal. April 22, 2011. http://www.gallup.com/businessjournal/147221/time-green-business.aspx.

[2] "Environment." Gallup.com. http://www.gallup.com/poll/1615/environment.aspx.

HOW DOES THE TYPICAL HOUSEHOLD SPEND ITS MONEY?

Average annual expenditures and characteristics of all consumer units, 2012.



Average number of people in consumer unit (household):	
Persons:	2.5
Earners:	1.3
Vehicles:	1.9
Percent homeowner:	64%
Income before taxes	$65,596

Source: Bureau of Labor Statistics, United States Department of Labor average annual expenditures and characteristics of all consumer units, 2012.

INDIVIDUAL & COMMUNITY VALUES

Those who shop local are casting a vote…

The City of Lakewood maintains a strong commitment to its local business community and seeks to create an environment that fuels innovation. The City's Comprehensive Plan sets goals for entrepreneurship, economic diversification, and business attraction and retention. These goals encourage new development and redevelopment in a manner that capitalizes on the community's strengths and supports the community's sustainability goals.

TRENDS AND OPPORTUNITIES

LIVING LOCAL

The past century was witness to an economic boom fueled by efficient transportation of goods and continuous innovations for mass production. This shift had unforeseen impacts on our local communities and natural ecosystems. The competitive efficiency of global markets influences the viability of many small, local businesses, making self-sufficiency in cities and regions increasingly difficult to attain. Impacts to the natural environment include unchecked resource extraction and greenhouse gas emissions from the transportation of goods. Many communities have recognized these impacts and are pursuing alternative investments for their future.

Living locally has become a value for many cities that are working toward a vibrant and resilient future. Living local involves everyone, including those who supply and process local resources, local businesses that distribute goods and services, and residents who purchase and share with their families and neighbors. Those who shop local are casting a vote with their dollars that represents their values as an individual and as a community. As local involvement increases, so does awareness and accountability. Residents begin to feel the impact of their business decisions on their natural environment and relationships with other community members.

Living locally not only respects the limits of our natural resources and promotes community cohesion, but it also stimulates local markets

LOCAL FOOD

One of the most popular ways to begin living locally.

and builds a resilient economy. This phenomenon is known as the local multiplier effect and describes the percentage of spending recirculated into the local economy through payroll, purchase of goods and services, business profits, and donations to local charities. On average, local spending returns almost three times as much money to the local economy compared to spending at chain businesses.[3] Living locally supports existing businesses and highlights opportunities for new business development. Living locally can only be fully accomplished if existing businesses can meet the needs of the community. When a gap is identified, local entrepreneurs have the opportunity to step in and create a new business.

With a direct connection to health, nature, and culture, local food has become one of the most popular ways to begin living locally. Food systems comprise all aspects of food production and distribution—harvest, processing, packing, transportation, and sales. When individuals make the decision to eat locally, it often leads to the consideration of other food qualities, including freshness, nutrition value, or production practices. Many choose to participate in community gardens or community-supported agriculture programs in order to ensure local and accountable food sources. All of these considerations work together to increase access to healthy food and to foster a vibrant and sustainable economy.

"According to a 2011 study by MIT, 65 percent of businesses have permanently integrated sustainability into management priorities."

SUSTAINABLE BUSINESS PRACTICES

Sustainability is rapidly becoming a common business strategy consideration. According to a 2011 study by MIT, 65 percent of businesses have permanently integrated sustainability into management priorities.[4] Businesses are recognizing that the economic landscape is increasingly being shaped by climate change, resource scarcity, and economic fluctuations. In order to remain competitive and maintain the support of the surrounding community, businesses are looking beyond immediate profits and taking a forward-thinking approach.

Businesses can achieve sustainable results in a number of ways, including efficiency upgrades, sustainable procurement, and creating a culture of sustainability for its employees and customers. In order to support sustainable business efforts, many cities have created sustainable business certification programs that provide resources, supportive networks, incentives, and recognition to participating businesses. The results benefit businesses, educate customers, and move communities closer to their sustainability goals.

SELF-SUFFICIENT HOUSEHOLDS AND COMPLETE NEIGHBORHOODS

A skilled labor force and a reliable customer base fuel a vibrant local economy. Strong households require stable incomes that allow them to meet their needs, opportunities for education and professional development, and financial management skills. With the proper economic support, individuals can contribute more to the labor force and the consumer base.

Self-sufficient households are supported by community cohesion, easy access to goods and services, and affordable housing and transportation options. After World War II, the nation experienced a severe housing shortage for returning veterans and their families. The solution

[3] American Independent Business Alliance. "The Multiplier Effect of Local Independent Businesses. 2014. http://www.amiba.net/resources/multiplier-effect.
[4] Knut Haanaes, et al. "Sustainability Nears a Tipping Point." MIT Sloan Management Review. 2012. http://sloanreview.mit.edu/reports/sustainability-innovation.

was a series of long-term mortgage loans that fueled a housing boom formed by single-use zoning laws. While providing affordable housing options, one of the unintended outcomes of the housing boom and zoning laws was a pattern of isolated, auto-dependent communities. Over the past two decades, the demand for walkable neighborhoods has resurfaced. A 2013 survey by the National Association of Realtors demonstrated the growing preference for walkable neighborhoods: 60 percent of respondents chose a walkable neighborhood compared with 35 percent who chose a neighborhood that requires driving to stores and other businesses.[5] Aging populations and the millennial generation have both vocalized their desires for walkable, transit-oriented, and economically dynamic neighborhoods that meet their needs and preferences. Transportation costs plummet when shops, services, and transit are accessible by foot or bicycle. Neighborhood cafes and other local businesses reduce anonymity and build social resilience. Ownership of the natural environment increases when people walk their streets daily and send their children to play at the local park. Community leaders around the world are responding to this trend through development policies and neighborhood programs. In 2013, the City of Lakewood revised its Zoning Ordinance to reflect these trends and support mixed-use development that fosters social and economic resilience. ■

[5] National Association of Realtors. "2013 Community Preference Survey." http://www.realtor.org/reports/nar-2013-community-preference-survey.

GOAL **SE1**

CULTIVATE A SUSTAINABLE, PROSPEROUS, AND SELF-RELIANT LOCAL ECONOMY.

TARGETS

- Increase local food assets annually through 2025 (baseline to be established after the completion of Implementation Strategy SE1-A).
- Achieve participation from 20 local businesses in the first three years of implementing a green business certification program.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Ensure the availability of locally produced goods and locally available services.
  - INDICATOR: Location quotients of specifically identified sectors
  - INDICATOR: Urban agriculture permits issued
  - INDICATOR: Acreage of community gardens and urban farms
  - INDICATOR: Funds deposited in locally owned and managed financial institutions

- **OBJECTIVE:** Support a local business community that attracts and develops local talent and investment and provides leadership in sustainable business practices.
  - INDICATOR: Unemployment level
  - INDICATOR: Jobs to labor force ratio
  - INDICATOR: Average "click-rate" for the City Economic Development electronic newsletter

IMPLEMENTATION STRATEGIES

SE1-A LOCAL AND HEALTHY FOOD

Develop a comprehensive strategy to increase production, availability, and consumption of locally grown, affordable, and healthy food. Specifically:

- Identify existing local food assets and gaps throughout the city;
- Assess and minimize barriers to local food production and sales;
- Promote opportunities for residents to participate in community supported agriculture and other farm-to-table programs;
- Connect residents with opportunities to develop local food production skills;
- Foster relationships between existing food stores, the City of Lakewood, and neighborhood residents to encourage expansion of local food availability;
- Support community-based local food distribution through cooperatives, neighborhood food stands, markets, and community-supported agriculture programs; and
- Support Comprehensive Plan Action Steps regarding food availability, including
    - increasing community gardens;
    - identifying and eliminating food deserts; and
    - expanding farmers' markets.

COMMUNITY SPOTLIGHT

EVERITT FARMS: A VISION FOR CHANGE

BY DEREK AND KAMISE MULLEN, ADDENBROOKE/BELMAR PARK NEIGHBORHOOD

WE DECIDED TO CREATE EVERITT FARMS because we believe the world is in need of true change. We saw the family land as an opportunity very few people have. The goal is to prove not only a financially viable model but one that honors the environment and the community.

As we began farming we started to realize the true meaning of sustainability and how far we need to go as a society to reach that goal. We began implementing sustainable practices in our everyday life, but we had no one to learn from. We often hear the saying, "I know this is a problem, but I don't know how to fix it." We see our farm as a place where our community can come together to teach and learn the daily life skills to begin fixing the problems.

Our vision is to build a "Functioning Historic Town Center" that is rooted in the traditions of times past. The center will be designed to maximize community engagement and education. Our "Functioning Historic Town Center" will be anchored by seven core food-based businesses. The farm, a grocery, a bakery, a butcher shop, brew pub, sit down restaurant, and a bed and breakfast. The shops will be those one would have found throughout history, each using techniques known for many generations. They will function in ways that enhance and educate the surrounding community by producing goods directly used by community members.

My wife and I are blessed to have this opportunity to create something out of the last of our family's homestead. We see the power of creating change through action, and that farming real food is an action at the root of real political, social, and economic change in our world. ■

CONCEPT

MICROFINANCING

BY ROB SMITH, ROCKY MOUNTAIN MICROFINANCE INSTITUTE

MICROENTERPRISE development programs provide business development services to people who need access to capital and training to acquire the resources and business knowledge they need to be successful. A microenterprise, also known as a "mom and pop," is a business with five or fewer employees. Most are solopreneurs, which create employment for the owner. Some grow into larger businesses, employing other community members. They are defined as requiring less than $35,000 in capital to start. A microentrepreneur is typically someone who is looking for a way to advance from a position of low-income to a place where they can create self-sufficiency for themselves and their households through the business. Microenterprises are wide ranging businesses across the service, wholesale, and retail markets. Typical microenterprises can be anything from caterers to auto mechanics to massage therapists.

Most microenterprise development programs offer access to core services including business training and technical assistance, and access to credit or business loans. Other services include business management assistance, such as access to markets and technology training.

WHY MICROENTERPRISE DEVELOPMENT?

- Assists people to become more economically self-sufficient, increasing personal and household wealth
- Diversifies local economies and builds well-being in the community
- Preserves the distinctive character of communities that make them appealing
- Contributes to the economy through tax revenues and eventual employment growth
- Represent 89 percent of existing businesses in Colorado and accounts for over 24 percent of employment

LEARN MORE ABOUT MICROFINANCING:

http://www.rmmfi.org

SE1-B LOCAL PRODUCTS AND SERVICES

Develop a comprehensive strategy to increase the production, availability, and consumption of local products and services. Specifically:

- Identify key products and services unavailable from local sources;
- Approach existing, sector-appropriate businesses to provide unavailable products and services;
- Foster entrepreneurship through local colleges and incubators to provide unavailable products and services; and
- Recruit businesses through targeted industry attraction to provide unavailable products and services.

SE1-C LIVE LOCAL AND HIRE LOCAL CAMPAIGN

Develop a brand and marketing campaign that promotes use of local goods and services along with a hire local Lakewood campaign to encourage businesses to hire local talent.

SE1-D LOCAL INVESTMENT

Facilitate investment and entrepreneurship in the local economy. Specifically:

- Promote opportunities for residents to invest locally through crowdfunding projects and local investment funds;
- Connect local businesses with local financial institutions, microfinancing institutions, and other alternative lenders and funders;
- Support incubators and co-working establishments; and
- Research creative financing mechanisms for small businesses.

SE1-E SUSTAINABLE BUSINESS HUB AND CERTIFICATION PROGRAM

CROSSCUTTING STRATEGY

Form a dynamic community to foster a self-reliant local economy, increase adoption of sustainable business practices, and set a standard for business sustainability by connecting businesses to local producers, potential employees, the education community, technical resources, existing sustainability and economic development programs, and funding opportunities. Specifically:

- Identify potential partners;[1]
- Host workshops with partners to identify needs and opportunities;
- Develop an online resource to facilitate connections between Hub participants;
- Identify available programs and expertise to support participants, including best practices from the City and peer-to-peer exchange;
- Facilitate mentorship, internship, and apprenticeship programs and other techniques that connect businesses with students and residents;
- Connect retirees to businesses as potential part-time employees, consultants, volunteers, and mentors;
- Develop a green business certification program to encourage and recognize businesses demonstrating leadership;
- Consider providing additional advisory and technical support to businesses achieving green business certification; and
- Use the Hub to incorporate specific strategies from other Sustainability Plan goals. These can be found throughout the Sustainability Plan under "Crosscutting Strategies."

[1] Local retailers, producers, manufacturers, and service providers, business associations, local financial institutions, nonprofit and governmental organizations providing economic development support and workforce training programs, high schools, tech and trade schools, college and universities.

SUPPORTING STRATEGIES

COLLABORATION	■ Work with regional agencies and organizations to coordinate and support shared economic development goals.
EDUCATION & PROMOTION	■ Promote Lakewood's high quality of life in order to attract and retain a talented workforce, entrepreneurs, and primary employers.
TOOLS & TECHNOLOGY	■ Monitor emerging technologies and best practices for supporting sustainable business.
RESEARCH & TRACKING	■ Research barriers to individuals living and working within the city. ■ Monitor emerging trends in green industries and employment. ■ Monitor trends and opportunities in the emerging sharing economy.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER BE1-C | P. 39	■ Share information and supportive services between the Sustainable Business Hub and Sustainable Energy and Water Resource Center.
SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Encourage businesses to participate in the Live Local and Hire Local Campaign.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Work with neighborhoods to pilot community-based local food programs. ■ Work with neighborhoods to pilot the use of crowdsourced funding to implement neighborhood-level projects.

TABLE SE1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
SE1-A: Local and Healthy Food	🍃	■	■■	■■	■■	■■
SE1-B: Local Products and Services	🍃🍃	■	■■	■	■	■
SE1-C: Live Local and Hire Local Campaign	🍃	⊘	■■	■	■	■
SE1-D: Local Investment	⊘	■	■■	■■	■■	■
SE1-E: Sustainable Business Hub and Certification Program	🍃	■■■	■■■	■■■	■■	■■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions ■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE SE1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
SE1-A: Local and Healthy Food	$	✓	–	–	✓
SE1-B: Local Products and Services	$	✓	✓	–	✓
SE1-C: Live Local and Hire Local Campaign	$	✓	–	✓	✓
SE1-D: Local Investment	$	✓	✓	✓	✓
SE1-E: Sustainable Business Hub and Certification Program	$$	✓	✓	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **SE2**

FOSTER SELF-SUFFICIENCY AND UPWARD MOBILITY OF LAKEWOOD HOUSEHOLDS.

TARGETS

- Increase the percentage of households in CDBG qualified neighborhoods spending less than 45 percent of income on housing and transportation costs to 60 percent by 2025.
- Increase number of households above Living Wage Standard by 15 percent by 2025.*
- Increase number of housing units within a designated Complete Neighborhood by 25 percent by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Increase opportunities for upward mobility across all households.
  - INDICATOR: Median household income
  - INDICATOR: Percentage of households that meet or exceed the living wage standard
- **OBJECTIVE:** Make household costs affordable and accessible for Lakewood residents.
  - INDICATOR: Percentage of households that spend more than 45 percent of income on housing and transportation costs
  - INDICATOR: Number of residents on waiting lists for subsidized units at Metro West Housing Solutions properties
  - INDICATOR: Number of households in areas within a designated Complete Neighborhood
- **OBJECTIVE:** Expand access to education and training in order to secure quality jobs and support career advancement.
  - INDICATOR: Jefferson County Schools postsecondary and workforce readiness score
  - INDICATOR: High school graduation rates and postsecondary educational attainment
  - INDICATOR: Participation in workforce development programs and skills training

* Baseline: 2010

IMPLEMENTATION STRATEGIES

SE2-A SELF-SUFFICIENCY EDUCATION

Host events and provide information for residents to encourage self-sufficient household practices. Specifically:

- Focus on financial education, including retirement planning, debt reduction, and basic money management through partnerships with local lending institutions, libraries, and community organizations;
- Highlight higher education and workforce empowerment opportunities; and
- Provide understanding of household expenses, including the connection between housing types, location, transportation options and the true cost of housing choices.

SE2-B COMPLETE NEIGHBORHOOD INDEX

Develop an index for assessing the completeness of neighborhoods in order to reduce transportation costs, build community cohesion, increase housing values, and provide other household and community benefits. Specifically:

- Develop specific criteria that define what makes a Complete Neighborhood in Lakewood and identify appropriate neighborhoods for analysis;
- Conduct a geospatial analysis to establish a baseline for the completeness of each appropriate neighborhood; and
- Develop neighborhood-specific strategies to address deficiencies.

CONCEPT

COMPLETE NEIGHBORHOOD

WHAT MAKES A GREAT NEIGHBORHOOD? Although the necessary ingredients are as diverse as the people living in them, there are common elements that support resilient and dynamic neighborhoods. Assorted housing options and multimodal transportation services ensure that people of all ages, incomes, and abilities are able to live and engage in the neighborhood. Quality schools, healthy food sources, open space, recreational facilities, and public gathering spaces contribute to community and individual well-being. Commercial services and quality jobs increase the resiliency of individual households and the neighborhood as a whole.

Collectively, these elements come together to form a "complete neighborhood," where one has safe and convenient access to a mix of uses that meet daily needs for people of all ages and abilities. An array of household and communitywide benefits is linked to complete neighborhoods, including:

- **AFFORDABLE, MULTIMODAL TRANSPORTATION INFRASTRUCTURE:** Residents are able to walk to take transit to work, shopping, and other activities.
- **STRONG SOCIAL FABRIC:** Residents interact frequently and are more aware of each other's strengths and needs.
- **STABLE AND DESIRABLE HOUSING VALUES:** Easily accessible goods, services, and activities make the neighborhood a desirable place to live.
- **UNIQUE NEIGHBORHOOD IDENTITY:** Public spaces reflect the neighborhood's character and vision for the future.
- **HEALTHY EATING AND ACTIVE LIVING:** Residents have greater access to healthy food and more opportunities for walking and biking.
- **AIR QUALITY:** Fewer cars on the road reduce vehicle emissions.
- **VIBRANT LOCAL ECONOMY:** Residents patronize local businesses and value local talent.

LEARN MORE ABOUT COMPLETE NEIGHBORHOODS:

https://www.eugene-or.gov/index.aspx?NID=506
http://www.portlandonline.com/portlandplan/index.cfm?c=52256&a=288098

SUPPORTING STRATEGIES

COLLABORATION

- Partner with Jefferson County and area nonprofits to promote workforce development programs and self-sufficiency skills.
- Work with regional transportation agencies, property managers, and neighborhood organizations to reduce household transportation costs through assorted transportation management programs.

EDUCATION & PROMOTION

- Promote the importance of affordable housing, types of housing programs and subsidies, and how these programs strengthen the overall community.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER

BE1-C | P. 39

- Support and promote policies and resources to rehabilitate and increase the energy efficiency of older housing within Lakewood, thereby reducing household overhead costs.

SUSTAINABLE BUSINESS HUB

SE1-E | P. 61

- Develop mentoring, shadowing, apprenticeship, and internship programs for students to assist them with career choice and educational program selections.

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Work with neighborhoods to host self-sufficiency education workshops.
- Work with neighborhoods to help develop the Complete Neighborhood Index.

TABLE SE2-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
SE2-A: Self-Sufficiency Education	🍃	⊘	■	■■	■	■
SE2-B: Complete Neighborhood Index	🍃	■■	■■	■■■	■■■	■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE SE2-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
SE2-A: Self-Sufficiency Education	$	✓	–	✓	–
SE2-B: Complete Neighborhood Index	$$	✓	–	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

CHAPTER 04

ZERO WASTE

THE CITY OF LAKEWOOD and its residents recognize their responsibility to minimize the harmful impacts of waste in order to foster a vibrant and sustainable community. Lakewood envisions a future where the community collaborates with the surrounding region to practice responsible procurement, reuse, and recovery of materials through which jobs are created, business networks grow, and resources are conserved.

GOALS

- Create a culture of zero waste in Lakewood through education, municipal operations, infrastructure, and services.
- Foster sustainable household waste management.
- Foster sustainable commercial waste management.

TARGETS

- Achieve a 60 percent communitywide diversion rate by 2025.
- Achieve an 80 percent diversion rate at the Civic Center by 2025.
- Achieve increased diversion rates for specific municipal facilities (to be established after the completion of Implementation Strategy ZW1-B).
- Achieve a 90 percent diversion rate at City of Lakewood Earth Day and Cider Days events.
- Achieve a 60 percent residential* diversion rate by 2025.
- Achieve a 60 percent construction and demolition diversion rate by 2025.
- Achieve a 60–90 percent diversion rate for priority waste streams**.

* Single-family residences and complexes with eight units or fewer.

** Priority waste streams will be established through Implementation Strategy ZW3-A.

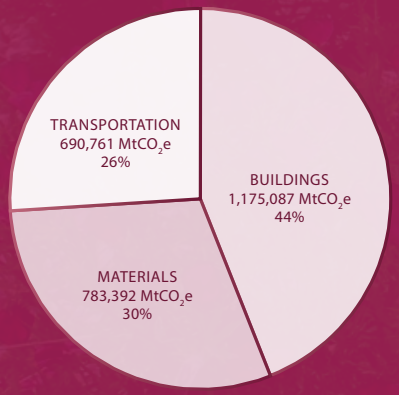
ZERO WASTE: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	2,649,240	100%

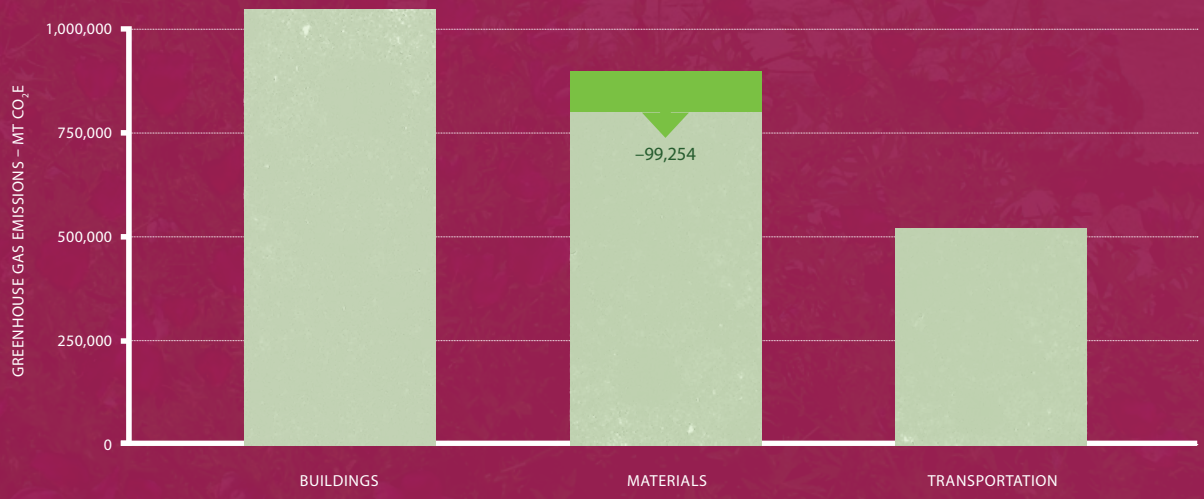
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	2,496,133	100%	**–153,107**

2025 AFTER ZERO WASTE STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	44%	0
MATERIALS	804,346	34%	– 99,254
TRANSPORTATION	539,165	22%	0
TOTAL GHG	2,396,879	100%	– 99,254

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF ZERO WASTE STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



EACH AMERICAN GENERATES AN AVERAGE OF 4.4 POUNDS OF WASTE PER DAY.

WHAT MANY OF US DON'T REALIZE is that for every pound of waste we produce, 87 pounds of waste have already been generated through the manufacturing of those products.[1] The average American recycles or composts 34 percent of their waste; however, in Colorado the recycling and composting rate, often referred to as the "diversion rate," is just 26.5 percent.[2] Although diversion rates have steadily increased over the past five years, 164 million tons of waste still end up in U.S. landfills and incinerators every year.[3] Increasing our diversion rate to 100 percent would have a significant positive environmental impact, but it would still not address all the waste generated during the manufacturing process.

The flow of material in our society is commonly a one way stream to the dump. Natural resources are extracted from the earth, processed into goods, transported to our communities, consumed, and disposed of in landfills or incinerated into our air. In this model, even before the waste is disposed of, we negatively impact ecosystems, extract nonrenewable resources, and contribute to greenhouse gas emissions through the manufacturing and transportation processes. Waste buried in the landfill contaminates groundwater and soil and releases potent greenhouse gas emissions, including methane, into the air.

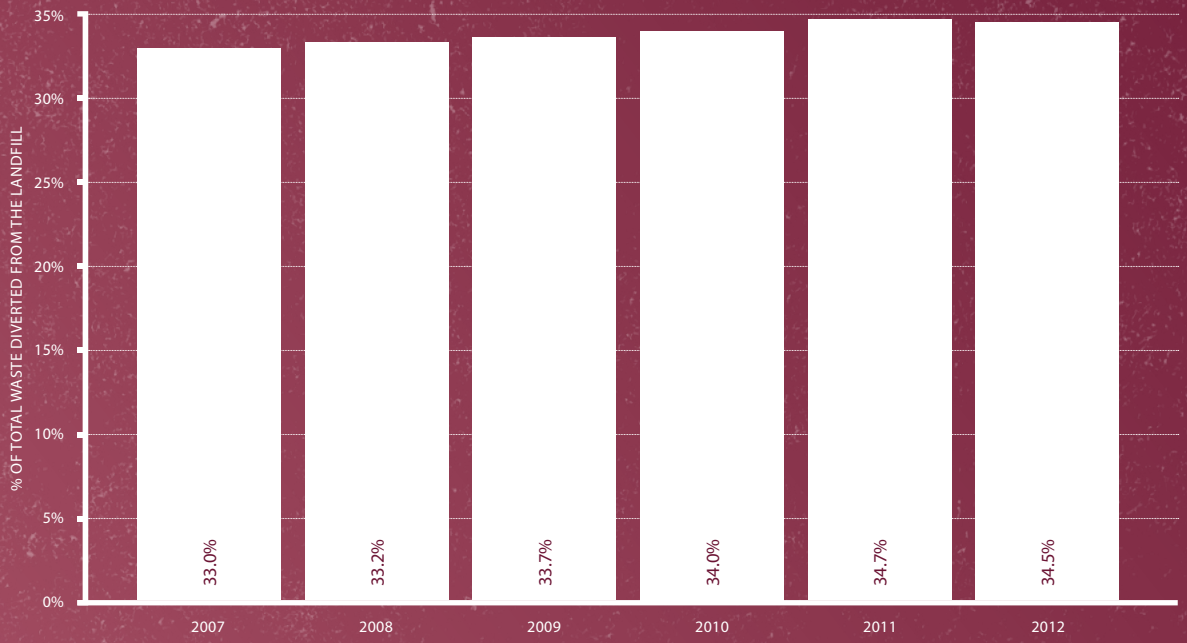
Communities around the country and the world are changing how they think about the flow of materials. Our natural ecosystems provide a healthy and efficient model that functions without creating waste. Outputs from one process, such as decomposing plant matter, provide input for another, such as creating nutrient rich soil for the next crop of plants. Communities are exploring ways to mimic nature's material cycle where used resources are repurposed and given a new life, an approach known as zero waste. Zero waste shifts the focus from simply managing how we dispose of waste to reducing how much we generate and finding value in our used materials.

Moving toward zero waste calls for partnerships within and between communities, businesses, industries, and government. With extensive collaboration, we can address the complexity of addressing diverse waste streams and the presence of hazardous materials in the goods we use daily. The outcomes of zero waste not only reduce negative impacts, but also create economic value through job creation, efficient material use, and industry innovation.

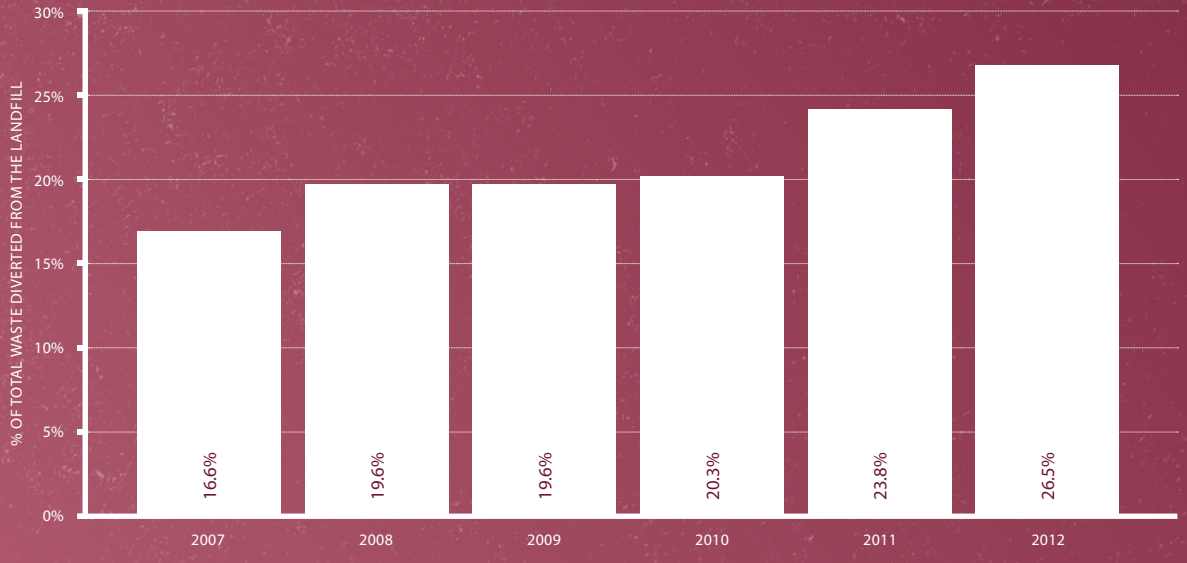
[1] Eco-Cycle. "Zero Waste: The Choice for a Sustainable Community." 2012. http://www.ecocycle.org/zerowaste.
[2] Colorado Department of Public Health and Environment. "Annual Solid Waste Diversion Totals 2007–2013." https://www.colorado.gov/pacific/cdphe/swreports.
[3] U.S. Environmental Protection Agency. "Municipal Solid Waste (MSW) in the United States: Facts and Figures." Last Updated: February 28, 2014. http://www.epa.gov/osw/nonhaz/municipal/msw99.htm.

HOW MUCH WASTE ARE WE DIVERTING FROM THE LANDFILL?

U.S. MUNICIPAL SOLID WASTE* DIVERSION TOTALS



COLORADO MUNICIPAL SOLID WASTE* DIVERSION TOTALS



*Municipal solid waste includes residential and commercial waste, but does not include industrial, hazardous, or construction waste.

TRENDS AND OPPORTUNITIES

UPSTREAM: WASTE REDUCTION AND GREEN PROCUREMENT

The zero waste approach considers the three phases of a product's lifecycle: upstream, midstream, and downstream. The upstream phase addresses resource extraction and production. Producers can play a large role in this stage through responsible manufacturing processes, reducing toxicity in their products, reducing packaging, and redesigning products that can be cycled back into the materials system. Consumers play an equally important role by consuming less and choosing to purchase from responsible producers. Although there are rarely "green" or "not green" items, purchasers can place items on a spectrum of sustainable production in order to compare items and make the more sustainable choice. Many organizations establish purchasing guidelines that align with their waste diversion targets and other sustainability goals. In 2012, the City of Lakewood adopted a Green Procurement Policy to encourage the purchase of green products throughout City operations.

MIDSTREAM: LONGEVITY AND REUSE

The midstream phase in the zero waste approach addresses how we use our materials. Disposable products are a common and inexpensive choice for many; yet the true cost is rarely represented on the price tag. The use of natural resources, production, transportation, and disposal are all costs of a single disposable item that is rapidly discarded. Plastic bags are a common example; according to the U.S. Environmental Protection Agency, the average American uses 500 plastic bags a year, using each bag for an average of 12 minutes before it is discarded. Choosing products that can be reused over and over again is an easy and effective way of reducing waste.

As our needs change and we no longer find our products useful, there are several alternatives before disposal. The growing sharing economy encourages people to share resources, reducing waste, saving money, and building relationships. These exchange networks can take many forms and happen in many places, including online neighborhood forums, garage sales, thrift stores, and donation sites. If there still is no demand for a product, there might be an opportunity for repurposing. Artists, entrepreneurs, and thrifty households have demonstrated that tires can be turned into chairs, wooden pallets into playgrounds, and leather airline seats into travel bags. Product reuse processes, such as repairs and reclamation, can create between 25 and 300 more jobs than landfilling and incineration.[4] Sharing and repurposing are midstream waste solutions with benefits far beyond our waste diversion goals.

The average American uses 500 plastic bags a year, using each bag for an average of 12 minutes before it is discarded. Choosing products that can be reused over and over again is an easy and effective way of reducing waste.

DOWNSTREAM: RESOURCE RECOVERY

The downstream phase includes all resource recovery operations. Recycling, composting, and waste-to-energy technologies are all ways to recapture the value of our discarded materials. Each of these processes is dependent on having the proper infrastructure and markets to support the redistribution of materials back into the zero waste system. Ensuring the proper facilities are available locally reduces transportation costs for waste haulers and creates jobs in the local economy. Resource recovery is also influenced by the upstream, green procurement process. By choosing products that can be recycled or composted, we are creating the inputs for the resource recovery industry.

Resource recovery is a critical mechanism for reducing community greenhouse gas emissions. Organic waste such as food scraps and yard trimmings that are sent to landfills produce methane, a greenhouse gas that is 72 times more potent than carbon dioxide. Organic waste makes up the largest portion of our current waste stream, resulting in 123 pounds of methane gas emissions for each ton of landfilled municipal solid waste.[5] Composting provides a healthy and economic alternative where recycled organic materials become nutrient-rich soil that can be used to grow new crops or fertilize our landscapes. Organic waste also can be processed into biogas through anaerobic digestion. Biogas can be combusted to generate electricity and heat or processed into fuel.

Each phase of the zero waste approach reduces negative health and environmental impacts and adds value to our economic and natural systems. Zero waste is an approach, vision, and way of life that everyone can participate in to create a vibrant and sustainable future. ■

[4] Institute for Local Self-Reliance. *Waste to Wealth: Recycling Means Business*. February 1, 2002. http://ilsr.org/recycling-means-business.

[5] Forster, P., V. Ramaswamy, et al. "2007: Changes in Atmospheric Constituents and in Radiative Forcing." Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Eds. Solomon, S., New York: Cambridge University Press, 2007. pp. 129–234.

ZERO WASTE DRIVERS

Programs, practices, and resources that support and contribute to a zero waste society.

- Producer Responsibility
- Green / Responsible Procurement
- Consumer Values
- Zero Waste Policies / Facilities

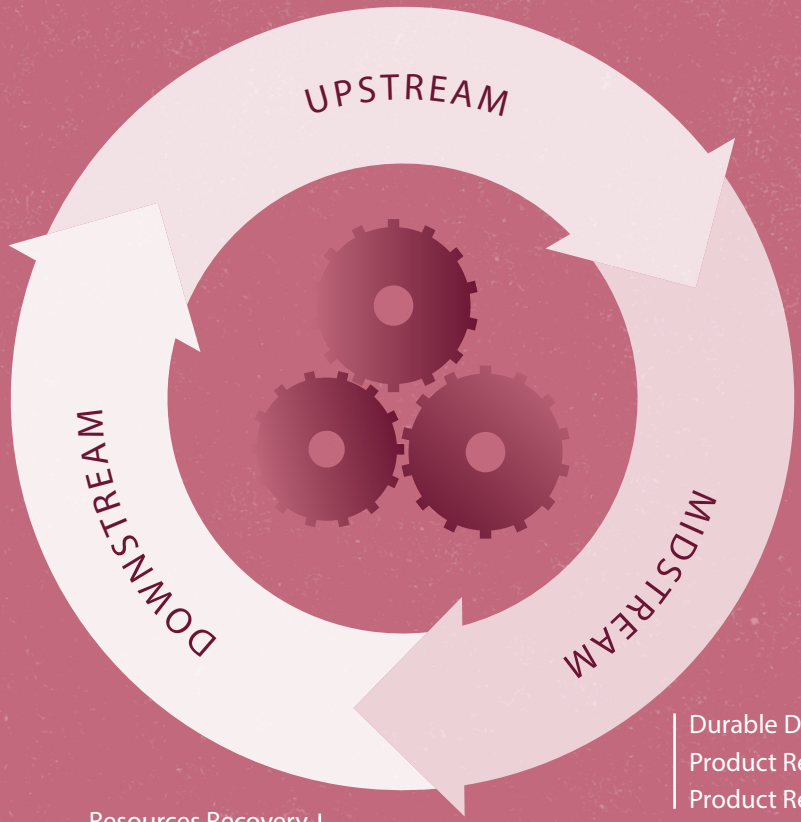
ZERO WASTE OUTPUTS

Social, economic and environmental benefits from a zero waste society.

- Jobs
- Energy Recovery
- Industry Innovation
- Sharing Economy
- Environmental Health

ZERO WASTE CYCLE

Product Design
Responsible Resource Extraction
Clean Manufacturing
Manufacturing From Recycled Materials



Durable Design
Product Reuse / Repair
Product Repurposing

Resources Recovery
Recycling
Composting
Waste-To-Energy / Energy Recapture

GOAL **ZW1**

CREATE A CULTURE OF ZERO WASTE IN LAKEWOOD THROUGH EDUCATION, MUNICIPAL OPERATIONS, INFRASTRUCTURE, AND SERVICES.

TARGETS

- Achieve a 60 percent communitywide diversion rate by 2025.
- Achieve an 80 percent diversion rate at the Civic Center by 2025.
- Achieve increased diversion rates for specific municipal facilities (to be established after the completion of Implementation Strategy ZW1-B).
- Achieve a 90 percent diversion rate at City of Lakewood Earth Day and Cider Days events.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Encourage the adoption of zero waste thinking with regard to the production, use, and disposal of resources.
  - INDICATOR: Number of residents engaged through zero waste outreach and education campaigns
- **OBJECTIVE:** Work toward zero waste in City facilities, operations, and events.
  - INDICATOR: Number of City facilities that offer recycling and composting collection
- **OBJECTIVE:** Increase the availability of facilities and specialized services to support reuse and resource recovery.
  - INDICATOR: Participation at special collection events
  - INDICATOR: Volume of material collected at Quail Street Recycling Center
  - INDICATOR: Volume of hazardous material collected at Rooney Road Recycling Center

CITY SPOTLIGHT

ZERO WASTE AT LAKEWOOD HERITAGE CENTER

THE LAKEWOOD HERITAGE CENTER'S (LHC) 20th Century Museum and festival grounds is home to the City's large community events. The LHC approach to zero waste has been a gradual, but continuous effort. Beginning in 2008 with the creation of waste sorting stations at large community events like the Sounds Exciting concert series, Cider Days, and Heritage Days, LHC has looked for ways to provide an overall reduction in waste. These events, which on average attract 5,000, 8,500, and 800 patrons respectively, are viewed as chances to serve museum visitors by implementing larger scale sustainable practices. By reducing our operational footprint and educating the Lakewood community about reducing theirs, we have an opportunity to cultivate awareness and foster change.

At both the Sounds Exciting concert series and Heritage Days, sorting stations with recyclable, compostable, and landfill containers have been very successful from the start. On average, 75 percent of each event's waste is recycled and composted each year. Unfortunately, Cider Days, which draws a substantially larger crowd, did not experience the same immediate success. After a couple of unsuccessful years with a mix of attended and unattended sorting stations, LHC decided the only way to create a meaningful difference in waste diversion was to hand sort every bag generated over a two day period. In order to achieve this goal, a large-scale hand sorting station was created and routinely staffed by a team of employees and volunteers. During the first year in 2011, sorters filled a 20 cubic yard container with recyclable materials and estimated that 75-80 percent of the total volume of material generated at the event was diverted from the landfill. That same year, 4,000 pounds of compostable material made up mostly of apple mash and wood shavings, generated from the event's cider pressing and saw mill demonstrations, were donated for pig feed and landscaping purposes. In 2014, LHC added additional composting to the Cider Days waste reduction efforts. The event was attended by 10,500 patrons, the biggest crowd in the event's history. The hand-sorting station collected 7,045 pounds of compostable/repurposed materials and 280 pounds of recyclable materials. Of the total waste generated, 84 percent was composted, 3 percent was recycled, with just 13 percent of waste going to the landfill.

In addition to special events, LHC practices zero waste in its day-to-day operations. The facility has integrated kitchen compost containers for staff/volunteer use and began composting organic waste generated from four large on-site flower and vegetable gardens in 2013 within a series of bins constructed of recycled palettes. The LHC compost bins have become a valuable tool for educating our visitors during events, tours and summer camps regarding the benefits of composting and organic gardening. The compost generated as part of this system is placed back in to our gardens annually and provides a nutrient-rich soil amendment more effective and safer than anything commercially available.

Many visitors at LHC share their appreciation of our endeavors toward waste reduction and the education that they use to become greener at home. Together, through these large- and small-scale efforts, LHC has witnessed firsthand the significant impacts a zero-waste approach has made and, as a result, continues to seek to improve, enhance, and expand our efforts. ■

IMPLEMENTATION STRATEGIES

ZW1-A ZERO WASTE OUTREACH AND EDUCATION CAMPAIGN

Develop sector-specific outreach materials and educational campaigns to promote zero waste concepts and resources. Specifically:

- Develop campaigns for the municipal organization, single-family residences, multifamily residences, businesses by sector, and construction and development;
- Identify opportunities to provide zero waste education, including City employee orientation and HOA and business association meetings;
- Use City events as opportunities for public outreach and to demonstrate leadership;
- Create standards for clear and consistent zero waste messaging, including bin signage, colors, design, placement, and terminology that makes it easy to participate;
- Customize and distribute information on resource recovery facilities in Lakewood, including Rooney Road Recycling Center, Quail Street Recycling Center, and private collection sites;
- Develop and distribute specific recycling resource lists by sector; and
- Utilize City website and other communication channels to provide information to residents, businesses, and waste haulers on communitywide zero waste goals and related municipal policies.

ZW1-B MUNICIPAL FACILITY ZERO WASTE PROGRAMS

Develop customized zero waste strategies for new and existing municipal facilities based on the type of use and users, waste characteristics, and unique constraints. Specifically:

- Assess facilities to understand the range of services provided, types of facility users, and potential for waste reduction and diversion;
- Prioritize facilities for zero waste program implementation;
- Conduct waste characterization studies to determine the specific composition and quantity of waste generated;
- Identify opportunities to minimize waste generation and increase diversion rates through enhanced services or infrastructure;
- Set diversion targets when appropriate;
- Identify budget requests required for implementation;
- Implement enhanced services and infrastructure, provided appropriate resources are allocated;
- Develop educational and behavioral change strategies;
- Identify on-site leaders and mechanisms for communication to support implementation; and
- Track effectiveness and concerns in order to adjust the program as necessary to ensure success.

ZW1-C GREEN PROCUREMENT PROGRAM

Expand the City's green procurement program for the preferential purchase of green products and services and provide guidance for implementation. Specifically:

- Identify the potential environmental, economic, and social benefits of sustainable procurement practices;
- Establish a set of criteria, specific to product or service categories, that can be used to identify preferred products and services. Consider impacts on the environment, human well-being, energy use, greenhouse gas emissions, natural resources, and support of local businesses;
- Assess existing purchases and contracts to identify opportunities to transition to more sustainable products or services;
- Set a threshold for an acceptable cost increase for sustainable alternatives and consider establishing requirements for purchases to be assessed for compatibility with City sustainability goals if they are 1) over a certain dollar amount or 2) from specifically identified product or service categories;
- Continue to host regular green procurement training sessions for City staff and green procurement vendor fairs to learn about sustainable products and services;
- Provide customized support to City departments to support implementation of the green procurement program.

CITY SPOTLIGHT

RECYCLING SERVICES

THE CITY OF LAKEWOOD offers a variety of recycling services for its residents and employees. Since 1993, the City has provided single-stream recycling in City offices, recreation centers, community and art centers, and at the Heritage Center. Education and employee initiative support strong participation from users, resulting in approximately 300 tons of recycled materials each year from City facilities. The City also recycles shredded paper, which requires a separate sorting and bailing process and in 2014, launched compost service at the Lakewood Civic Center.

The City provides several recycling services for the Lakewood community and is continuously seeking ways to improve and expand operations. The Quail Street Recycling Center is open seven days a week and accepts common recyclable materials. Since the reopening of the Quail Street Recycling Center in early 2012, more than 3,000 tons of materials have been recycled, and in 2013 300 cars used the facility every day. The City also contributes funding and operational support to the Rooney Road Recycling Center (RRRC), which accepts household hazardous waste, chemicals, and electronics. The RRRC is owned and operated by a coalition of cities and towns in Jefferson County and provides a safe, responsible option for recycling hazardous materials. The City also provides Community Cleanups, which are special events that give residents an affordable opportunity to get rid of bulk items, electronics, and other household waste. ■

ZW1-D MUNICIPAL ZERO WASTE TOOLS

Develop resources and tools for City employees and facility users to support zero waste events, meetings, and operations. Specifically:

- Expand the green vendor list of businesses that provide products and services consistent with the City's zero waste goals;
- Provide model contract language and vendor agreements;
- Create a list of green products that meet the City's green procurement criteria and can be reused, recycled, or composted;
- Assemble facility-specific zero waste toolkits for events and meetings that provides step-by-step instructions, relevant signage, messaging standards, and additional materials and resources; and
- Provide customized support to City departments for green purchasing and other opportunities to reduce waste.

ZW1-E REUSE AND RESOURCE RECOVERY FACILITIES

Assess existing resource recovery facilities and infrastructure for capacity and material limitations in order to expand opportunities for landfill diversion. Specifically:

- Inventory existing public and private facilities to identify waste streams collected and processing capacity;
- Identify waste streams with insufficient recovery facilities;
- Identify funding opportunities and resources to address limitations and expand service; and
- Utilize the facility, waste stream, and budget assessments to prioritize investments in resource recovery facilities. Consider:
  - Expanding the level of service at City facilities, including Quail Street Recycling Center and Rooney Road Recycling Center;
  - Developing additional recycling drop-off sites and material recovery facilities (Example: City of Boulder CHaRM: Center for Hard to Recycle Materials);
  - Maintaining existing or expanding regular community cleanups and special collection events;
  - Facilitating additional collection sites for thrift stores and other charitable reuse outlets on private and public locations, ensuring the credibility of the collection organizations; and
  - Partnering with businesses to safely collect hard-to-recycle and hazardous materials related to their products and services. (Example: Paint Care, Colorado Paint Stewardship Program).

ZW1-F YARD WASTE COLLECTION SITE AND SERVICES

Establish a collection site and provide supportive services to divert yard waste from landfills and generate revenue for expanded recycling and sustainability services. Specifically:

- Identify and secure a location of sufficient size to accommodate a slash collection operation, as well as accommodate additional future recovery operations, such as food composting or a materials recovery facility;
- Identify the management process for the slash collection operation and establish operational responsibilities, collection and drop fees, and a revenue agreement to support operating costs and to generate additional revenue for expanded recycling and sustainability services; and
- Provide community and neighborhood-level yard waste collection events on an ongoing and consistent schedule (specific implementation steps for residential organic waste collection can be found in ZW2-B). Consider including special collection events as an operational responsibility of the site manager.

SUPPORTING STRATEGIES

COLLABORATION	■ Work with nearby jurisdictions to expand opportunities for resource recovery and landfill diversion. ■ Collaborate with local businesses and community organizations to support collection, special events, and outreach.
EDUCATION & PROMOTION	■ Identify opportunities to introduce the concept of zero waste into area schools and institutions. ■ Recognize leadership in zero waste efforts by employees, residents, and businesses through the Sustainability Awards and other City communication channels. ■ Promote City zero waste initiatives.
TOOLS & TECHNOLOGY	■ Utilize digital and mobile technology to facilitate zero waste behavior, such as location based services, crowdsourced material exchange, and resource directories. ■ Develop tracking software and reporting standards for collecting waste diversion data.
RESEARCH & TRACKING	■ Research funding streams to expand zero waste services and infrastructure, including grants, advertising, and sponsorships. ■ Research best practices and emerging material reuse and recovery technologies.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Ensure zero waste educational materials and strategies are transferrable and share with local businesses. ■ Identify opportunities for enhanced business services through collection of hard-to-recycle materials.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Work with neighborhoods to identify zero waste "experts" in each neighborhood to answer questions and provide guidance for zero waste initiatives. ■ Share zero waste educational materials with neighborhoods.

TABLE ZW1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
ZW1-A: Zero Waste Outreach and Education Campaign	🍃	■■■	■■	■	■	■■
ZW1-B: Municipal Facility Zero Waste Programs	🍃	■■■	■■	⊘	■	■■
ZW1-C: Green Procurement Program	🍃	■■■	■■	■	■	■■
ZW1-D: Municipal Zero Waste Tools	🍃	■■	■■	⊘	■	■■
ZW1-E: Reuse and Resource Recovery Facilities	🍃	■■■	■■	■	■	■
ZW1-F: Yard Waste Collection Site and Services	🍃	■■■	■■	■	■	■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE ZW1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
ZW1-A: Zero Waste Outreach and Education Campaign	$	✓	–	✓	✓
ZW1-B: Municipal Facility Zero Waste Programs	$$$	✓	✓	–	–
ZW1-C: Green Procurement Program	$	✓	✓	✓	✓
ZW1-D: Municipal Zero Waste Tools	$	–	–	–	–
ZW1-E: Reuse and Resource Recovery Facilities	$$$$	✓	✓	✓	✓
ZW1-F: Yard Waste Collection Site and Services	$$$$	✓	✓	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **ZW2**

FOSTER SUSTAINABLE HOUSEHOLD WASTE MANAGEMENT.

TARGET

- Achieve a 60 percent residential* diversion rate by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Minimize the amount of waste sent to landfills from single-family residences and complexes with eight units or fewer.
  - INDICATOR: Residential diversion rate (eight units or fewer)
  - INDICATOR: Percentage of residents with recycling/composting services
  - INDICATOR: Percentage of residents who compost at home
- **OBJECTIVE:** Minimize the amount of waste sent to landfills from residences with more than eight units.
  - INDICATOR: Residential diversion rate (more than eight units)
  - INDICATOR: Percentage of multifamily residences with recycling/composting services

* Single-family residences and complexes with 8 units or fewers

IMPLEMENTATION STRATEGIES

ZW2-A RESIDENTIAL CURBSIDE RECYCLING AND WASTE DIVERSION

As an immediate priority, present City Council with potential programs and policies for residential waste haulers that address the inclusion of recycling services in collection contracts, minimize impacts to neighborhoods from traffic and noise, and explore the use of variable rate collection systems where the cost of service is based on the volume of trash generated. Specifically:

- Assess the current waste hauling operations within the city, costs and types of services offered, companies providing hauling services, scheduling and number of vehicles operating, and the social, environmental, and economic benefits and impacts;
- Conduct a communitywide, residential waste composition study to determine the mix and volume of waste streams and the current landfill diversion rate for the community;
- Launch a formal residential outreach process to introduce potential programs and policies. Collect feedback and identify resident needs and concerns;
- Launch a formal waste hauler outreach process to introduce potential programs and policies. Collect feedback and identify hauler concerns and business impacts, including costs, logistical limitations, vehicle requirements, collection route efficiency, likely rate structures, existing contractual obligations, licensing processes, and implementation timing;
- Utilize the community assessment, waste characterization study, public and waste hauler outreach outcomes, and best practices to develop a set of potential program or policy recommendations; and
- Present recommendations to residents, haulers, City staff, and City leadership to collect comments, refine proposed program or policy details, and implement.

CONCEPT

PAY-AS-YOU-THROW

PAY-AS-YOU-THROW (PAYT) is a trash collection program where the cost of service reflects how much you throw away and provides incentives for you to recycle. There are several models of PAYT programs; most include free, unlimited recycling services to encourage more recycling and less trash. This model can reduce household costs and help the community reduce the volume of waste ending up in landfills, which causes air and water pollution.

Similar to utilities, such as electric and water, PAYT systems require that charges are based on the services provided to each household. For example, some models offer three sizes of trash cans to residents. Those who choose the smallest size pay the least, and the price increases with the can size. Simply put, the less you throw away, the less you pay.

The two common ways of implementing PAYT are through a City ordinance or contracting with haulers. In both scenarios, haulers coordinate services to increase efficiency, which lowers hauling costs and significantly reduces the wear and tear on City streets. PAYT has also been shown to be the most effective way to increase recycling and can increase recycling volume by more than 50 percent .

Residents have expressed a strong demand for recycling solutions in Lakewood. In the City of Lakewood 2013 Citizen Survey, 94 percent of residents agreed that curbside recycling should be a standard option in residential trash services and that the City should investigate strategies for increased recycling. PAYT is one option to respond to resident demand and meet City waste diversion goals. ■

LEARN MORE ABOUT PAY-AS-YOU-THROW:

http://www.epa.gov/osw/conserve/tools/payt
http://www.epa.gov/osw/conserve/tools/payt/top13.htm

ZW2-B RESIDENTIAL ORGANIC WASTE

Provide opportunities for residents to divert organic waste from landfills. Specifically:

- Facilitate access to a yard waste collection site and associated services; ZW1-F | P. 79
- Support community yard waste collection events on an ongoing and consistent schedule in order to increase ease of participation;
- Explore opportunities to support resident-initiated, neighborhood-scale yard waste collection events through financial or operational support;
- Assess feasibility of curbside collection of yard and food waste through waste hauler requirements, voluntary neighborhood-organized collection programs, and other strategies; and
- Connect residents with opportunities to learn how to effectively compost organic waste at home.

ZW2-C MULTIFAMILY RECYCLING AND COMPOSTING

Assist multifamily developers, owners, managers, and homeowner associations in implementing recycling and composting programs in residential developments. Specifically:

- Assess waste collection systems for multifamily properties including types of waste collected, costs, site constraints, and other limitations to providing recycling and compost collection;
- Conduct a communitywide, multifamily residential waste composition study to determine the mix and volume of waste streams and the current landfill diversion rate for multifamily properties;
- Develop policies and site plan requirements that minimize barriers to recycling and composting;
- Develop a suite of strategies, policies, and behavior-change programs to address challenges of implementing recycling and composting programs; and
- Promote strategies and provide consulting services to assist multifamily developers, owners, managers, and homeowner associations to implement strategies and programs.

SUPPORTING STRATEGIES

COLLABORATION

- Work with residents to regularly review needs, concerns, and opportunities related to residential waste.
- Work with haulers to convey the City's sustainability goals, requirements, and processes for waste diversion, including data collection, efficient operations, and proper disposal.

EDUCATION & PROMOTION

- Educate residents on sustainable household purchasing and disposal that reduces waste through source reduction, reuse, recycling, and composting. ZW1-A | P. 76
- Promote opportunities and locations (public and private) to properly dispose of hazardous, bulk, and other hard-to-recycle items.
- Develop ongoing and seasonally specific outreach to residents.

TOOLS & TECHNOLOGY

- Utilize or customize digital search tools that identify resource recovery outlets.
- Encourage the use of neighborhood-level online platforms that facilitate reuse and material exchange.

RESEARCH & TRACKING

- Research best practices for residential waste diversion.
- Track waste collection costs, diversion rates, and number of City service requests related to residential waste collection.

CROSSCUTTING STRATEGIES

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Work with neighborhoods to assist in public outreach efforts for proposed residential waste programs.
- Work with neighborhoods to pilot waste diversion programs including household organic waste collection.

TABLE ZW2-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
ZW2-A: Residential Curbside Recycling and Waste Diversion	🍃🍃🍃🍃🍃	■■	■	■	⊘	■■
ZW2-B: Residential Organic Waste	🍃	■■■	■	■	⊘	■■
ZW2-C: Multifamily Recycling and Composting	🍃🍃	■■■	■	■	⊘	■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE ZW2-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
ZW2-A: Residential Curbside Recycling and Waste Diversion	$	✓	✓	✓	–
ZW2-B: Residential Organic Waste	$	✓	–	✓	–
ZW2-C: Multifamily Recycling and Composting	$	✓	–	✓	–

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **ZW3**

FOSTER SUSTAINABLE COMMERCIAL WASTE MANAGEMENT.

TARGET

- Achieve a 60 percent construction and demolition diversion rate by 2025.
- Achieve a 60–90 percent diversion rate for priority waste streams*.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Minimize the amount of commercial waste sent to landfills.
  - INDICATOR: Commercial landfill diversion rates
  - INDICATOR: Number of restaurants and grocery stores participating in food composting programs
- **OBJECTIVE:** Add value to Lakewood's economy through materials exchange and recovery.
  - INDICATOR: Number of individuals employed at reuse and resource recovery businesses
- **OBJECTIVE:** Minimize the amount of construction and demolition (C&D) material sent to landfills.
  - INDICATOR: C&D landfill diversion rates

* Priority Waste Streams will be established through Implementation Strategy ZW3-A.

IMPLEMENTATION STRATEGIES

ZW3-A COMMERCIAL WASTE ASSESSMENT AND PRIORITIZATION

Assess commercial waste systems to identify gaps in resource recovery facilities and prioritize the development of programs and policies. Specifically:

- Conduct a commercial waste characterization study to determine the mix and volume of waste streams, gaps in resource recovery facilities, and current landfill diversion rates;
- Identify priority waste streams based on volumes generated and environmental impact;
- Inventory existing resource recovery infrastructure; and
- Establish landfill diversion targets for priority waste streams.

ZW3-B COMMERCIAL WASTE DIVERSION PROGRAMS AND POLICIES

Develop commercial waste diversion programs and policies that support responsible disposal choices, enhance efficiency, minimize environmental impacts, and convert waste into valuable products. Specifically:

- Identify best practices and prioritize the development of programs, policies, and regulations to support landfill diversion of priority waste streams. Specific assessments may include cardboard, styrofoam, food waste, and single-use bags;
- Provide customizable tools and materials, technical assistance, financing mechanisms, behavior-change strategies, and other resources for priority waste streams;
- Identify and secure funding and grant opportunities to be used to subsidize program costs and provide technical assistance to businesses;
- Develop formal business and community outreach programs when considering adoption of commercial waste management regulations; and
- Employ a targeted outreach strategy to promote available resources to businesses.

ZW3-C CONSTRUCTION AND DEMOLITION WASTE

Adopt construction and demolition (C&D) waste diversion requirements and provide supportive materials for businesses. Specifically:

- Assess C&D regulations and requirements adopted by other municipal governments to determine efficacy, costs of implementation, and impact on the local economy;
- Develop requirements for C&D waste diversion through a municipal ordinance. Consider requirements for project-specific diversion rates, mandated waste management plans, and on-site posting to support compliance; and
- Develop resources to support adopted regulations, including materials exchange networks and directories of businesses providing recycled construction materials and C&D material recovery services.

COMMUNITY SPOTLIGHT

SUSTAINABILITY: LEARNING FROM NEIGHBORING COMMUNITIES

SUSTAINABILITY is an Arvada recycling company with a mission to create meaningful work for people who have developmental disabilities, a segment of our society that faces an over 70 percent unemployment rate. The company combines a passion for the environment and recycling with an understanding that every human being is unique and has something to offer the community and the planet.

SustainAbility opened in July 2012 as a result of a private public partnership led by the City of Arvada. The founders of SustainAbility recognized the need and demand for expanded recycling services in the city. The center offers free, single-stream recycling and accepts a variety of hard-to-recycle items. The company's innovative business model is shaped by the abilities of its employees, including meticulously disassembling electronics and transforming furniture material scraps into eco-friendly bags.

Through creativity and collaboration, the Arvada community found a way to reduce its waste footprint and fill employment demands for a unique population. SustainAbility is a true model of sustainability, incorporating environmental, social, and economic concepts to create a stronger community. ■

SUSTAINABILITY

SUPPORTING STRATEGIES

COLLABORATION	■ Work with recyclers that employ populations with developmental disabilities. ■ Work with U.S. Green Building Council and Construction & Demolition Recycling Association to expand resources and best practices. ■ Work with nonprofit organizations to support tax-deductible donations of surplus and used construction and commercial materials.
EDUCATION & PROMOTION	■ Educate businesses on sustainable purchasing and disposal that reduces waste through source reduction, reuse, recycling, and composting. ZW1-A | P. 76 ■ Promote alternatives to traditional demolition of buildings, including renovation and historic preservation.
TOOLS & TECHNOLOGY	■ Develop or utilize existing online resources to facilitate the exchange of surplus and used construction and commercial materials.
RESEARCH & TRACKING	■ Track economic benefits resulting from reuse and recycling services and companies. ■ Research and track new types of construction materials to understand zero waste impacts.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Incorporate zero waste concepts into the green business certification program. ■ Utilize participating businesses to pilot commercial waste management programs. ■ Help businesses develop zero waste management plans and provide toolkits to support efforts.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Encourage participating neighborhoods to support local businesses demonstrating zero waste principles.

TABLE ZW3-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
ZW3-A: Commercial Waste Assessment and Prioritization	🍃	■■	■■	⊘	⊘	■
ZW3-B: Commercial Waste Diversion Programs and Policies	🍃🍃🍃🍃🍃	■■■	■■	■	■	■■
ZW3-C: Construction and Demolition Waste	🍃	■■■	■■	⊘	■	■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE ZW3-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
ZW3-A: Commercial Waste Assessment and Prioritization	$$	–	–	–	–
ZW3-B: Commercial Waste Diversion Programs and Policies	$	✓	–	–	✓
ZW3-C: Construction and Demolition Waste	$	–	–	–	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

CHAPTER **05**

COMMUNITY COHESION AND PUBLIC HEALTH

THE CITY OF LAKEWOOD and its residents recognize that health, sense of well-being, and social connectedness are the foundation for a vibrant and resilient community. Lakewood actively supports a future where residents live healthy lifestyles and connect with their neighbors and where businesses, visitors, and residents alike are supported by a strong sense of place and a healthy environment.

GOALS

- Strengthen community cohesion, increase civic participation, and celebrate diversity.
- Promote physical well-being through healthy eating and active living.
- Promote social equity and provide strong supportive services.

TARGETS

- Increase the precentage of residents reporting "good" or "very good" satisfaction ratings for Lakewood's efforts at welcoming citizen involvement as reported in the City of Lakewood Citizen Survey to 60 percent by 2025.
- Increase resident subscriptions to City communication tools each year through 2025.
- Certify 12 neighborhoods as "Outstanding Sustainable Neighborhoods" in the Sustainable Neighborhoods Program by 2025.
- Increase recreation program participation each year through 2025.
- Eliminate USDA-defined food deserts in Lakewood.
- Achieve community affordable housing targets (to be established after the completion of Implementation Strategy CC3-A).
- Increase the percentage of residents reporting "good" or "very good" satisfaction ratings for Lakewood programs for people with special needs, older adults, low-income persons, and homeless people to above Front Range benchmarks.

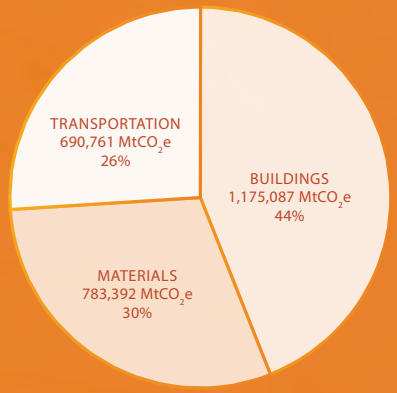
COMMUNITY COHESION AND PUBLIC HEALTH: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,649,240**	**100%**

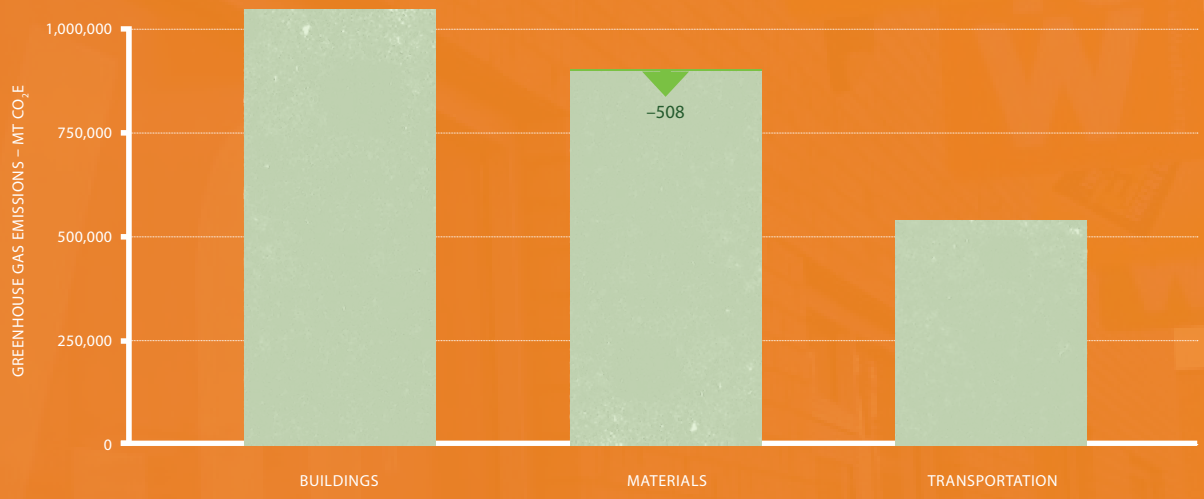
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER COMMUNITY COHESION AND PUBLIC HEALTH STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	0
MATERIALS	903,092	36%	– 508
TRANSPORTATION	539,165	22%	0
TOTAL GHG	**2,495,625**	**100%**	**–508**

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF COMMUNITY COHESION AND PUBLIC HEALTH STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



COMMUNITY COHESION AND PUBLIC HEALTH ARE CRITICAL COMPONENTS OF SOCIAL SUSTAINABILITY AND WORK TOGETHER TO IMPROVE OVERALL COMMUNITY WELL-BEING.

BOTH ARE STRONGLY INFLUENCED by the natural and built environment, community leadership, economic opportunities, and connectivity between individuals and groups. Communities that foster cohesion and health benefit from increased social equity, enhanced community pride, happier residents, and a more productive workforce.

Community well-being encompasses not only how individuals perceive their quality of life, but also how the community as a whole interacts. A cohesive community is inclusive of people of all backgrounds and circumstance and values civic involvement, strong supportive networks, and cultural engagement, all of which contribute to a more resilient community.

Public health is another critical component of community well-being. There are many ways to think about health, including safety, physical fitness, and relationships. The World Health Organization states:
"Health is as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

Public health trends are costing the nation billions of dollars in medical costs, absenteeism, and lack of productivity. Developing health solutions involves participation from regional and local partners to implement strategies for healthy eating, active living, and mental wellness.

The Comprehensive Plan includes goals that support the character, health, and safety of neighborhoods, as well as goals that provide quality housing, human services, recreation opportunities, and schools. The Comprehensive Plan also addresses the importance of historical preservation, arts and culture, and emergency preparedness in order to ensure a sustainable future. The City of Lakewood brings these values to life in many ways, including offering a variety of community services to help people connect to one another and access services to meet their needs. Lakewood prides itself as a great place to live. In the 2013 Citizen Survey, 93 percent of respondents rated the overall quality of life as "good" or "very good" and indicated regular use of Lakewood parks and other community amenities.

Health is as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

TRENDS AND OPPORTUNITIES

DIVERSITY

Just as a biological diversity strengthens the overall health and resilience of an ecosystem, social diversity creates a stronger, more vibrant community that is able to take a more holistic view on issues and opportunities. As communities recognize the value of social diversity, many have faced the challenges of providing equitable access to resources and opportunities for their increasingly diverse populations. By developing strategies to overcome these challenges, communities cultivate new sets of skills to create a resilient community and spur economic growth.

Creating a more equitable community also means encouraging diversity in civic participation and leadership. Cities who actively engage all types of racial, economic, and social groups gain a better understanding of residents' needs and, by working together, can develop unique solutions suited to their community. Civic engagement, along with training and development opportunities, builds capacity for individuals from all backgrounds to pursue leadership positions to represent the community's diverse population.

Equitable access to affordable housing and services also is critical to supporting diversity in a community. Housing is inextricably linked to the well-being of individuals and communities as a whole. Housing to support a community's workforce is a key component of a city's infrastructure, like transit, schools, and parks and leads to better living conditions for families, stronger household finances, and a greater ability for a community to attract primary employers. A comprehensive housing strategy requires planning for existing and future demographics to ensure developments offer a mix of housing types that are affordable and sustainable, and consider community needs. Together, with adequate human services and social support, quality housing options enable individuals to pursue personal development and a high quality of life.

A community's diversity is reflected in its arts and culture and is a strong indicator of social cohesion and sustainability.

A community's diversity is reflected in its arts and culture and is a strong indicator of social cohesion and sustainability. Arts and culture give identity to neighborhoods and can be catalysts for innovation and civic participation. The catalytic effect of diversity can be applied to all community institutions, including schools where diversity

contributes to academic development, satisfaction, cultural awareness, and advocacy.[2] The Lakewood City Council has recognized this value through a formal commitment to promote an inclusive environment for all residents. The City has enormous opportunities to continue its engagement with residents from all backgrounds through arts and culture programs, family and human services, volunteer opportunities, and neighborhood development programs.

SOCIAL CAPITAL

Increasing evidence shows that social connectedness can improve overall community well-being. A sense of belonging and access to a network of human resources enable people to live happy and healthy lives. The term, social capital, is often used to represent the value of those interactions and relationships. Building social capital has a number of positive effects on our society. Research has shown the following:

- In high social capital areas public spaces are cleaner, people are friendlier, and the streets are safer. Places have higher crime rates in large part because people don't participate in community organizations, don't supervise younger people, and aren't linked through a network of friends;[2]
- Social capital can help address inequality through organized advocacy efforts;[2]
- Child development is strongly affected through family, school, and community support;[3]
- Social capital improves access to health education and information, health care delivery systems, and prevention efforts;[4]
- Social capital is also strongly associated with happiness. Regular club attendance, volunteering, entertaining, or church attendance is the happiness equivalent of getting a college degree or more than doubling your income.[5]

LAKEWOOD LINKED

The Lakewood Linked initiative and the Sustainable Neighborhoods Program provide residents with resources to connect with their neighbors to create a stronger, collaborative community.

A community can build social capital anywhere, from informal face-to-face interactions in neighborhood parks to organized community groups to virtual communities and online social networks. The City of Lakewood strongly supports social connectedness through a variety of community programs and facilities, as well as through the Lakewood Linked initiative and the Sustainable Neighborhoods Program. The Lakewood Linked initiative provides residents with resources to connect with their neighbors to create a stronger, collaborative community. The Sustainable Neighborhoods Program gives residents the opportunity to become active in making a vibrant community, using guidance from staff to organize workshops, projects, and events that enhance the livability of their neighborhood and reduce their ecological footprint. When residents reach out to one another and build relationships, they are creating a stronger, more sustainable community.

HEALTHY EATING / ACTIVE LIVING

Improving public health can support workplace productivity, lower health care costs, increase community engagement, and enhance personal satisfaction. In order to address the challenges of improving public health, communities across the country are focusing on healthy eating and active living initiatives.

The way we design our communities affects how we spend our time.

Healthy eating is essential to good overall health. Diet choices contribute to many of the leading causes of death in Jefferson County, including cardiovascular disease and cancer. In 2013, 86 percent of adult Coloradans did not meet recommendations for fruit and vegetable consumption.[6] This percentage was strongly correlated with several

[2] Mitchell Chang. "Who Benefits from Racial Diversity in Higher Education?" Diversity Digest. http://www.diversityweb.org/Digest/W97/research.html.
[3] Robert Putman. "Bowling Alone." New York: Simon & Schuster, 2000.
[4] The World Bank Group. "Social Capital and Health, Nutrition, and Population." 2011. http://go.worldbank.org/5DODHAB-MT0 .
[5] Robert Putman. "Bowling Alone." New York: Simon & Schuster, 2000.
[6] Colorado Department of Public Health. "Fruit and Vegetable Consumption in Colorado. November, 2014. https://www.colorado.gov/pacific/sites/default/files/DC_fact-sheet_Fruit-vegetables_Nov-2014_without-Appendix.pdf.

adverse health outcomes, including diabetes, high blood pressure, and depressive disorders. Although individual behaviors account for many diet decisions, they are also influenced by many outside factors. A holistic view of nutrition is critical for healthy communities. Communities can promote healthy eating by ensuring access to healthy foods, advancing nutritional education, and supporting behavior changes.

Equally as important, regular physical activity can help reduce the risk of chronic illnesses, as well as improve mental health, mood, and life span. Despite these benefits, 25 percent of American adults neglect physical activity, and childhood obesity rates have tripled since 1980.[7] The City of Lakewood encourages physical activity through a wide variety of recreation facilities and classes, supporting 450,000 admissions to recreation centers and pools.

DESIGNING FOR HEALTH

The way we design our communities affects how we spend our time and energy. Public gathering spaces can provide more time for family and friends, recreation, civic engagement, and other activities that build a cohesive community. Infrastructure can provide opportunities for physical activity. Signage and multiple transportation options can ensure that people of all background, ages, and abilities can access, understand, and use community facilities. Incorporating nature into our built environment can improve mental well-being and environmental awareness. Communities are updating zoning codes, design standards, and development guidelines to facilitate an environment that supports and facilitates a healthy and cohesive community. ■

[7] Tammy Zborel and Stephanie Rozsa. "Healthy People, Healthy Places - Building Sustainable Communities through Active Living." The Missouri Municipal Review. March 8, 2012. http://c.ymcdn.com/sites/www.mocities.com/resource/resmgr/march2012_review_files/healthysustainablecomm_march.pdf.

GOAL **CC1**

STRENGTHEN COMMUNITY COHESION, INCREASE CIVIC PARTICIPATION, AND CELEBRATE DIVERSITY.

TARGETS

- Increase the percentage of residents reporting "good" or "very good" satisfaction ratings for Lakewood's efforts at welcoming citizen involvement as reported in the City of Lakewood Citizen Survey to 60 percent by 2025.
- Increase resident subscriptions to City communication tools each year through 2025.
- Certify 12 neighborhoods as "Outstanding Sustainable Neighborhoods" in the Sustainable Neighborhoods Program by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Ensure that Lakewood residents of all racial and economic backgrounds are able to participate in civic life.
  - INDICATOR: Voter turnout in regular municipal elections
  - INDICATOR: Enrollment in citizen academies
  - INDICATOR: Number of applications for citizen boards and commissions
  - INDICATOR: Number of volunteers participating in City programs and activities
  - INDICATOR: Total page views on Lakewood.org
  - INDICATOR: Number of followers of Lakewood social media channels
  - INDICATOR: Number of Google Translate requests for Lakewood.org Web pages
  - INDICATOR: Minority resident satisfaction with the job Lakewood government does at welcoming citizen involvement

- **OBJECTIVE:** Support diverse social networks to build community cohesion.
  - INDICATOR: Resident satisfaction with overall quality of life
  - INDICATOR: Number of participants in the Sustainable Neighborhoods Program
  - INDICATOR: Number of registered neighborhood organizations
  - INDICATOR: Number of neighborhoods, households, and people registered on NextDoor.com

- **OBJECTIVE:** Promote cultural engagement in Lakewood through the arts and community events.
  - INDICATOR: Participation in Lakewood's Inspire Arts Week
  - INDICATOR: Attendance at City cultural and heritage programs and events
  - INDICATOR: Annual number of public art installations

COMMUNITY SPOTLIGHT

SOUTHERN GABLES SUSTAINABLE NEIGHBORHOOD

BY DANA GUTWEIN, SOUTHERN GABLES NEIGHBORHOOD

THE SUSTAINABLE NEIGHBORHOODS PROGRAM encourages and empowers neighbors to enhance neighborhood sustainability by supporting communities as they take on sustainability projects and initiatives. Our neighborhood, Southern Gables, was thrilled to be accepted into this program in 2014. In the year and a half since, we have made exciting and meaningful strides toward living more sustainably as a community. But there was an even more powerful and somewhat unintended consequence. Being a part of the Sustainable Neighborhoods Program taught us the power of what it means to build and be a part of a "community" and how it directly relates to and improves quality of life.

Southern Gables has worked on projects to educate and provide resources on topics such as solar, energy efficiency, water efficiency, xeriscaping, gardening, recycling, and composting. As neighbors came together over these shared goals and passions, something special, yet simple, happened. We got to know each other and care about each other, and from there, all of these really cool things took off. Sharing resources from hand-me-down clothes to gardening tools. Carpooling. We share our meals and holidays together. We plant our trees, our tomatoes, our tulips together. We share ideas, information, and experiences on everything from how to go solar to how to solve a composting issue. Since sharing reduces demand for new resources and makes it easier to implement positive household changes, maybe this sharing is what sustainability is all about.

> "…maybe this sharing is what sustainability is all about."

That's when I started noticing another surprising effect of the Sustainable Neighborhoods Program. People that participated in our events and projects were, quite simply, happier. It started in our leadership level. Sharing the joy and work of making meaningful accomplishments made this project something each of us didn't just like, but something we actually loved. It's fulfilling. It feels great. As our group grew, this feeling spread through the community. Getting together and sharing life with friends is always fun and makes you happy. With this program, though, we're getting together over a common cause, one that people care and feel good about. Giving, working on something you believe in, making progress and sharing that experience with those around you feels great. It adds laughter, companionship, fulfillment, and accomplishment to our lives. In other words, this program is increasing our quality of life.

We came together to advance sustainability, and we are, slowly but surely. In coming together for that cause, we built community. While building our community, we experienced happiness and an enhanced quality of life. Now, there's been yet another unintended result. What do you suppose is happening thanks to our strengthened and growing, happy, and involved community? A stronger, bigger, more united team taking on higher impact community projects, ones that will have long lasting results on that original goal we set out to tackle… sustainability. ■

IMPLEMENTATION STRATEGIES

CC1-A DIVERSITY IN CIVIC PARTICIPATION AND LEADERSHIP

Build capacity for residents of all ages, abilities, and backgrounds to participate in civic life and assume leadership roles in order to ensure accurate representation of the city's diverse population. Specifically:

- Identify opportunities to engage residents in various locations throughout the city. Consider creative ways to increase civic participation by hosting public meetings at off-site locations like schools and community centers;
- Identify methods to increase participation from underrepresented populations in citizen academies, boards, and commissions in order to foster diversity in community leadership roles; and
- Coordinate and promote available volunteer and leadership opportunities with the City, partner agencies, and local organizations.

CC1-B OPEN AND HONEST COMMUNICATION

Support the City's core community value of open and honest communication. Specifically:

- Use a diverse range of media platforms and regularly review emerging communication technologies in order to optimize and expand communication;
- Review City communications to identify opportunities to enhance accessibility by all residents;
- Assess needs, potential impacts, and costs of expanding Lakewood's communication services to multilingual;
- Provide employee trainings to enhance intercultural awareness and increase effective communication; and
- Develop customized marketing and outreach strategies to increase participation in City programs, planning efforts, and projects.

CC1-C SOCIAL RESILIENCE AND PERSONAL NETWORKS

Strengthen and expand community social networks to foster collaboration, communication and cooperation. Specifically:

- Support existing neighborhood programs that increase social capital and enhance neighborhood identity, including Lakewood Linked, annual neighborhood organization registrations, the Neighborhood Participation Program, and the Sustainable Neighborhoods Program;
- Continue to use Lakewood Linked to strengthen relationships between neighborhood residents, businesses, the faith community, and schools;
- Recognize and promote the role of online social networks, such as NextDoor.com, as key mechanisms to inform and connect residents; and
- Promote the formation of social resiliency circles where residents come together to increase personal security through learning, mutual aid, social action, and community support. Utilize the successful Eiber Resiliency Circle as a model to support the formation of similar groups.

CC1-D SUSTAINABLE NEIGHBORHOODS PROGRAM

CROSSCUTTING STRATEGY

Expand the Sustainable Neighborhoods Program and the Sustainable Neighborhood Network in order to encourage direct citizen action, assist residents in enhancing neighborhood sustainability and reduce the environmental footprint of residents. Specifically:

- Expand the technical and financial resources available to participating neighborhoods in order to support neighborhood-specific initiatives;
- Facilitate the expansion of the Sustainable Neighborhood Network through professional affiliations, speaking engagements, formal outreach and marketing;
- Increase program credibility and effectiveness through the formation of an advisory council made up of representatives from participating communities and neighborhood leaders;
- Establish a revenue stream to support the program through a fee structure charged to new communities joining the Sustainable Neighborhood Network based on technical support needs and the size of the community; and
- Support the ongoing University of Colorado Denver research study evaluating participant motivations and outcomes of the Sustainable Neighborhoods Program and Sustainable Neighborhood Network.

CC1-E ARTS, CULTURE, AND EVENTS

Recognize arts, culture, and community events as important components of sustainability. Specifically:

- Identify opportunities to incorporate arts and culture into sustainability programs, outreach strategies, and events;
- Collaborate with City of Lakewood Heritage, Culture & Arts programs, the 40 West Arts District, Rocky Mountain College of Art + Design, and other organizations to communicate the role of arts and culture as a critical element of community sustainability;
- Support the growth of creative industries in Lakewood; and
- Support the Comprehensive Plan, Lakewood Public Art Master Plan, and other City plans that promote and expand art and cultural activity in Lakewood.

SUPPORTING STRATEGIES

COLLABORATION

- Collaborate with organizations providing databases of area volunteer opportunities in order to ensure opportunities in Lakewood are listed.
- Work with Jefferson County Public Library, the Learning Source, and other organizations that provide training on the use of digital media in order to increase access to City information.
- Work with schools to identify opportunities to integrate civic participation into curricula.

EDUCATION & PROMOTION

- Development mechanisms to recognize civic leadership and volunteers in the community.

TOOLS & TECHNOLOGY

- Monitor emerging technology and communication strategies to connect residents to each other and to the City.

RESEARCH & TRACKING

- Monitor Lakewood's social and community diversity to inform effective communication strategies.
- Ask residents about how they use City communication outlets as sources of information about Lakewood.
- Research community-based social marketing strategies in order to identify opportunities to utilize best practices.
- Track creative industries in Lakewood.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB

SE1-E | P. 61

- Connect participating businesses and local artists to integrate commerce, arts, and culture.

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Promote civic participation opportunities, volunteer programs, and openings on boards and commissions to residents in participating neighborhoods.
- Share City expertise on effective communication with participating neighborhoods through training sessions highlighting resources, technologies, and best practices.

TABLE CC1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
CC1-A: Diversity in Civic Participation and Leadership	⊘	■	■	■■	■■■	■
CC1-B: Open and Honest Communication	⊘	■	■■	■■■	■■■	■■
CC1-C: Social Resilience and Personal Networks	⊘	■	■■	■■■	■■■	■■
CC1-D: Sustainable Neighborhoods Program	🍃	■■■	■■■	■■■	■■■	■■■
CC1-E: Arts, Culture, and Events	⊘	■	■■	■	■■■	■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE CC1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
CC1-A: Diversity in Civic Participation and Leadership	$	✓	–	–	–
CC1-B: Open and Honest Communication	$$	✓	–	✓	✓
CC1-C: Social Resilience and Personal Networks	$	✓	–	✓	✓
CC1-D: Sustainable Neighborhoods Program	$$	✓	✓	✓	✓
CC1-E: Arts, Culture, and Events	$	✓	✓	–	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000


CATS

GOAL **CC2**

PROMOTE PHYSICAL WELL-BEING THROUGH HEALTHY EATING AND ACTIVE LIVING.

TARGETS

- Increase recreation program participation each year through 2025.
- Eliminate USDA-defined food deserts in Lakewood.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Increase access to healthy foods and nutritional information.
  - INDICATOR: Acreage of community gardens and urban farms
  - INDICATOR: Number of households in identified food deserts
- **OBJECTIVE:** Support active living and participation in recreation programs and facilities.
  - INDICATOR: Residents' satisfaction with recreation programs and facilities
  - INDICATOR: Number of unique visits to City recreation facilities
  - INDICATOR: Bicycle traffic counts
  - INDICATOR: Level of Bicycle or Walk Friendly Community certification
- **OBJECTIVE:** Increase personal health awareness.
  - INDICATOR: Jefferson County Public Health selected health conditions and causes of death

IMPLEMENTATION STRATEGIES

CC2-A REGIONAL HEALTH EFFORTS AND ORGANIZATIONS

Collaborate with regional partners in order to identify critical issues, develop programs and policies, and track effectiveness. Specifically:

- Identify appropriate staff representatives to participate in regional work groups, committees, and health initiatives;
- Support efforts by Jefferson County to collect local health data and secure grant funding;
- Support the formation of a regional health coalition; and
- Continue participation in the LiveWell Colorado Healthy Eating Active Living (HEAL) Cities and Towns Campaign.

CC2-B LOCAL AND HEALTHY FOOD FOR FULL STRATEGY SEE SE1-A | P. 59

Develop a comprehensive strategy in order to increase production, availability, and consumption of locally grown, affordable, and healthy food.

CC2-C COMMUNITY PHYSICAL WELLNESS PROGRAMS

Promote healthy eating and active living programs in businesses, schools, and other community organizations. Specifically:

- Assemble and distribute best practices and resources to facilitate implementation of wellness programs; and
- Develop a healthy food connection program that matches local producers and vendors of healthy foods (including residential growers, community gardens and farms, and local retailers) with businesses, schools, and other community organizations interested in purchasing healthy food.

COMMUNITY SPOTLIGHT

WALK/RUN/BIKE BELMAR

BY DOUG WELLS, BELMAR NEIGHBORHOOD

THE BELMAR neighborhood's physical activity groups grew out of the City's Sustainable Neighborhoods Program. When the Belmar Sustainable Neighborhood chapter was founded, a Health and Wellness Committee was formed, and leaders hatched the idea of creating regular activities with three primary goals in mind. The first goal was to get neighbors engaged in physical activity on a regular basis. The second goal was to create social connections between neighbors and foster greater community engagement, and the third goal was to encourage a greater awareness of the natural beauty abounding in Lakewood's parks and recreation areas. The results of these efforts were the formation of three groups: Walk, Run, and Bike Belmar. Walk Belmar takes groups weekly on a circuit of Belmar or O'Kane Park while Bike Belmar conducts easy to intermediate group bike rides throughout the city. Subsequently, the Walk Belmar group has added trash pickup to its weekly walks, and areas where trash collection was repeatedly noticed to be an issue have been adopted to make sure receptacles are emptied and kept tidy. The Walk Belmar group is a great example of how we can foster community cohesion and public health, while contributing to sustainability. ■

CC2-D ACCESS TO PHYSICAL ACTIVITY FACILITIES AND PROGRAMS

Increase use of physical activity facilities and participation in recreation classes and programs. Specifically:

- Identify gaps in facilities and programs in underserved areas;
- Explore opportunities to establish joint-use agreements with schools and other partners;
- Explore opportunities to provide "pop-up" recreation activities in neighborhood parks and other strategic locations;
- Identify opportunities to incorporate fitness infrastructure as an element of park improvement projects;
- Review opportunities to subsidize access to City facilities and programs for low-income residents, such as revised fee structures and scholarships; and
- Assess barriers to facility access, including public transportation routes, bicycle and pedestrian infrastructure, and hours of operation.

CC2-E DESIGN FOR ACTIVE LIVING

Integrate key elements of the Center for Active Design's Active Design Guidelines into the City's development guidelines. Specifically:

- Conduct a comprehensive assessment of the Active Design Guidelines to identify key concepts applicable to Lakewood; and
- Develop and adopt customized active design guidelines with consideration of benefits and impacts on the cost of development.

SUPPORTING STRATEGIES

COLLABORATION

- Work with schools to support existing and new Safe Routes to Schools programs.
- Work with schools and youth organizations to support opportunities for a variety of youth sports and physical activities year-round.
- Work with nutrition experts to educate residents, schools, and businesses about the importance of healthy eating.
- Work with LiveWell Colorado to support school-based nutrition education programs and efforts to establish a statewide farm-to-school program.

EDUCATION & PROMOTION

- Continue to market Lakewood's range of recreation and wellness programs and facilities.
- Market Lakewood as Healthy Eating Active Living (HEAL) community.
- Promote the 9News Health Fair and opportunities for residents to regularly track their critical health numbers.

TOOLS & TECHNOLOGY

- Promote mobile technologies and apps that track personal wellness goals and activities.

RESEARCH & TRACKING

- Track fitness trends and activities.
- Track diversity of physical activity facilities and recreation program participants.
- Track private recreation center business trends.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB

SE1-E | P. 61

- Reach out to businesses to record and promote worksite wellness programs.

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Provide support to neighborhoods looking to incorporate active lifestyle initiatives into their program, such as wellness challenges among participating neighborhoods.

TABLE CC2-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
CC2-A: Regional Health Efforts and Organizations	⊘	■■	■■	■■■	■■	■■■
CC2-B: Local and Healthy Food (For full strategy see Sustainable Economy Chapter: SE1-A)	⊘	■	■■	■■	■■	■■
CC2-C: Community Physical Wellness Programs	⊘	■	■■	■■	■■	■■■
CC2-D: Access to Physical Activity Facilities and Programs	⊘	■	■	■■	■■	■■■
CC2-E: Design for Active Living	⊘	■	■■	■■	■■	■■■

<5,000 $MtCO_2e$ Greenhouse Gas Emissions ~10,000 $MtCO_2e$ Greenhouse Gas Emissions ■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE CC2-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
CC2-A: Regional Health Efforts and Organizations	$	✓	–	✓	✓
CC2-B: Local and Healthy Food (For full strategy see Sustainable Economy Chapter: SE1-A)	$	✓	–	✓	✓
CC2-C: Community Physical Wellness Programs	$	✓	–	–	✓
CC2-D: Access to Physical Activity Facilities and Programs	$ – $$$*	✓	✓	✓	–
CC2-E: Design for Active Living	$	–	✓	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

* Costs will vary significantly based on infrastructure component

GOAL **CC3**

PROMOTE SOCIAL EQUITY AND PROVIDE STRONG SUPPORTIVE SERVICES.

TARGETS

- Achieved community affordable housing targets (to be established after the completion of Implementation Strategy CC3-A).
- Increase the percentage of residents reporting "good" or "very good" satisfaction ratings for Lakewood programs for people with special needs, older adults, low-income persons, and homeless people to above Front Range benchmarks.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Ensure a range of housing options across incomes and neighborhoods.
  - INDICATOR: Number of residents on waiting lists for subsidized units at Metro West Housing Solutions properties
  - INDICATOR: Percentage of households that spend more than 45 percent of income on housing and transportation costs
- **OBJECTIVE:** Support the provision and promotion of high quality human services for all ages and abilities.
  - INDICATOR: Participation in City of Lakewood Family Services programs
  - INDICATOR: Number of people served through the Action Center
  - INDICATOR: Residents' feelings of safety
- **OBJECTIVE:** Design community spaces to support mental wellness through natural, accessible, safe, and social features.
  - INDICATOR: Jefferson County Public Health selected health conditions and causes of death

IMPLEMENTATION STRATEGIES

CC3-A AFFORDABLE HOUSING

Create and periodically update a locally adopted comprehensive housing strategy in collaboration with other jurisdictions and organizations in the region. Specifically:

- Assess housing needs and establish targets for the creation of new affordable housing units;
- Encourage the production of affordable, accessible rental units for people with disabilities;
- Align housing and transportation planning to increase household accessibility to low-cost transportation options;
- Develop an outreach plan aimed at educating residents on the connection between housing types, location, transportation options, and the true cost of housing choices;
- Develop a community outreach and marketing plan aimed at educating residents on the types of affordable and subsidized housing and the benefits to neighborhoods and the community;
- Integrate housing strategies into other City plans; and
- Support Comprehensive Plan goals to supply an adequate mix of housing.

CC3-B COMMUNITY HAPPINESS

Catalyze happiness by designing spaces and supporting services that support mental wellness. Specifically:

- Identify opportunities to incorporate mental wellness into City recreation programs and services;
- Create a "Find Your Spot" outreach campaign that highlights favorite public places in Lakewood;
- Continue to offer Crime Prevention Through Environmental Design (CPTED) security services to residents and businesses;
- Incorporate natural features into all new and redesigned public spaces; and
- Identify opportunities to develop therapeutic gardens in public spaces that address specific needs of the surrounding community.

CC3-C AGING IN PLACE

Develop and support programs, policies, and resources that allow residents to age in place. Specifically:

- Regularly assess barriers and challenges for older adults;
- Work with the Consortium for Older Adult Wellness and similar organizations to connect community-based organizations to health systems that support older adults;
- Encourage neighborhood groups, faith-based organizations, and other community-based organizations to engage and support older adults, such as senior check-in programs and home repair support;
- Ensure housing for older adults is addressed in the local comprehensive housing strategy CC3-A | P. 113
- Identify opportunities to increase accessibility and reliability of transportation routes with high use by senior populations, including crosswalk safety and clear transit signage; and
- Design public spaces that are user-friendly to people of all ages and abilities, such as well-placed benches and ramps.

CC3-D ACCESS TO HUMAN AND FAMILY SERVICES

Support programs and services that enable residents to meet their fundamental needs. Specifically:

- Continue to provide supportive services and programs for children, teens, families and older adults, including Head Start and early childhood education;
- Conduct outreach to inform residents about how to enroll in available service programs to help meet basic needs;
- Work with partner organizations to hold events that attract high-needs populations and first-time customers needing human services in order to provide individual guidance and information;
- Support the development and implementation of a communitywide poverty reduction plan; and
- Support Comprehensive Plan goals to support efforts that provide services and resources to reduce and prevent homelessness.

SUPPORTING STRATEGIES

COLLABORATION	■ Work with Jefferson County Human Services, Metro West Housing Solutions, Seniors' Resource Center, and other area human services agencies and organizations to support implementation of programs and improve access to services.
EDUCATION & PROMOTION	■ Look for creative opportunities to provide outreach and information on human services through related City efforts.
TOOLS & TECHNOLOGY	■ Use the City website and social media to share information on supportive services.
RESEARCH & TRACKING	■ Monitor mental health trends through Jefferson County Public Health Reports. ■ Research best practices for universal design, which ensures accessibility for people of all ages and abilities.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER BE1-C | P. 39	■ Target outreach toward low-income households to increase awareness of financial incentives and training opportunities for energy-efficiency upgrades and removal of toxic building materials.
SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Educate employees at major area organizations and companies about available supportive services. ■ Share best practices for incorporating universal design and programs to support employee happiness and mental well-being into businesses.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Utilize neighborhoods to spread awareness of available supportive services and identify community needs. ■ Provide recommendations on how to implement neighborhood-level programs that provide assistance to neighbors.

TABLE CC3-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
CC3-A: Affordable Housing	⊘	■	■■	■■■	■■■	■■
CC3-B: Community Happiness	⊘	■	■	■	■■■	■■■
CC3-C: Aging in Place	⊘	■	■	■■■	■■■	■■
CC3-D: Access to Human and Family Services	⊘	■	■■	■■■	■■■	■■■

 <5,000 $MtCO_2e$ Greenhouse Gas Emissions ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE CC3-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
CC3-A: Affordable Housing	$	✓	–	✓	✓
CC3-B: Community Happiness	$	✓	–	✓	–
CC3-C: Aging in Place	$	✓	–	✓	–
CC3-D: Access to Human and Family Services	$	✓	–	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

CHAPTER **06**

NATURAL SYSTEMS

THE CITY OF LAKEWOOD and its residents recognize the value of healthy ecosystems and rich biodiversity, which provide critical services that support our community's environmental, economic, cultural, physical, and mental health. Lakewood envisions a future where nature at all scales and its benefits are valued, conserved, enhanced, and responsibly managed, sustaining a resilient and thriving community.

GOALS

- Mitigate the negative effects of the built environment and human behavior on Lakewood's natural systems to ensure biodiversity and enhance ecosystem services.
- Enhance Lakewood's resilience to the impacts of climate change using green infrastructure and ecosystem-based adaptation.

TARGETS

- Increase the acreage of functional and healthy natural ecosystems (Specific target to be established after the completion of Implementation Strategy NS1-C).
- Ensure that all waters within Lakewood meet or exceed the Colorado Department of Public Health and Environment's Water Quality Standards for the uses assigned.
- Achieve tree canopy coverage of 30 percent by 2025.

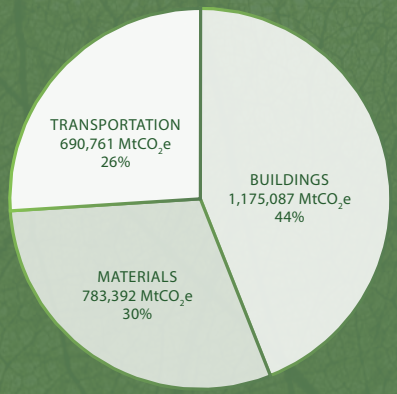
NATURAL SYSTEMS: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,649,240**	**100%**

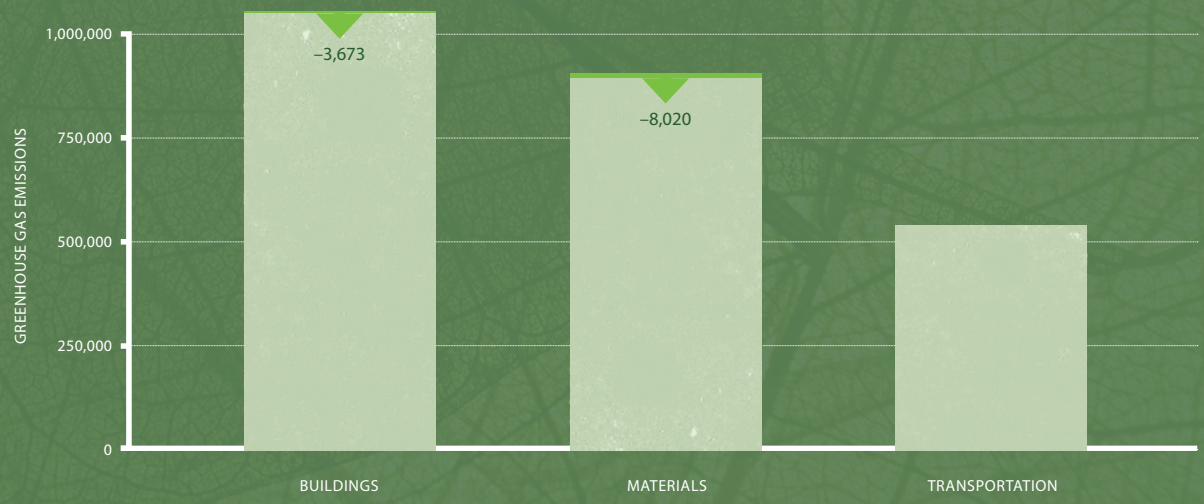
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER NATURAL SYSTEMS STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,049,695	42%	– 3,673
MATERIALS	895,580	36%	– 8,020
TRANSPORTATION	539,165	22%	0
TOTAL GHG	**2,484,440**	**100%**	**– 11,693**

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF NATURAL SYSTEMS STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



NATURAL SYSTEMS ARE THE FOUNDATION OF A HEALTHY AND SUSTAINABLE COMMUNITY.

OUR ECONOMIC AND SOCIAL STABILITY relies on functioning ecosystems for food, energy, clean air and water, aesthetic value, and other natural products and processes. These ecosystems include collections of species, habitats, and the interactions between the two. Maintaining biological diversity (biodiversity) is essential to ecosystem health and ensures that we retain our natural heritage.

When our natural systems are functioning correctly, we receive a myriad of benefits that enable us to meet our present and future needs. These benefits, known as ecosystem services, can be categorized into four types:

- **Provisioning services** are the material and energy outputs from ecosystems. Examples include food, water, and medicine.
- **Regulating services** are the results of ecosystem processes that regulate climate and soil erosion; protect air, water, and soil quality; moderate extreme weather events; facilitate pollination; and control pests and diseases.
- **Cultural services** are the aesthetic, spiritual, intellectual, and physical benefits we receive from nature, including recreation, ecotourism, inspiration, and sense of place.
- **Habitat or supporting services** make all other ecosystems services possible by creating a place for species to survive and maintaining genetic diversity.

Unfortunately, our natural systems' health and critical functions have been severely affected and face increasing threats and pressures. Population growth and development has resulted in habitat loss and habitat fragmentation, which isolates species and prevents the flow of genetic material between populations. High levels of nitrate and phosphorous pollution from sources like sewage and agricultural runoff, leaching of heavy metals and plastics from common waste streams, and spraying of chemicals like herbicides and pesticides all increase the toxicity in our soils, water, and air. Invasive species outcompete native plants and animals, significantly altering the intricate interactions and relationships that took millennia to evolve. As if all of these threats weren't enough, changes in climate have resulted in an additional layer of stress on biodiversity and ecosystem health.

These threats to our natural systems have serious implications for the future of our cities and our world. Disrupted and damaged ecosystems affect our ability to continue living healthy lives. The impacts of these collective threats are evident by the current rate of global species extinction, which is estimated to be 1,000 to 10,000 times higher than the rate of extinction across our planet's history. Climate change is expected to worsen this trend, potentially resulting in the extinction of 25 percent or more of all species on land by 2050.[1] When

These threats to our natural systems have serious implications for the future of our cities and our world.

ECOSYSTEM SERVICES

Natural ecosystems perform fundamental life-support services upon which human civilization depends. There are four categories of ecosystem services: provisioning, regulating, cultural, and supporting. Learn more about ecosystem services on page 126.

PROVISIONING

Material or energy outputs from ecosystems that benefit people

Food
Fiber
Medicine
Fuel
Dye, Wax, Resin, Oil

REGULATING

Benefits provided by ecosystem processes that moderate natural conditions

Air Purification
Water Purification and Storage
Decomposition
Pollination and Dispersal

CULTURAL

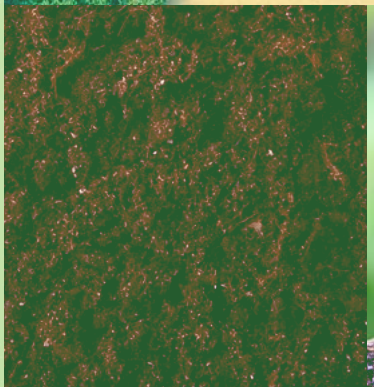
Nonmaterial benefits that contribute to the development and cultural advancement of people

Beauty
Spirituality
Behavior

SUPPORTING

Natural processes that sustain ecosystems and associated benefits

Soil Formation
Habitat
Biological Diversity
Nutrient Cycling



BIODIVERSITY

When we lose a gene or species, we lose it forever.

we lose a gene or species, we lose it forever, and along with the loss of each species, we lose the contribution or services that it provided. For example, services from bees and other pollinators affect one-third of the human food supply.[2]

Incorporating biodiversity and ecosystem considerations into our policy and planning is critical to protecting and restoring our natural systems. Rich biodiversity not only can exist in cities, but also help cities thrive. When we take a holistic approach to our natural, economic, and social systems, we can create a sustainable future for everyone.

TRENDS AND OPPORTUNITIES

URBAN LAND STEWARDSHIP

We use our land to produce food, aesthetic value, and recreational activities. Lakewood's large lots, neighborhood parks, and abundance of open space give residents of all backgrounds an opportunity to utilize and enjoy the land. However, the common use of pesticides and herbicides can have severe impacts on human health, flora, and fauna. Recognizing that the use of chemicals to control invasive weeds and public health related pests is often the most practical and effective management tool, their use should be evaluated and reduced where possible. One example of the negative impacts associated with the use of pest control chemicals is the damage caused by neonicotinoids on pollinator species. Neonicotinoids, one of the most widely used classes of insecticides in the world, are systemic, persistent neurotoxins that spread throughout a treated plant including to the pollen that is gathered by pollinators. A review of more than 800 scientific studies concluded that neonicotinoids are causing significant damage to a wide range of beneficial invertebrate species and are a key factor in the decline of bee populations. In response to this threat, several communities have banned neonicotinoids and increased awareness on the severe, unintended consequences of pesticide and herbicide use.

Increasing awareness and sharing best practices can help communities manage their land in responsible and productive ways. Ecological stewardship can be practiced at all levels, including individual residences. Backyard gardens can accommodate significant biodiversity with the proper shelter, food, and water. In a study of 61 gardens, researchers found more than 4,000 species of invertebrates, 80 species of lichen, and more than 1,000 species of plants.[3] By understanding our land and the web of life it supports, we can become good stewards of our landscapes and our earth.

RESTORING AND RECONNECTING

Habitat loss is the no. 1 threat to biodiversity[4] and is steadily increasing with the rapid growth of cities and mismanagement of existing lands. Patches of isolated habitats prevent the movement of species and genetic variation. In order to reverse this trend, we must restore and reconnect habitats throughout the urban environment. This includes protecting large patches of habitat that provide shelter for species that are less tolerant of human activity, restoring connectivity between habitats to facilitate the movement of species, and providing a variety of habitats to preserve biodiversity.

By understanding how our land and the web of life it supports, we can become good stewards of our landscapes and our earth.

Restoration and connectivity not only ensures healthy ecosystems and biodiversity, but also enhances ecosystem services. By increasing the scope of our natural systems, we are cleaning our air and water, providing opportunities to produce food and medicine, and creating an environment that supports mental and physical health.

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[1] Eric Chivian and Aaron Bernstein. "How Our Health Depends on Biodiveristy." Center for Health and the Global Environment. Harvard Medical Center. 2010.

[2] T. Tscharntke. "Global food security, biodiversity conservation and the future of food security and sustainability in a changing world." FAO: 2011.

[3] UNEP & UN-HABITAT. "Ecosystems and Biodiversity The Role of Cities." Nairobi, 2005.

[4] City of Surrey. "Biodiversity Conservation Strategy." January, 2014.

CLIMATE ADAPTATION

In recent decades, Colorado has experienced increases in extreme heat, large wildfires, flooding, and drought. As our state and other communities across the world prepare for the effects of climate change, many are choosing to use ecosystem services to adapt. The capacity of our natural landscapes to store and filter stormwater can be applied to our urban environment through rain gardens, permeable pavements, bioswales, and simply increasing urban vegetation. Many of these features also serve to reduce urban temperatures and reduce carbon in the atmosphere. The metro Denver urban forest saves residences $21.8 million in cooling costs each year,[5] and a healthy tree can store 13 pounds of carbon each year. Collectively, these features are called "green infrastructure" and can be incorporated into our built infrastructure in order to help us successfully prepare for climate change. ■

[5] E. Gregory McPherson, et al. "Metro Denver Urban Forest Assessment." March 28, 2013.

GOAL **NS1**

MITIGATE THE NEGATIVE EFFECTS OF THE BUILT ENVIRONMENT AND HUMAN BEHAVIOR ON LAKEWOOD'S NATURAL SYSTEMS TO ENSURE BIODIVERSITY AND ENHANCE ECOSYSTEM SERVICES.

TARGETS

- Increase the acreage of functional and healthy natural ecosystems. (Specific target to be established after the completion of Implementation Strategy NS1-C).
- Ensure that all waters within Lakewood meet or exceed the Colorado Department of Public Health and Environment's Water Quality Standards for the uses assigned.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Protect, restore, and enhance ecosystem health and biodiversity throughout Lakewood's natural and built environments.
  - INDICATOR: Acreage of land cover by habitat type
  - INDICATOR: Acres of Colorado List A noxious weed species on cityowned property
  - INDICATOR: Population counts of key indicator species
- **OBJECTIVE:** Minimize the volume of pollutants entering Lakewood's terrestrial and aquatic ecosystems.
  - INDICATOR: Number of developments that have installed or retrofitted BMPs to improve water quality
- **OBJECTIVE:** Facilitate communitywide stewardship of Lakewood's natural heritage and biological diversity.
  - INDICATOR: Number of environmental education programs and outreach events
  - INDICATOR: Attendance at Lakewood's annual Earth Day Celebration

CONCEPT

ECOSYSTEM SERVICES

BY KEN BAGSTAD, U.S. GEOLOGICAL SURVEY

AT THE U.S. FOREST SERVICE regional headquarters in Lakewood, a forest manager spreads out a map of the Pike-San Isabel, White River, and Arapaho-Roosevelt National Forests. Most of us only think about the forests when we're driving to the mountains for a ski trip, taking the kids to go hiking or camping, or pausing for a moment to admire the mountains from a distance. But today, let's think about fire and water. Here in a dry state like Colorado, these can quite literally be a matter of life or death, prosperity or ruin.

Forest fires are costly. Along with lost life and property, health effects from smoke, and the costs of firefighting, there are risks to our drinking water supplies. The 2002 Hayman Fire, southwest of Denver, burned nearly 140,000 acres — an area five times the size of Lakewood. On slopes where trees burned, soil and debris flowed into Cheesman Reservoir, and Denver Water spent more than $41 million to dredge the reservoir and keep it functional — costs that were passed on to their customers. Today, Denver Water and the Forest Service are getting proactive. There are maps that show areas around the reservoirs that are most important to keeping the reservoirs sediment-free. By charging each water user a nominal fee, Denver Water is raising $16.5 million over five years, which will be matched by the Forest Service to thin forests in these water supply protection zones, reducing fire risks and the potential for costly dredging in the future. So, in this example, the value of a healthy forest is at least $33 million. Economists call programs like this "payments for ecosystem services," and in everyday terms it's a classic example of paying for an ounce of prevention today to avoid the cost of a pound of a cure tomorrow.

Nature provides value to people in many ways. It can supply clean air and water, protection from flooding and other natural disasters, pollination for our crops, and recreational, educational, therapeutic, and spiritual benefits. Ask one person about the value of nature, and they may tell you that nature has no value because it has no price tag. Ask another, and they might say that it is impossible, undesirable, or unethical to value nature. But we know that without natural resources as inputs to the economy and places to put the waste products of economic production, our economy would quickly grind to a halt. In mountain towns across the state, outdoor recreation provides a critical economic engine, adding $34 billion in economic activity per year to the state's economy. In cities, trees add property value for homeowners, reduce summer air conditioning bills, and filter air and water pollution. In addition, nature provides many less tangible values — places to disconnect from an increasingly fast-paced world, to meditate or find spiritual peace, to pass on outdoor skills and traditions from parent to child, even for psychological therapy and healing for returning veterans seeking nonthreatening environments or inner-city children experiencing wild nature for the first time.

For an economist then, the truth of how to value nature lies somewhere between the extremes of valueless and priceless. Like any economic good or service, something becomes more valuable as it gets scarcer. Today nature provides value to 5.2 million Coloradans and 7.2 billion people around the world. And in a globalizing world, connections matter. The choices we make in managing Colorado's forests affect water users in 13 downstream states (1 in 10 Americans), while choices made in coastal states to protect wetlands, dunes, and coral reefs can reduce the cost of natural disasters that are borne by all U.S. taxpayers. Meanwhile, economics, environmental science, satellite mapping, and computing technology are providing the technical tools scientists need to more accurately map and value nature's contributions to society's well-being. Public awareness of nature's importance to economic prosperity and community well-being are growing, and new policies to value and protect nature's economic benefits are being tested and developed in communities around the country and world. As we learn to build the value of nature into everyday economic decision-making, economic development strategies are emerging that protect a high level of economic and environmental quality.

Like any economic good or service, something becomes more valuable as it gets scarcer. Today nature provides value to 5.2 million Coloradans and 7.2 billion people around the world.

Bio: Ken Bagstad, PhD, is a research economist working with the U.S. Geological Survey at the Denver Federal Center in Lakewood. His work focuses on mapping and valuing how nature provides economic and cultural values to people. He has worked with communities, state governments, federal agencies, and international organizations (https://profile.usgs.gov/kjbagstad). ■

LEARN MORE ABOUT ECOSYSTEM SERVICES:

http://www.usgs.gov/climate_landuse/lcs/projects/ecosys_val.asp
http://www.fs.fed.us/ecosystemservices

IMPLEMENTATION STRATEGIES

NS1-A CULTURE OF ECOLOGICAL STEWARDSHIP

Facilitate communitywide stewardship of Lakewood's natural heritage by advancing understanding of the importance of biological diversity and the value of ecosystem services. Specifically:

- Continue to provide environmental education programs for residents of all backgrounds and ages;
- Identify opportunities for interpretive signage and on-site messaging in Lakewood's parks, natural areas, and other appropriate public spaces;
- Integrate environmental education into community events like Earth Day, Cider Days, and the annual Community Resources Plant Sale;
- Develop resources and tools that enable residents to share ecological stewardship concepts and programs with neighbors, employers, and co-workers; and
- Recognize efforts of residents, businesses, and organizations demonstrating stewardship of Lakewood's natural systems.

NS1-B LANDSCAPE AND AGRICULTURAL STEWARDSHIP

Reduce the impacts to ecosystem health, air and water quality resulting from landscaping and agricultural practices in Lakewood. Specifically:

- Increase resident awareness of the impacts associated with the use of chemical fertilizers, pesticides and other toxins on pollinator species and overall ecological health through education and outreach, including promoting alternatives;
- Consider enacting policies or regulations that limit the use of systemic persistent neurotoxins linked to significant declines in critical invertebrate species and pollinators;
- Work with the Colorado State Cooperative Extension and other organizations to develop urban agriculture stewardship standards including pest and invasive species management and animal waste management techniques;
- Encourage the use of "cover crops" during off season to reduce soil erosion and improve aesthetics; and
- Address the impact of open burns on air quality and public health through outreach and education. Consider adopting regulations to address the size, frequency, and timing of private open burns in the city.

NS1-C **BIODIVERSITY INVENTORY, CLASSIFICATION, AND BEST MANAGEMENT PRACTICES**

Identify natural habitat types in the city and establish management areas based on land-use context. Specifically:

- Inventory and map land-use cover and habitat types;
- Identify and count indicator species on an ongoing basis to monitor change over time. Host or support an annual "bioblitz" to conduct species counts. Consider opportunities such as the Audubon Society annual Christmas Bird Count;
- Establish management areas with consideration of habitat types, biodiversity value, current and potential future land use, level of human disturbance, restoration potential, level of fragmentation, and vulnerability to natural hazards;
- Maintain a database and map of management areas that include data on habitat type and size, ownership information, and potential restoration opportunities and constraints; and
- For each management area, develop restoration guidelines, best management practices, site development recommendations or standards with the intent of effectively managing and restoring habitat and biodiversity.

GARDEN FOR WILDLIFE: A SUSTAINABLE THING TO DO IN THE CITY

BY THOMAS SLABE, EIBER NEIGHBORHOOD

THE CITY OF LAKEWOOD is a great place to live for a host of reasons, including, but not limited to, a responsive city government, a healthy economy, copious amenities, world-class cultural and recreational opportunities, and local natural areas. Those natural areas are largely protected public lands now. But they are fragmented and surely not as wild as they once were. Some natural areas even to this day are being converted into housing or other kinds of developments. It goes without saying, then, that built-up environments exist at the expense of the city's wildness.

Just four elements are required for a wildlife garden: 1. Cover 2. Water 3. Food and 4. Places to rear young.

The good news is that there is something that each one of us can do to help wildlife within the city. And by helping wildlife you are also helping yourself and people around you. Why is that? Because, for one matter, wildlife is part of the natural heritage of the region. Wildlife, especially native plant and animal species, is what helps to make this place what it is — a high plains, prairie ecosystem. This ecosystem sustained itself somewhat uniformly over many millennia. But in recent times, starting a little over 150 years ago, wildlife habitat has become radically altered due to ongoing population increases and changing land-use patterns. Preserving remaining fragments of wildlife habitat is critical to our long-term sustainability.

Taking efforts to preserve our natural heritage is important. We obviously cannot bring back conditions in which the region's original Native American tribesmen were found hunting the bison. But we can preserve small fragments in wildlife gardens that have their origins rooted back to a time when Colorado was truly wild.

Wildlife gardens are many things to many people. They may be a single rabbit bush or a cottonwood tree or a rehabilitated short grass prairie. Wildlife gardens are forever changing and offer a level of complexity that the human mind craves. Our brains thrive on complexities, including different textures, odors, and colors that change with the seasons, and the various surprises one regularly encounters in their wildlife habitat, like the precision aerobatics of a dragon fly divebombing gnats and mosquitoes or the chance visit from a Western Tanager at the birdbath. We must cultivate "wildness" in today's day and age because wild areas are vulnerable to multiple threats such as pesticide applications, infestation from species on Colorado's noxious weed list, or ongoing development.

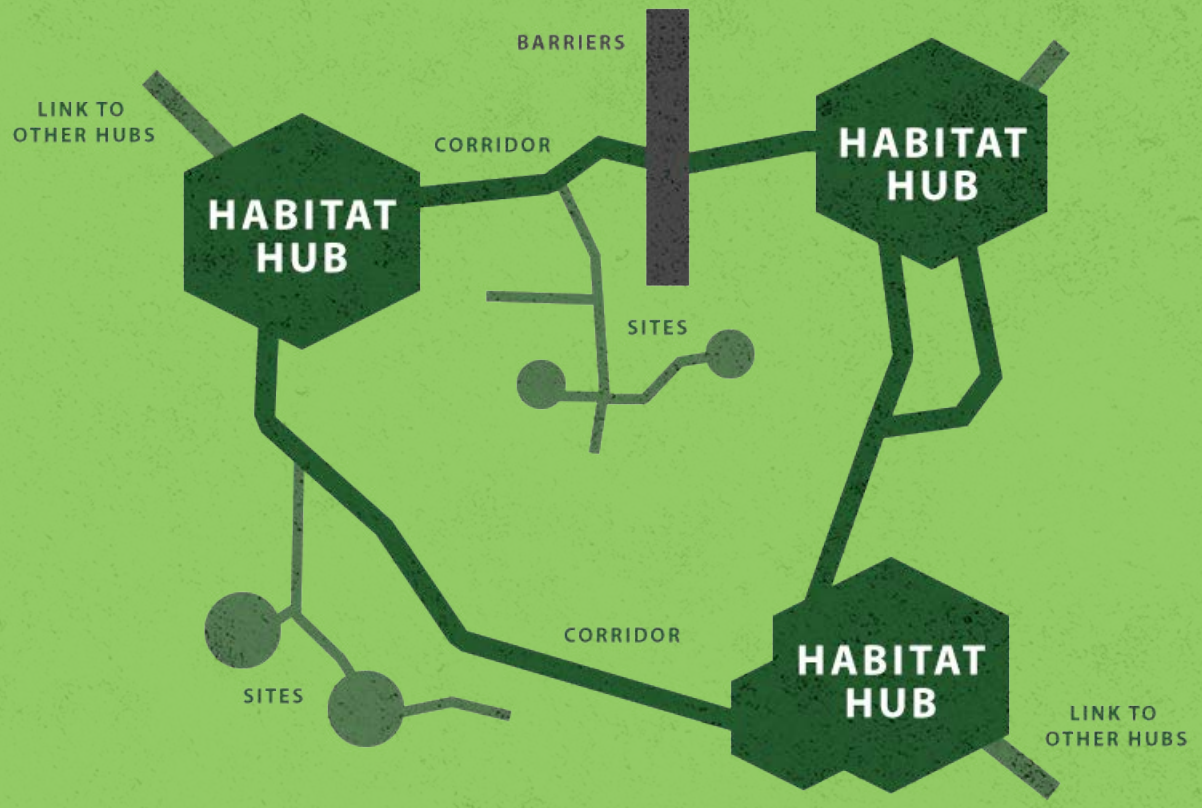
Gardening for wildlife in my yard has naturally reduced the numbers of pests, like aphids, while visibly increasing the numbers of beneficial animals living in and visiting the habitat — such as hummingbirds, ladybird beetles, and lacewings. Insect pests are naturally fecund, which means they reproduce rapidly, and as such they are meant to be food for other species. This is just one other of the multiple reasons why wildlife habitats are important and beneficial.

Gardening for wildlife is simply what you make of it. It can range from a simple, affordable, relaxing diversion to a major landscape restoration/design and implementation project. It simply depends upon your intention. You can garden for wildlife on the balcony, in a small grotto or nook in your yard, or, perhaps, at the neighborhood elementary school you may create a schoolyard habit.

Just four elements are required for a wildlife garden: 1. Cover 2. Water 3. Food and 4. Places to rear young. When you garden for wildlife you most likely are providing cover, food, and places to rear young with the plants you choose to grow in the habitat. So what's left is to maintain a regular supply of water. Adding accessories, such as bird feeders, pollinator houses, logs, brush piles, rocks, and suchlike, is desirable but not required. The intent above all is to be aware of the importance of gardening for wildlife and to appreciate and enjoy the habitat you have created. The activity is as good for the soul and for one's mental perspective as it is for the wildlife and your community.

So, grow some "wild" on your balcony or in your yard or in your neighborhood schoolyard. You can access a wealth of information on the National Wildlife Foundation (NWF) website. For those who are so inclined, you may wish to join ranks with the approximately 176,000 others who have created NWF certified wildlife habitats to "protect wildlife for our children's future." It is up to us to turn the corner now and be better stewards of Earth's biosphere, starting in our very own neighborhoods. ■

LAKEWOOD GREEN INFRASTRUCTURE NETWORK



DEFINITIONS

- **HABITAT HUB**: Parks and other large areas of natural area
- **SITE**: Backyard gardens, pocket parks, and other small patches of habitat
- **CORRIDOR**: Gulches and other connections between hubs and sites
- **BARRIER**: Highways and other interruptions to connectivity

NS1-D GREEN INFRASTRUCTURE NETWORK

Establish a Green Infrastructure Network (GIN) to strategically facilitate habitat protection, restoration, and connectivity across the urban landscape. Specifically:

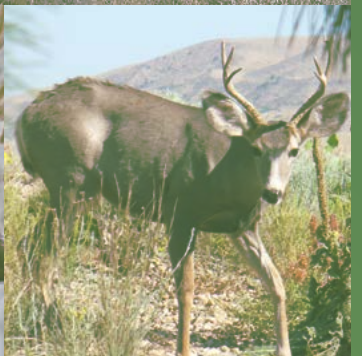
- Identify potential habitat hubs (large intact areas of habitat), sites (smaller patches of habitat), corridors (connections between hubs and sites), and connectivity barriers like road crossings;
- Prioritize key GIN elements for acquisition and preservation;
- Develop financing strategies for land acquisition for priority GIN elements;
- Identify ways to protect existing GIN elements on private property through various tools and resources including development standards, conservation easements, and technical support; and
- Assess opportunities and develop strategies to reduce barriers to movements including fencing and roadways.

LAKEWOOD'S NATURAL SYSTEMS AND REGIONAL PARKS

THE CITY OF LAKEWOOD manages thousands of acres of open space and natural areas within the city boundaries that serve as important wildlife habitat, water resources, and recreational resources for hundreds of thousands of users each year. A variety of high quality wildlife habitats are found within the natural areas including riparian, wetland, rangeland, and shrub land. The natural areas also contain important wildlife corridors that link open space and park areas and provide food, cover, and other habitat needs for wildlife. All of the natural areas provide exceptional wildlife viewing opportunities for the public, along with endless opportunities for nature based recreation, and they serve as the outdoor classroom for Lakewood's active environmental education programs. The parks also serve as regional wildlife and recreational connectors to properties managed by other governmental agencies including Jefferson County, Foothills Parks and Recreation District, and the City of Denver.

The most abundant habitat type found within the natural areas is rangeland, made up of a wide variety of native shortgrass prairie plant species including blue grama grass, buffalo grass, Western heatgrass, and sand dropseed, as well as a variety of native wildflower species. This prairie ecosystem serves many wildlife species including deer, elk, coyotes, cottontail rabbits, raptors, prairie rattlesnakes, and ground nesting birds such as the Western meadowlark. The rangeland areas within Lakewood transition into many areas of shrub land near the foothills, dominated by pockets of shrub species including mountain mahogany, three leaf sumac, and golden currant. These areas serve various songbirds, bobcats, and the occasional mountain lion. Creeks, springs, drainages, ponds, and reservoirs within these areas create additional riparian and wetland habitats dominated by willows, cottonwoods, and areas of cattails. These areas are vital wildlife habitat, serving a large variety of bird, reptile, amphibian, insect, and mammal species. Many of these habitats are connected within the city by parks, golf courses, greenbelts, and ditches, providing important routes for wildlife to move between natural areas. These areas are known as wildlife corridors, and they are vitally important to many wildlife species to prevent habitat fragmentation and allow for migration and movement between wildlife populations.

All of the native habitat areas within Lakewood have been affected by human uses over the years, including agriculture, development, and mining. This has disturbed the native plant and wildlife communities and has allowed many invasive and noxious plants to take hold, reducing the overall quality of habitat and the scenic values. Lakewood manages these areas with the intent of restoring them as much as possible to presettlement conditions in order to provide the best possible wildlife and plant habitat, while also providing high quality outdoor recreation. A variety of techniques are used for this restoration. These include controlling noxious weeds through Integrated Pest Management; restoring native vegetation in highly disturbed areas; managing wildlife populations; restoring and improving existing wetland and riparian areas; enforcing park and environmental regulations; and providing high-quality environmental educational programs. Prescribed burns are also occasionally used to help manage and improve habitat. Historically, shortgrass prairies burned naturally every 1–10 years, but fire suppression by humans since the 1900s dramatically altered this process. Fire helps to remove dense vegetation areas, replaces soil nutrients, and can help control invasive species. ■



NS1-E MUNICIPAL NATURAL RESOURCE MANAGEMENT

Manage municipal natural areas, parks, right of ways, and other properties to maximize ecological health and biological diversity. Specifically:

- Integrate ecosystem health and biodiversity considerations in Citywide plans and policies;
- Implement prioritized GIN (NS1-D) strategies and management area best practices (NS1-C) on cityowned properties;
- Develop a water quality strategic plan to identify sites in need of water quality protection strategies;
- Coordinate with Urban Drainage and Flood Control District, Bear Creek Watershed Association, and other water quality managers to prioritize projects aimed at reducing point-source and nonpoint-source pollution in local waterways;
- Research and implement nontoxic management practices for pest and weed control where possible. Consider testing alternative management techniques on pilot sites and incorporate environmental education and outreach opportunities; and
- Support regional and state level air quality programs/initiatives.

SUPPORTING STRATEGIES	
COLLABORATION	■ Work with neighboring communities and regional organizations to protect regional natural areas and corridors. ■ Work with Denver Urban Gardens (DUG) to ensure Lakewood's native plants are preserved through seed banks. ■ Collaborate with Project Learning Tree and other similar organizations to provide environmental education.
EDUCATION & PROMOTION	■ Promote watershed awareness in schools, neighborhoods, and for City staff involved in the development process. ■ Increase community awareness of the value of ecosystem health. Activities could include: community conversations, curriculum development, signage, website development, and nature walks. ■ Educate garden centers and landscape companies on the impacts of fertilizers, pesticides, and other chemicals. ■ Increase community awareness regarding air and water quality. Activities could include website development, stormwater vs. wastewater educational campaign, informational materials on mechanical systems maintenance, and publicizing available rebates for water conservation practices.
TOOLS & TECHNOLOGY	■ Explore crowdsource data collection tools to enhance habitat and biodiversity inventories and monitoring.
RESEARCH & TRACKING	■ Monitor threatened and endangered species and habitats. ■ Monitor the presence and extent of state-listed noxious weeds on public and private property. ■ Monitor the water quality of Lakewood's water bodies.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER BE1-C | P. 39	▪ Share information and supportive services regarding water quality protection.
SUSTAINABLE BUSINESS HUB SE1-E | P. 61	▪ Utilize the Hub network and technical resources to implement management area best practices and GIN priorities.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	▪ Work with neighborhoods to develop neighbor-to-neighbor tools for education on ecological stewardship. ▪ Work with neighborhoods to pilot urban agriculture stewardship standards. ▪ Encourage initiatives aimed at ecological restoration, including backyard wildlife habitat and utilizing Neighborhood Participation Program grants for habitat restoration on public property.

TABLE NS1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
NS1-A: Culture of Ecological Stewardship	🍃	■■■	■■■	■	■■	■■■
NS1-B: Landscape and Agricultural Stewardship	🍃	■■■	■■	■■	■■	■■■
NS1-C: Biodiversity Inventory, Classification, and Best Management Practices	🍃	■■■	■■	■	■■	■■■
NS1-D: Green Infrastructure Network	🍃	■■■	■■■	■	■	■■■
NS1-E: Municipal Natural Resource Management	🍃	■■■	■■	■	■	■■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE NS1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
NS1-A: Culture of Ecological Stewardship	$	✓	✓	–	–
NS1-B: Landscape and Agricultural Stewardship	$	✓	–	✓	–
NS1-C: Biodiversity Inventory, Classification, and Best Management Practices	$$	✓	✓	✓	✓
NS1-D: Green Infrastructure Network	$$$– $$$$	✓	✓	✓	✓
NS1-E: Municipal Natural Resource Management	$	✓	✓	–	–

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **NS2**

ENHANCE LAKEWOOD'S RESILIENCE TO THE IMPACTS OF CLIMATE CHANGE USING GREEN INFRASTRUCTURE AND ECOSYSTEM-BASED ADAPTATION.

TARGETS

- Achieve 30 percent tree canopy coverage by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Leverage natural and built landscapes to regulate climate and manage stormwater runoff.
  - INDICATOR: Percentage of permeable land
  - INDICATOR: Percentage of 100-year flood plain with vegetative coverage

IMPLEMENTATION STRATEGIES

NS2-A STORMWATER MANAGEMENT AND FLOOD CONTROL

Increase the capacity of Lakewood's landscape to manage stormwater and protect water quality Specifically:

- Utilize the City of Lakewood's climate vulnerability study CCA1-C and Climate Preparedness Plan CCA1-D to help prioritize stormwater management projects and to guide development standards;
- Develop a suite of requirements, resources, and incentives that promote the use of green infrastructure for stormwater management, including green roofs, rain gardens, and bioswales;
- Explore opportunities to work with utility providers to create utility fee structures that create incentives for sustainable site designs;
- Identify funding mechanisms that can be used to acquire property in flood plains and floodways; and
- Review regularly and test emerging technologies and methods for managing and improving stormwater quality.

CITY SPOTLIGHT

MORSE PARK RAIN GARDEN

THE MORSE PARK RAIN GARDEN is a water-quality feature designed to include a bermed, xeriscape garden. The shallow depressions within the garden collect rain water from the surrounding parking lots, street, and tennis courts and then filter out sediments and contaminants as the water drains through a sand filter located beneath the pond.

The primary goals in the design of the Morse Park Rain Garden were functionality and sustainability. Designed to reduce the risk of flooding and maximize water storage and treatment capacity, the rain garden uses swales to increase groundwater infiltration. Landscape materials were carefully selected for low water-use and low-maintenance operations and a soil moisture sensor controls garden irrigation cycles to conserve water. Dark gray, rock mulch was used to enhance aesthetics and obscure sediment deposits after storm events. Three stages of water filtration capture sediment prior to rain water entering the garden area to prevent clogging and reduce maintenance. The Morse Park Rain Garden is an example of multipurpose green infrastructure providing stormwater management, enhancing water quality, and providing a community amenity. ■

NS2-B **COOLING AND CARBON SEQUESTRATION**

Adapt to increased temperatures and reduce carbon in the atmosphere through healthy vegetation, tree canopy coverage, and use of low-reflective materials. Specifically:

- Track threats to Lakewood's trees and vegetation from pests and disease;
- Develop a suite of requirements, resources, and incentives to protect vulnerable trees, including funding sources and technical assistance;
- Utilize the Metro Denver Urban Forest Assessment to identify potential planting sites and facilitate community plantings;
- Develop a suite of strategies to facilitate tree and shrub planting including site planning requirements, funding sources, technical assistance, and incentives or requirements for vacant properties;
- Update recommended tree and plant species lists to focus on diversity of species and plants that can thrive under future climate scenarios; and
- Adopt site plan requirements or recommendations that facilitate the use of low-reflective landscaping and construction materials.

SUPPORTING STRATEGIES

COLLABORATION

- Collaborate with Lakewood water providers and ditch companies to facilitate implementation of water quality and vegetation strategies.
- Work with Urban Drainage and Flood Control to address existing and expected stormwater challenges.

EDUCATION & PROMOTION

- Increase community awareness regarding proper tree/shrub care, stormwater drainage, and soil erosion. Activities could include fairs for new products and techniques, an arboretum to showcase tree varieties, annual tree/shrub sales, tours of sustainable sites, and workshops on pruning, dying/dead tree care, and groundcover options.
- Promote low-cost erosion control techniques.

TOOLS & TECHNOLOGY

- Utilize available GIS and remote sensing technologies to monitor changes in land cover and composition.
- Utilize crowdsourcing tools to monitor flood and drainage patterns and problems.

RESEARCH & TRACKING

- Research and pilot permeable pavement systems.
- Research ways to leverage ecosystem services for climate adaptation.

CROSSCUTTING STRATEGIES

SUSTAINABLE ENERGY & WATER RESOURCE CENTER

BE1-C | P. 39

- Provide information, technical assistance, and other resources on ecological climate adaptation strategies including cooling and carbon sequestration.

SUSTAINABLE BUSINESS HUB

SE1-E | P. 61

- Provide technical resources and establish certification criteria related to climate adaptation.

SUSTAINABLE NEIGHBORHOODS

CC1-D | P. 102

- Encourage initiatives that enhance Lakewood's urban forests.
- Use neighborhood workshops to educate residents on the importance of implementing resiliency strategies.

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
NS2-A: Stormwater Management and Flood Control		■■■	■■	■	■	■■
NS2-B: Cooling and Carbon Sequestration		■■■	■■	■■	■	■■■

 <5,000 $MtCO_2e$ Greenhouse Gas Emissions  ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
NS2-A: Stormwater Management and Flood Control	$$$$	✓	✓	–	–
NS2-B: Cooling and Carbon Sequestration	$$$	✓	✓	✓	✓

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000


PARK RANGER
Lakewood
Community Resources
DELTA
4X4

CHAPTER **07**

TRANSPORTATION

THE CITY OF LAKEWOOD and its residents recognize and value the importance of multiple safe, reliable, and affordable transportation choices for all users in order to foster a healthy and thriving community. Lakewood envisions a future with a convenient and resilient transportation system that improves our quality of life by making our streets safer, our air cleaner, and our community better connected.

GOALS

- Develop, maintain, and operate sustainable transportation systems and infrastructure.
- Foster sustainable transportation choices in Lakewood.

TARGETS

- Convert all streetlights to LED or other high efficiency lighting technologies by 2025.
- Reduce Lakewood's daily per capita vehicle-miles-traveled by 10 percent by 2025.*
- Reduce the percent of trips to work by single-occupancy vehicles from 75 percent to 65 percent by 2025.*
- Reduce petroleum-based fuel consumption of the City fleet by 10 percent by 2025.**

* Baseline: 2007
** Baseline: 2014

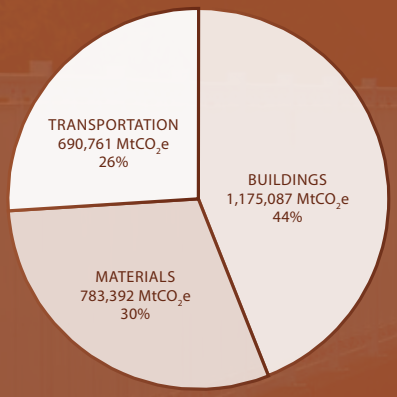
TRANSPORTATION: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

BASELINE		
EMISSIONS BY SECTOR – MT CO_2E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	**2,649,240**	**100%**

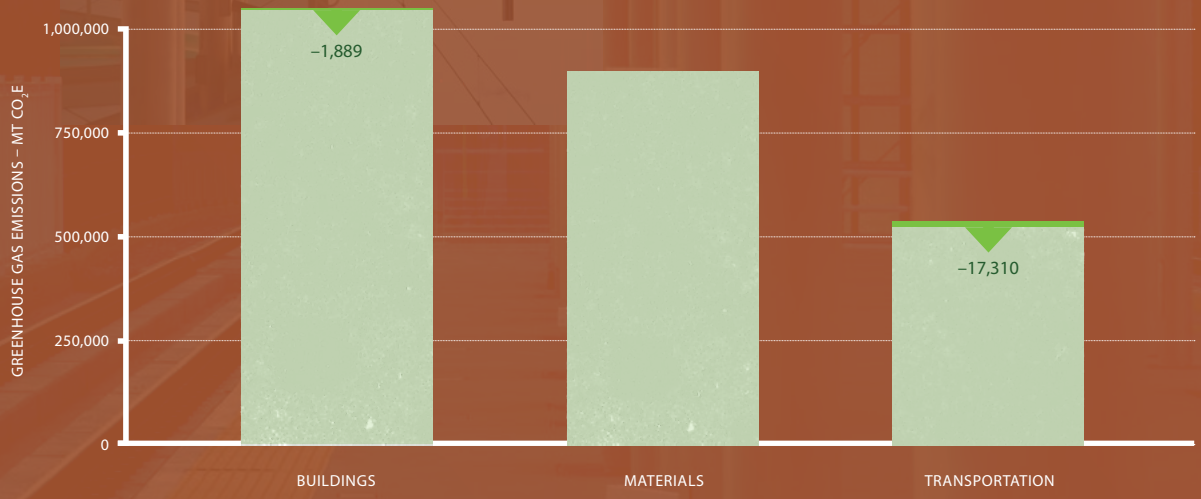
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	**2,496,133**	**100%**	**–153,107**

2025 AFTER TRANSPORTATION STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO_2E			CHANGE
BUILDINGS	1,051,479	42%	– 1,889
MATERIALS	903,600	36%	0
TRANSPORTATION	521,854	21%	– 17,310
TOTAL GHG	**2,476,934**	**100%**	**– 19,199**

2007 BASELINE EMISSION BREAKDOWN



IMPACT OF TRANSPORTATION STRATEGIES ON 2025 BUSINESS AS USUAL (BAU)



A SUSTAINABLE TRANSPORTATION SYSTEM ENHANCES THE CONNECTION BETWEEN PEOPLE AND PLACES.

RESOURCE EFFICIENT INFRASTRUCTURE, effective maintenance, and low impact-travel produces accessible and affordable multimodal transportation options. Sustainable transportation systems provide the infrastructure and systems that people need to choose travel options that reduce greenhouse gas emissions and are healthier and more affordable than the traditional single-occupancy vehicle.

Today's transportation system is predominantly focused on an efficient network of highways and roads that connect communities and businesses. In Lakewood, 77 percent of commuters drive alone to work, creating traffic congestion and releasing pollutants and greenhouse gas emissions into the air.[1] The transportation sector contributes 27 percent of Lakewood's greenhouse gas emissions, 19 percent of which comes from gasoline vehicles. Reducing the number of vehicle-miles-traveled and switching to cleaner fuels protects air quality and reduces greenhouse gas emissions.

The Comprehensive Plan includes the chapter, *Lakewood Moves*, to address multimodal transportation systems, future transportation planning, complete streets, and transportation signage. These concepts lay a strong foundation for a sustainable transportation system that fuels our economy and is accessible by all. The strategies in the Sustainability Plan support, complement, and expand on the concepts found in the Comprehensive Plan.

[1] Denver Regional Council of Governments. "Lakewood Community Profile." Last Updated: March 2014. http://gis.drcog.org/datacatalog/content/lakewood-community-profile.

TRENDS AND OPPORTUNITIES

SUSTAINABLE TRANSPORTATION SYSTEMS AND INFRASTRUCTURE

Transportation systems require continuous maintenance and repair in order to ensure safe and efficient travel. Operations, such as snow and ice removal, traffic signal timing, and road repair, can significantly affect the natural environment through chemical use and vehicle emissions. In the last decade, a variety of technologies and techniques have been developed to more effectively manage the use of materials, improve route efficiency, and extend the life span of roads.

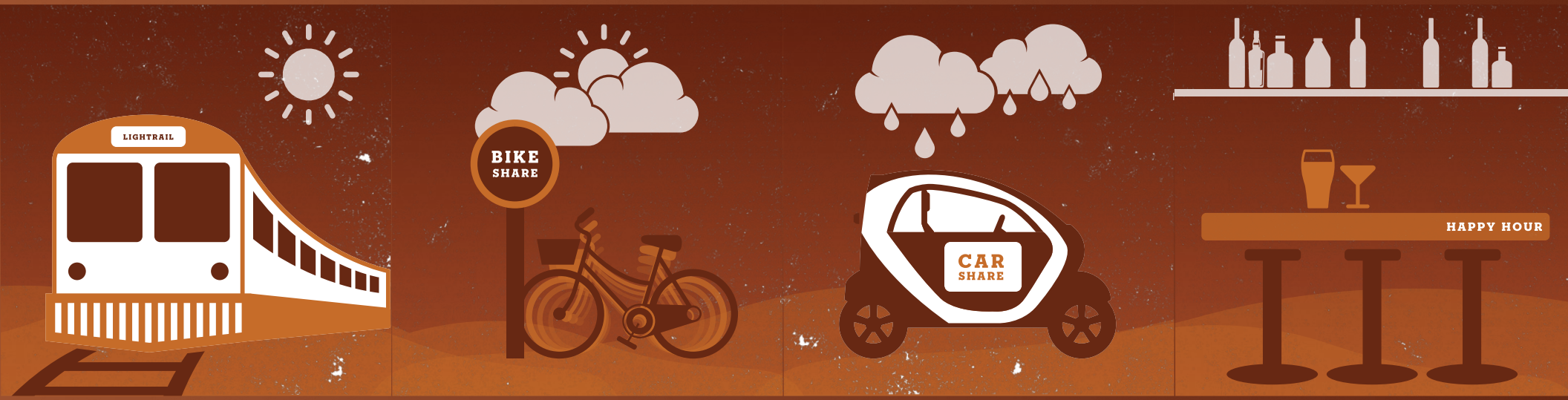
Electronic fleet management systems are an increasingly popular choice for organizations seeking more efficient ways to track vehicle and driver performance. On-board diagnostics and GPS technology enable both a fleet manager and an operations manager to coordinate schedules and anticipate needs. For the street maintenance division, this has the potential to reduce vehicle miles traveled, and idling and to help manage the amount of materials used for snow and ice removal.

The City of Lakewood is continuously seeking ways to incorporate sustainable features into its transportation systems. From LED traffic signals to recycling asphalt, the City recognizes the impact of its transportation system on the social, environmental, and economic well-being of the community.

MULTIMODAL NETWORKS

A multimodal transportation system provides infrastructure for pedestrians, bicycles, automobile, and transit. Expanding that system to

INTEGRATED NETWORKS OF TRANSPORTATION OPTIONS CAN MAKE TRAVEL EASY, AFFORDABLE, AND FUN



COMMUTE by light rail or bus.

BIKE for short trips and errands.

CAR SHARE for when the weather doesn't cooperate and other convenience trips.

RIDE SHARE services for when you want someone else to do the driving for you.

create a network involves creating connections between the various modes in order to increase accessibility and build awareness. The City of Lakewood covers more than 27,000 acres of land, which requires a mix of well-connected travel modes to provide access for people with different travel preferences and abilities. This network looks different throughout the city. While some neighborhood streets might be suited for a shared road and sidewalk, more urban areas might include a separate bicycle lane, sidewalks, automobile traffic lanes, and transit routes. The network as a whole should be planned and designed to safely facilitate all types of uses and users.

Multimodal transportation also ensures that active transportation infrastructure is available to support public health. Many who might choose to walk or bike are often deterred by barriers that affect safety or result in significantly increased travel times. Sustainable, multimodal transportation networks address these concerns through education, infrastructure, and supportive facilities, ensuring accessibility for all users.

RIDE SHARING

Ride sharing is a rapidly growing facet of the sharing economy. Ride sharing ranges from informal carpooling between neighbors to formal car share memberships, such as Car2Go and Zipcar. As more people participate in the trend and the industry grows, convenience and reliability improves, making it an attractive alternative to the expenses of car ownership. Many organizations coordinate ride sharing as part of their commuting programs, which saves employees money, reduces parking and traffic congestion, and improves air quality by taking vehicles off the road.

> The network as a whole should be designed to safely facilitate all types of uses.

Common barriers to ride sharing include lack of awareness and perceived inflexibility that comes with coordinating with another's schedule. Researchers have shown that a variety of improvements and incentives can remove these barriers and increase participation. Some

examples include priority parking spaces and ride matching, which identifies people who live and work close to each other. Ride sharing programs can attract between 10 to 30 percent of commuter trips if they offer information, engagement, and financial incentives.[2]

ALTERNATIVE FUELS

Over a dozen alternative fuels are in production or under development for use in the United States.[3] Compared to conventional fuels, which are derived from petroleum, alternative fuels reduce air pollution and other vehicle emissions. Although public and private vehicle fleets are the primary users of alternative fuel vehicles, individuals are increasingly joining the alternative fuel market. In 2013, 32 new alternative fuel incentives were established by public and private entities, and 54 new laws and regulations were enacted.[4] The most popular alternatives include ethanol blends (E85), propane, compressed natural gas, and electricity.[5] In Colorado, there are approximately 1,300 plug-in electric vehicles, and such cars are expected to grow over the next 10 years.[6] Community partners, such as the Denver Metro Clean Cities Coalition, are working to increase that number, along with other alternative fuel vehicles through education, policy development, and partnerships. The City of Lakewood actively collaborates with regional partners to further this mission and currently has four electric vehicles. The City recognizes the environmental and economic benefits from alternative fuels and continues to explore opportunities to expand its alternative fuel vehicle fleet. ■

RIDE SHARING

Ride sharing programs can attract between 10 to 30 percent of commuter trips.

[2] Victoria Transport Policy Institute. "Ridesharing: Carpooling and Vanpooling." TDM Encyclopedia. Last Updated: June 4, 2014. http://www.vtpi.org/tdm/tdm34.htm.
[3] U.S. Department of Energy. "Alternative Fuels and Advanced Vehicles." Last Updated: November 22, 2014.
[4] U.S. Department of Energy. "State Alternative Fuel and Advanced Vehicle Laws and Incentives: 2013 Year in Review." Last Updated: August 6, 2014.
[5] Energy Information Administration. Alternative Fuel Data. http://www.eia.gov/renewable/afv/users.cfm#tabs_charts-2.
[6] Denver Metro Clean Cities Coalition. "Project FEVER." 2014. http://www.denvercleancities.org/project_fever.html.

GOAL **T1**

DEVELOP, MAINTAIN, AND OPERATE SUSTAINABLE TRANSPORTATION SYSTEMS AND INFRASTRUCTURE.

TARGETS

- Convert all streetlights to LED or other high efficiency lighting technologies by 2025.

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Ensure efficient and effective street maintenance operations that protect the environment.
  - INDICATOR: Annual vehicle miles traveled (VMT) in street maintenance operations
  - INDICATOR: Concentration of criteria air pollutants
- **OBJECTIVE:** Enhance resource efficiency of lighting, street construction materials, and other transportation infrastructure.
  - INDICATOR: Street construction waste diversion rates
  - INDICATOR: Percentage of recycled materials used in street maintenance and construction
  - INDICATOR: Street and signal lighting energy use

IMPLEMENTATION STRATEGIES

T1-A ENVIRONMENTALLY FRIENDLY AND EFFICIENT STREET MAINTENANCE OPERATIONS

Protect the environment, reduce air and water pollution, and improve vehicle efficiency while maintaining a high level of service in street maintenance operations. Specifically:

- Use electronic fleet management systems to improve route and resource efficiency in City fleet;
- Use on-board technologies to manage and track materials used in snow and ice operations; and
- Update standards and procedures for street sweeping and snow and ice operations regularly.

T1-B ROADSIDE VEGETATION

Increase the viability and extent of roadside landscaping and vegetation through coordinated planning efforts to assess infrastructure, design, plant selection, and street maintenance operations.

T1-C STREET AND SIGNAL LIGHTS

Convert street and signal lights to LEDs or other high-efficiency technologies. Specifically:

- Customize streetlight replacement programs through acquisition of existing infrastructure, metering, or tariff adjustments;
- Work with Xcel to install LED or other high-efficiency technologies for all new street and signal lights; and
- Research and, when appropriate, pilot emerging high-efficiency streetlighting technologies and design (e.g., solar, motion detection, ambient light detection).

T1-D SUSTAINABLE STREET REPAIR AND CONSTRUCTION

Ensure sustainable street repair and construction. Specifically:

- Explore opportunities to use sustainable technologies and materials; and
- Incorporate zero waste principles for projects that maximize local and recycled material sources, recycle waste materials, and maximize the lifespan of materials through an efficient street repair schedule.

SUPPORTING STRATEGIES

COLLABORATION	■ Work with nearby jurisdictions and agencies to share best practices and maximize networks (e.g., signal timing efficiency).
EDUCATION & PROMOTION	■ Educate the public about sustainable street maintenance, including snow removal chemicals and signal light timing and route efficiency.
TOOLS & TECHNOLOGY	■ Monitor emerging technologies and data-analysis tools to support efficient and adaptive transportation systems.
RESEARCH & TRACKING	■ Research environmentally friendly transportation materials and technology, including treatments, signage, striping, and lighting. ■ Research technologies, materials, and design that improve stormwater drainage, including permeable pavements, heated streets, and green infrastructure.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Transfer sustainable transportation infrastructure and operational knowledge from the City to property owners and managers responsible for surface maintenance on private property.

TABLE TE1-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
T1-A: Environmentally Friendly and Efficient Street Maintenance Operations	🍃	■■■	■	⊘	■	■■
T1-B: Roadside Vegetation	🍃	■■■	■	⊘	■	■■■
T1-C: Street and Signal Lights	🍃	■■	■	⊘	■	■■
T1-D: Sustainable Street Repair and Construction	🍃	■■■	■■	⊘	■	■■■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE TE1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
T1-A: Environmentally Friendly and Efficient Street Maintenance Operations	$$	✓	✓	–	–
T1-B: Roadside Vegetation	$	✓	–	–	–
T1-C: Street and Signal Lights	$$$$	–	✓	–	–
T1-D: Sustainable Street Repair and Construction	$	✓	–	–	–

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GOAL **T2**

FOSTER SUSTAINABLE TRANSPORTATION CHOICES IN LAKEWOOD.

TARGETS

- Reduce Lakewood's daily per capita vehicle-miles-traveled by 10 percent by 2025.*
- Reduce the percent of trips to work by single-occupancy vehicles from 75 percent to 65 percent by 2025.*
- Decrease petroleum-based fuel consumption of the City fleet by 10 percent by 2025.**

OBJECTIVES & INDICATORS

- **OBJECTIVE:** Facilitate the use of an affordable and accessible, multimodal transportation system.
  - INDICATOR: Commuter mode split
  - INDICATOR: Transit ridership
  - INDICATOR: Percentage of household income spent on transportation
  - INDICATOR: Bicycle level of service
  - INDICATOR: Number of miles of bike trails and routes and number and length of missing segments
  - INDICATOR: Bicycle traffic counts

- **OBJECTIVE:** Promote alternative fuel vehicles and fuel efficiency.
  - INDICATOR: Number of alternative fuel vehicles in Lakewood
  - INDICATOR: Number of alternative fuel vehicles in the City's fleet
  - INDICATOR: Number of alternative fuel stations in Lakewood
  - INDICATOR: Average miles per gallon of vehicles in Lakewood

* Baseline: 2007
** Baseline: 2014

IMPLEMENTATION STRATEGIES

T2-A BICYCLE AND PEDESTRIAN PLANNING AND OUTREACH

Remove barriers to bicycle and pedestrian transportation through a comprehensive strategy. Specifically:

- Coordinate with diverse community groups to identify barriers in bicycle and pedestrian networks;
- Facilitate participation in initiatives and programs that encourage residents to use bicycle and pedestrian transportation, including bike to work days, neighborhood challenges, transit riding training, traffic safety workshops, and various school based programs;
- Utilize available technologies to gather bicycle user reviews and feedback to measure bicycle level of service and stress, and encourage bicycle advocates to lead the effort;
- Develop strategies to encourage maintenance of pedestrian and bicycle routes on private and public property, including snow removal and landscape maintenance;
- Incorporate bicycle level of stress, which classifies routes based on perceived safety issues, into a bicycle level of service rating; and
- Support Comprehensive Plan goals to improve the pedestrian and bicycle environment within the city.

COMMUNITY SPOTLIGHT

WAY TO GO: A BETTER WAY TO BUILD COMMUNITY

BY KENNETH BODEN, DENVER REGIONAL COUNCIL OF GOVERNMENTS

ANALYZE AND INFORM

Way to Go understands that organizing a community to do the right thing often leaves one wondering where to start. Whether the decision is to build customized commute plans for participants, to set up the schoolpool program for neighborhood children, or to start a friendly competition to see who can leave their car at home the most, Way to Go has the tools to help launch small or large initiatives and can help organizers ask the right questions and analyze the results to learn what programs are the most effective for the community. Way to Go can provide support every step of the way, helping to explain the nuts and bolts of the program.

COMMUNITY BENEFITS

When communities partner with Way to Go, positive results happen. Participants who pledge to use active transportation (walking or biking) see health benefits and help make their communities a friendlier place to get around. Those who form carpools and vanpools save money, reduce stress, and build their professional networks. Those who take public transportation increase their work productivity, reduce stress, and help to take single-occupancy vehicles off of increasingly congested roads. By seeking greater community connectivity and improving the quality and number of viable transportation options, neighborhoods thrive.

MYWAYTOGO.ORG

MyWayToGo.org is an easy-to-use website where you can learn how to save money, burn more calories, save time, and reduce carbon emissions by adopting smart commuting practices. The Way to Go program helps concerned citizens take those first steps toward building a better community. ■

T2-B TRANSPORTATION MANAGEMENT SERVICES

Collaborate with west metro agencies to develop an approach, or several, to provide sustainable transportation management services. Specifically:

- Develop mode-shift programs;
- Participate in transportation policy monitoring and advocacy;
- Coordinate vehicle share and transit operations;
- Enhance transit facilities and technologies;
- Expand transit pass options and incentives; and
- Support Comprehensive Plan goals related to transportation management, connectivity, transit service, and multimodal transportation.

T2-C WAY TO GO

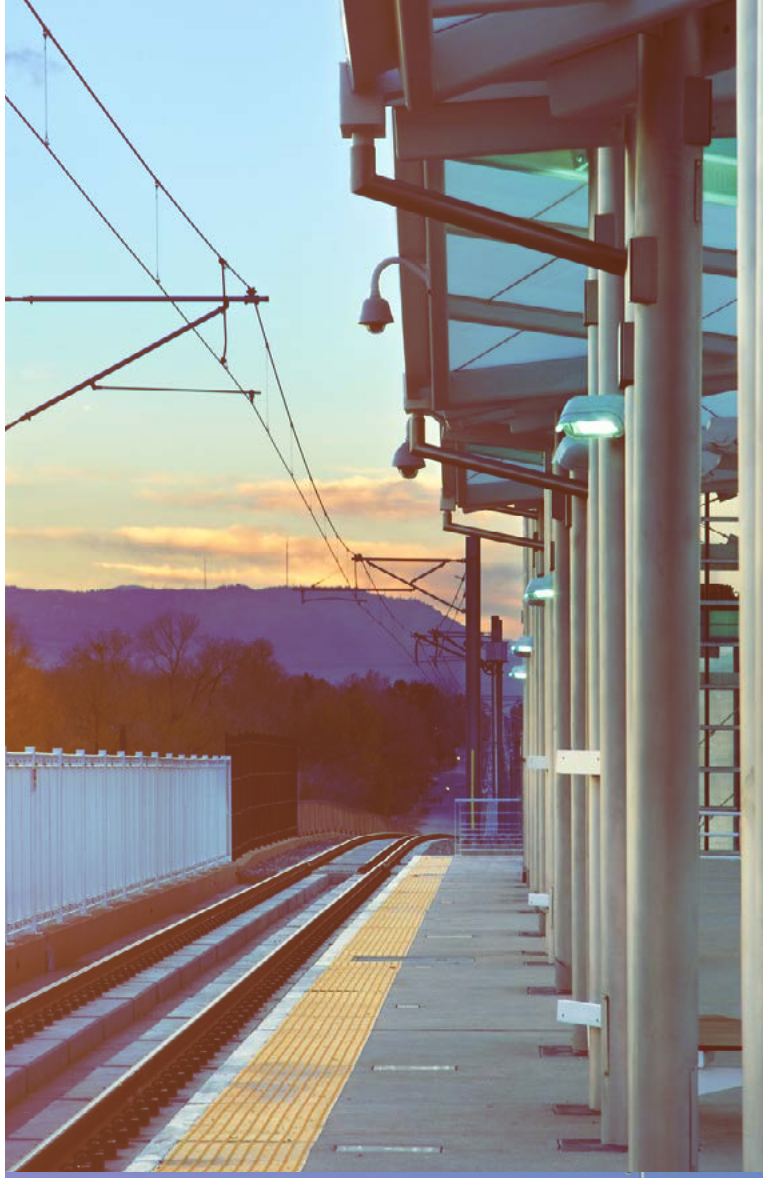
Utilize and promote the suite of transportation management tools available through Denver Regional Council of Governments' Way to Go program. Specifically:

- Use Way to Go employer services and Web-based tools to coordinate transportation options for City employees, including carpool, vanpool, transit, biking, and guaranteed-ride-home programs;
- Identify opportunities to use Way to Go's customizable crowdsourced ride share platform to coordinate transportation to City of Lakewood events;
- Encourage businesses to use Way to Go's employer services;
- Promote the suite of Way to Go tools for daily travel and special events to neighborhood groups, Homeowners Associations, schools, and other community organizations; and
- Support the Comprehensive Plan goals to promote the use of shared transportation options through shared bicycle systems and expanded car share operations.

T2-D CITY FLEET

Develop a strategic plan to increase fuel efficiency and incorporate alternative fuel vehicles into the City vehicle fleet. Specifically:

- Assess the City fleet to understand the range of vehicle classes, roles of vehicles used, and potential for reducing petroleum-based fuel consumption;
- Research and recommend cost effective and maintainable fuel-efficient or alternative fuel vehicle options to departments that are replacing or acquiring new vehicles;
- Educate employees on the benefits of fuel-efficient practices and alternative vehicles;
- Consider adopting vehicle class or use specific strategies to reduce petroleum-based fuel consumption;
- Consider incorporating fuel efficiency or emission requirements during licensing and in contracts for City projects; and
- Explore opportunities to develop and encourage development of alternative fuel infrastructure, including compressed natural gas and electric charging stations.



SUPPORTING STRATEGIES

COLLABORATION	■ Partner with other jurisdictions and agencies on bike way finding systems, including digital and print resources and signage.
EDUCATION & PROMOTION	■ Promote the benefits of alternative fuel vehicles and fuel-efficient practices to Lakewood residents and businesses. ■ Promote transportation management programs to residential property managers to include as an amenity to renters.
TOOLS & TECHNOLOGY	■ Monitor mobile technologies that facilitate multimodal transportation use and efficiency. ■ Explore crowdsource data collection tools to inform transportation management and infrastructure.
RESEARCH & TRACKING	■ Research best practices for incorporating alternative fuel vehicle infrastructure, including electric vehicle charging stations, into site planning requirements. ■ Monitor resident satisfaction with Lakewood's transportation environment. ■ Monitor pedestrian and bicycle safety statistics.

CROSSCUTTING STRATEGIES

SUSTAINABLE BUSINESS HUB SE1-E | P. 61	■ Incorporate sustainable commuting programs aimed at employees into a green business certification program. ■ Incorporate sustainable commuting programs and infrastructure aimed at customers into a green business certification program.
SUSTAINABLE NEIGHBORHOODS CC1-D | P. 102	■ Work with neighborhoods to pilot community-based transportation management programs. ■ Work with neighborhoods to collect bicycle user review and feedback data to measure level of service and stress.

TABLE TE2-1: STRATEGY BENEFITS

STRATEGY	ENVIRONMENTAL BENEFITS		ECONOMIC BENEFITS		SOCIAL BENEFITS	
	GHG REDUCTION POTENTIAL	ECOSYSTEM HEALTH	SELF-RELIANCE	HOUSEHOLD BENEFITS	COMMUNITY COHESION	PUBLIC HEALTH
T2-A: Bicycle and Pedestrian Planning and Outreach	🍃	■	■■	■■	■■	■■■
T2-B: Transportation Management Services	🍃	■■	■■	■■	■■	■■■
T2-C: Way to Go	🍃	■■	■■	■■	■■	■■■
T2-D: City Fleet	🍃	■■	■	⊘	⊘	■

🍃 <5,000 $MtCO_2e$ Greenhouse Gas Emissions 🍃 ~10,000 $MtCO_2e$ Greenhouse Gas Emissions

■■■ High ■■ Medium ■ Low ⊘ Does Not Apply

TABLE TE1-2: STRATEGY FEASIBILITY

STRATEGY	CITY OF LAKEWOOD			COMMUNITY	
	UPFRONT COSTS	ONGOING COSTS	PAYBACK / REVENUE POTENTIAL	FINANCIAL BENEFIT FOR RESIDENTS	FINANCIAL BENEFIT FOR BUSINESSES
T2-A: Bicycle and Pedestrian Planning and Outreach	$$	✓	–	✓	✓
T2-B: Transportation Management Services	$$	✓	–	✓	✓
T2-C: Way to Go	$	–	–	✓	✓
T2-D: City Fleet	$$$$	✓	–	–	–

$** < 50,000 **$$** = 50,000–100,000 **$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

GLOSSARY

#

100-YEAR FLOOD A flood having a 1 percent chance of occurring in any given year.

100-YEAR FLOOD PLAIN The area of land susceptible to being inundated as a result of the occurrence of a 100-year flood.

A

ACRE-FOOT A volume of water equal to 1 foot in depth covering an area of 1 acre or 43,560 cubic feet or approximately 325,851 gallons. One acre-foot of water serves about 2½ households for one year.

ACTIVE DESIGN GUIDELINES Strategies for designing neighborhoods, streets, and outdoor spaces that encourage active transportation and recreation, including walking and bicycling.

ADAPTIVE TRANSPORTATION SYSTEMS Systems that continuously monitor arterial traffic conditions and the queuing at intersections and dynamically adjust the signal timing to optimize one or more operational objectives (such as minimizing overall delays). Adaptive Traffic Signal Control approaches typically monitor traffic flows upstream of signalized locations or segments with traffic signals, anticipating volumes and flow rates in advance of reaching the first signal, then continuously adjusting timing parameters (e.g., phase length, offset, cycle length) during each cycle.

AFFORDABLE AND SUBSIDIZED HOUSING Housing for which the occupant(s) is/are paying no more than 30 percent of income for gross housing costs, including utilities. Some jurisdictions may define affordable housing based on other, locally determined criteria and use this definition as an approximate guideline or general rule of thumb.

ALTERNATIVE FUELS Alternative fuels are derived from resources other than petroleum. Some are produced domestically, reducing dependence on imported oil, and some are derived from renewable sources. They often produce less pollution than gasoline or diesel. Examples include biodiesel (derived from vegetable oils and animal fats), natural gas, propane, hydrogen, and electricity.

ANAEROBIC DIGESTION A biological process that occurs when organic matter (in liquid or slurry form) is decomposed by bacteria in the absence of oxygen (i.e., anaerobic). As the bacteria "work," biogas is released, which consists of approximately 60 percent methane and 40 percent carbon dioxide. Biogas can be used to generate electricity.

B

BENCHMARKING (ENERGY) The process of accounting for and comparing a metered building's current energy performance with its energy baseline, or comparing a metered building's energy performance with the energy performance of similar types of buildings (based on use, such as comparing the energy performance of a hospital to that of other hospitals).

BICYCLE LEVEL OF SERVICE An evaluation of bicyclists' perceived safety with respect to motor vehicle traffic. It identifies the

quality of service for bicyclists that currently exists within the roadway environment.

BICYCLE LEVEL OF STRESS A planning tool used to analyze existing and potential future conditions by measuring bicyclist stress with factors such as intersection crossings, traffic speeds, traffic volumes, and separation from vehicle lanes.

BIKE FRIENDLY COMMUNITY A program by the League of American Bicyclists to assess engineering, education, incentive programs and how a community encourages people to bike for transportation and recreation.

BIOBLITZ An intense period of biological recording within a specific area. A BioBlitz usually takes place over a 24 hour period and involves experts and amateurs taking an inventory of all the living organisms within an area. These areas are commonly parks or other urban spaces.

BIODIVERSITY The variety and variability among living organisms and the ecological complexes in which they occur. Although it most often refers to the numbers of species, the term can apply to levels of organization ranging from genes to ecosystems.

BIOGAS The gaseous emissions from anaerobic degradation of organic matter (from plants or animals) by a consortium of bacteria. Biogas is principally a mixture of methane (CH4) and carbon dioxide (CO2) along with other trace gases.

BIOLOGICAL INTEGRITY RATINGS A scientific tool where several biological indicators are combined to identify and classify the biological integrity of water bodies of water.

BIOMASS Materials that are biological in origin, including organic material (both living and dead) from above and below ground, such as trees, crops, grasses, tree litter, roots, animals, and animal waste.

BIOSWALES Vegetated, mulched, or xeriscaped channels that provide treatment and retention as they move stormwater from one place to another. Bioswales slow, infiltrate, and filter stormwater flows. As linear features, bioswales are particularly suitable along streets and parking lots.

BUSINESS AS USUAL (BAU) A method of measuring future conditions using the assumption that future trends follow those of the past, and no changes in policies will take place.

C

CAR SHARE Automobile rental service intended to substitute for private vehicle ownership.

CARBON BUDGET The precise quantity of carbon dioxide that humans can emit and still limit warming to 2 C (3.6 F) above pre-industrial levels.

CARBON SEQUESTRATION The process by which trees and plants absorb carbon dioxide, release the oxygen, and store the carbon.

CDBG Community Development Block Grant program from the United States Department of Housing and Urban Development that provides communities with resources to address a wide range of unique community development needs.

CIDER DAYS Lakewood's signature event held on the first full weekend in October each year. Celebrating the area's agricultural heritage in remembrance of more than 40 apple orchards that were once landmarks in Lakewood, the event hosts the state's largest classic and antique tractor pull and features vintage machinery displays, interactive activities and amusements, historic demonstrations, and a variety of exhibitors and vendors.

CITIZEN ACADEMIES City of Lakewood opportunities for residents to learn more about the City. Academies include Citizens' Planning Academy, Youth Police Academy, Civics 101, Small Business Academy, and Citizen Police Academy.

CITY CORE COMMUNITY VALUES City Council's core community values are the following: safe community, open and honest communication, fiscal responsibility, education and information, quality transportation options, quality economic development, physical & technological infrastructure, quality living environment, and community sustainability.

CLIMATE CHANGE Any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

CLIMATE FUTURES Also referred to as climate scenarios, which are plausible and often simplified descriptions of how the future may develop based on a coherent and internally consistent set of assumptions about driving forces and key relationships.

CLIMATE PREPAREDNESS PLAN (CLIMATE ADAPTATION PLAN) A comprehensive set of strategies developed to guide a community in efforts to adapt to climate-related risks and impacts to infrastructure, ecology, economic systems, and social well-being.

CLIMATE VULNERABILITY STUDY The analysis of the expected impacts, risks, and the adaptive capacity of a region or sector to the effects of climate change.

CO-WORKING ESTABLISHMENTS Establishments that provide office space or other working environments for people who are self-employed or working for different employers. Co-working spaces facilitate sharing of equipment, ideas, and knowledge.

CO_2 EQUIVALENT ($MtCO_2e$) Emissions of greenhouse gases are typically expressed in a common metric so that their impacts can be directly compared, as some gases are more potent (i.e., have a higher global warming potential) than others. The international standard practice is to express greenhouse gases in carbon dioxide equivalents (CO_2e).

COMMUNITY COHESION A state of harmony or tolerance between people from different backgrounds living within a community.

COMMUNITY RESILIENCE The capability to anticipate, prepare for, respond to, and recover from significant multihazard threats with minimum damage to social well-being, the economy, and the environment.

COMMUNITY SOLAR PROJECTS A solar-electric system that provides power and/or financial benefit to multiple community members.

COMMUNITY-BASED SOCIAL MARKETING An approach to achieving behavior change that merges knowledge from psychology with expertise from social marketing.

COMMUNITY-SUPPORTED AGRICULTURE A community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community's farm, with the growers and consumers providing mutual support and sharing of the risks and benefits of food production.

COMPLETE STREETS Roadway design and operating practices that are intended to safely accommodate diverse users and activities including pedestrians, cyclists, motorists, public transport users, people with disabilities, and adjacent businesses and residents.

COMPOSTING The bio decomposition of organic material, such as animal wastes, plant residues or sludges in the presence of air by controlled methods including mechanical mixing and aerating.

COMPREHENSIVE HOUSING STRATEGY A planning tool to assist communities establish priorities for creating and preserving diverse, affordable housing choices.

CONSERVATION EASEMENTS A legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs.

CORRIDORS Components of the landscape that facilitate the movement of organisms and processes between areas of intact habitat.

COVER CROPS Cover crops are plants sowed into agricultural fields, either within or outside of the regular growing season, with the primary purpose of improving or maintaining ecosystem quality.

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) A strategy used by architects, city planners, law enforcement officers and others, using the physical environment to reduce the incidence and fear of crime, including graffiti.

CRITERIA AIR POLLUTANTS A group of six widespread and common air pollutants that EPA regulates on the basis of standards set to protect public health or the environment (see National Ambient Air Quality Standards). The six criteria pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

CROSSCUTTING STRATEGIES Strategies that leverage the benefits of multiple implementation strategies. There are three crosscutting strategies in the Sustainability Plan: The Sustainable Energy and Water Resource Center, the Sustainable Business Hub, and the Sustainable Neighborhoods Program. These strategies are introduced as implementation strategies in the Energy, Water, and Built Environment; the Sustainable Economy; and the Community Cohesion and Public Health chapters, but are incorporated into each of the plan's goals in order to enhance the scope and effectiveness of implementation.

CROWDFUNDING The use of small amounts of capital from a large number of individuals to finance a project.

CROWDSOURCING The practice of obtaining needed services, ideas, or content by soliciting contributions from a large group

of people and especially from the online community rather than from traditional employees or suppliers.

D

DEMAND-SIDE MANAGEMENT PROGRAMS Utility sponsored programs designed to encourage consumers to modify their level and pattern of resource use.

DENVER REGIONAL COUNCIL OF GOVERNMENTS (DRCOG) A nonprofit, membership organization of local governments in the Denver region. DRCOG is the designated Metropolitan Planning Organization (MPO), Regional Planning Commission, and Area Agency on Aging (AAA).

DISTRICT-SCALE SUSTAINABILITY A wide spectrum of activities and focused strategies that have the potential to help cities achieve sustainability goals by shifting the focus from an individual building or citywide efforts to a customized district scale.

DIVERSION RATE The amount of material being diverted for recycling or composting compared to the total amount that was previously disposed of.

E

EARTH DAY CELEBRATION The City of Lakewood's annual Earth Day fair.

ECOLOGICAL (ENVIRONMENTAL) STEWARDSHIP The responsibility for environmental quality shared by all those whose actions affect the environment.

ECOSYSTEM SERVICES The benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling that maintain the conditions for life on Earth.

ECOSYSTEMS The interacting system of a particular biological community and its nonliving environmental surroundings, or a class of such systems (e.g., forests or wetlands).

EMISSION PATHWAY The trajectory of greenhouse gas emissions over time.

ENERGY FROM RENEWABLE SOURCES Energy from resources that are naturally replenishing such as biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

ENERGY RESOURCE MIX The types and proportion of resources used to produce energy.

ENERGY USE INTENSITY A measure of a building's energy use as a function of its size or other characteristics, typically expressed as energy per square foot per year.

ENDANGERED SPECIES Plants and animals that have become so rare they are in danger of becoming extinct.

F

FLOOD PLAINS The area which would be inundated during the occurrence of the base flood or 100-year flood.

FLOODWAY The channel of a gulch or other watercourse and the adjacent land areas that must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than six inches at any point.

FOOD DESERTS An identified area, generally within lower-income neighborhoods, that has low access to healthful whole foods, fresh fruits and vegetables, and may have a higher concentration of fast-food restaurants and convenience stores. The U.S. Department of Agriculture defines low access as an area where at least 500 people of 33 percent of the census tract's population resides more than one mile from a supermarket or large grocery store.

FOSSIL FUELS A general term for organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the Earth's crust over hundreds of millions of years.

G

GENETIC VARIATION Naturally occurring genetic differences among organisms in the same species.

GPS TECHNOLOGY Technologies that use satellite navigation systems to determine ground position and velocity (location, speed, and direction). GPS stands for Global Positioning System.

GREEN BUILDINGS Buildings and sites designed with consideration of efficient use of energy, water, and materials, and reduced impacts on human health and the environment through better siting, design, construction, operation, maintenance, and waste removal.

GREEN INFRASTRUCTURE An adaptable term used to describe an array of products, technologies, and practices that use natural systems to enhance overall environmental quality and provide utility services. As a general principle, green infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, or recycle stormwater runoff.

GREEN INFRASTRUCTURE NETWORK (GIN) An interconnected network of green open spaces that bring together natural and built environments to provide a range of ecosystem services including clean air and water, wildlife habitat, and carbon sinks.

GREEN PROCUREMENT The purchase of environmentally friendly products and services, the selection of contractors and the setting of environmental requirements in a contract.

GREEN ROOFS Also known as rooftop gardens, green roofs are planted over existing roof structures and consist of a waterproof, root-safe membrane that is covered by a drainage system, lightweight growing medium, and plants.

GREENHOUSE GAS EFFECT Trapping and buildup of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these GHGs rise, the average temperature of the lower atmosphere will gradually increase.

GREENHOUSE GAS EMISSIONS The release into the Earth's atmosphere of any of various gases that contribute to the greenhouse gas effect.

GREENHOUSE GAS INVENTORY An accounting of greenhouse gases (GHGs) emitted to or removed from the atmosphere over a period of time.

GREENHOUSE GASES Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

H

HABITAT CONNECTIVITY The degree to which the landscape facilitates animal movement and other ecological flows.

HABITAT CORRIDORS Components of the landscape that facilitate the movement of organisms and processes between areas of intact habitat.

HABITAT FRAGMENTATION The process by which habitat loss results in the division of large, continuous habitats into a greater number of smaller patches of lower total area, isolated from each other by a matrix of dissimilar habitats.

HABITAT HUBS Large patches of continuous habitat, the size of which is determined by local factors and management standards.

HABITAT TYPES An ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. It is the natural environment in which an organism lives or the physical environment that surrounds a species population.

HEALTHY EATING AND ACTIVE LIVING (HEAL) A program sponsored by LiveWell Colorado that provides training and technical assistance to help city officials adopt policies that improve their communities' physical activity and retail food environments.

HOUSING AND TRANSPORTATION COSTS The combined household expenses for housing and transportation.

I

ICE CORES A cylindrical section of ice removed from a glacier or an ice sheet in order to study climate patterns of the past. By performing chemical analyses on the air trapped in the ice, scientists can estimate the percentage of carbon dioxide and other trace gases in the atmosphere at a given time. Analysis of the ice itself can give some indication of historic temperatures.

INCUBATORS (BUSINESS) A flexible combination of business development processes, infrastructure, and people designed to help businesses grow through vulnerable or early stages of development.

INDICATOR SPECIES An individual species that serves as a measure of the environmental conditions that exist in a given locale.

INTERNATIONAL PANEL ON CLIMATE CHANGE (IPCC) The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on

climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue.

INVASIVE SPECIES Nonindigenous plant or animal species that can harm the environment, human health, or the economy.

J

JOBS TO LABOR FORCE RATIO A ratio comparing the total number of jobs available in a community against the total number of individuals available for work.

K

KILOWATT HOUR A standard metric unit of measurement for electricity. One kilowatt-hour is equal to 1,000 watt-hours, and one watt-hour is the amount of energy delivered at a rate of one watt for a period of one hour.

KILOWATTS A unit of electric power equal to 1,000 watts.

L

LAKEWOOD LINKED INITIATIVE A City initiative started by Mayor Bob Murphy that fosters collaboration, communication, and cooperation in Lakewood's neighborhoods.

LAKEWOOD'S INSPIRE ARTS WEEK A multiple day event that encourages local residents to get out and experience arts and culture in Lakewood. Participating Lakewood art and cultural organizations offer discounted or free special events.

LAND COVER The observed biophysical cover or physical land type such as forest or open water on the Earth's surface.

LAND USE The human use of land including the arrangements, activities, and inputs people undertake on the land.

LED Light-emitting diode; a semiconductor diode that emits light when conducting current.

LEED SILVER A level of LEED certification - there are four levels: certified, silver, gold, and platinum.

LEED Leadership in Energy & Environmental Design (LEED) is a green building certification program that recognizes best-in-class building strategies and practices. To receive LEED certification, building projects satisfy prerequisites and earn points to achieve different levels of certification.

LIVEWELL COLORADO A nonprofit organization committed to reducing obesity in Colorado by promoting healthy eating and active living through education, policy, and environmental efforts.

LOCAL FOOD ASSETS Resources, facilities, services, or spaces that are available to Lakewood and are used to support the local food system. This includes assets such as community gardens and orchards, urban farms, farmers markets, food processing infrastructure, community composting facilities, and neighborhood food networks.

LOCAL MULTIPLIER EFFECT The greater local economic return generated by money spent at locally owned independent businesses compared to corporate chains or other absentee-owned businesses. The multiplier results from the fact that independent locally owned businesses recirculate a far greater percentage of revenue locally compared to absentee-owned businesses.

LOCATION QUOTIENTS An analytical statistic that measures a region's industrial specialization relative to a larger geographic unit (usually the nation). An LQ is computed as an industry's share of a regional total for some economic statistic (earnings, GDP by metropolitan area, employment, etc.) divided by the industry's share of the national total for the same statistic. For example, an LQ of 1.0 in mining means that the region and the nation are equally specialized in mining while an LQ of 1.8 means that the region has a higher concentration in mining than the nation.

LOW-VOC MATERIALS Volatile Organic Compounds (VOCs) are organic chemical compounds whose composition make it possible for them to evaporate under normal indoor atmospheric conditions. VOCs are commonly found in paints sealants, adhesives, and cleaners. VOCs are of concern as an indoor air pollutant due to the potential for VOCs to adversely affect the health of people that are exposed. Impacts may include various health problems, such as nausea, tremors, and headaches. Low-VOC is a general term that defines a broad spectrum of VOC contents that are significantly less than those of conventional products.

M

MICROGRID PROJECTS A small-scale power grid that can operate independently or in conjunction with the area's main electrical grid. Any small-scale localized station with its own power resources,

generation and loads, and definable boundaries qualifies as a microgrid.

MODE-SHIFT A change between methods of travel.

MODERATE DROUGHT As defined by the U.S. Department of Agriculture Drought Mitigation Center: "Some damage to crops, pastures, streams, reservoirs, or wells; some water shortages developing or imminent; voluntary water-use restrictions requested."

MULTIMODAL TRANSPORTATION Transportation systems that include various modes (walking, cycling, automobile, public transit, etc.) and connections among modes.

MUNICIPAL SOLID WASTE Residential solid waste and some nonhazardous commercial, institutional, and industrial wastes. This material is generally sent to municipal landfills for disposal.

N

NATURAL HERITAGE The sum total of the elements of biodiversity, including flora and fauna and ecosystem types, together with associated geological structures and formations.

NATURAL SYSTEMS Ecological systems that exist independent of any human involvement. Natural systems consist of all the physical and biological materials and their intertwined processes.

NEIGHBORHOOD PARTICIPATION PROGRAM A City-funded, annual program that accepts applications for community improvements that will provide benefits to the residents of the community.

NEONICOTINOIDS A group of insecticides that are used widely on farms, as well as around our homes, schools, and city landscapes. Used to protect against sap-sucking and leaf-chewing insects, neonicotinoids are systemic, which means they are absorbed by the plant tissues and expressed in all parts, including nectar and pollen. Unfortunately, bees, butterflies, and other flower-visiting insects are harmed by the residues. Extremely concerning is the prolific inclusion of these insecticides in home garden products. Home garden products containing neonicotinoids can legally be applied in far greater concentrations in gardens than they can be on farms—sometimes at concentrations as much as 120 times as great, which increases the risk to pollinators.

NEUROTOXINS A substance that is poisonous or destructive to nerve tissue.

NEXTDOOR.COM An online social network that allows users to connect with people in their neighborhood.

NONRENEWABLE SOURCES Any natural resource that exists in limited supply and cannot be replaced if it is used up; also, any natural resource that cannot be replenished by natural means at the same rates that it is consumed.

NONPOINT-SOURCE POLLUTION A diffuse source of pollution, having no single point of origin, commonly used to describe water pollution caused by rainfall or snowmelt moving over and through the ground and carrying natural and human-made contaminants into lakes, rivers, streams, wetlands, estuaries, other coastal waters, and groundwater. Atmospheric deposition and hydrologic modification are also sources of nonpoint water pollution

O

ON-BOARD DIAGNOSTICS Hardware or software that monitors and reports the status of a vehicle's systems.

ORGANIC WASTE The biodegradable component of the waste stream that is of biological origin but does not contain any listed waste, radioactive waste or hazardous waste.

OUTSTANDING SUSTAINABLE NEIGHBORHOODS The highest level of certification achievable for neighborhoods participating in the City of Lakewood Sustainable Neighborhoods Program.

P

PERMEABLE PAVEMENTS A range of sustainable materials and techniques for permeable pavements with a base and subbase that allow the movement of stormwater through the surface. In addition to reducing runoff, these pavements effectively trap suspended solids and filters pollutants from the water.

PLUG-IN ELECTRIC VEHICLES Any motor vehicle that can be recharged from an external source of electricity, such as wall sockets, and the electricity stored in the rechargeable battery drives or contributes to drive the wheels.

POINT-SOURCE POLLUTION A fixed location or facility that discharges pollution, such as a factory smokestack, a ship, an ore pit, a ditch, or a pipe discharging treated industrial wastewater or treated sewage into a waterway.

POP-UP RECREATION ACTIVITIES Organized but temporary activities intended to increase engagement or test new concepts or programs.

PREINDUSTRIAL Pertaining to society before industrialization.

R

RAIN GARDENS A depressed area of the ground planted with vegetation, allowing runoff from impervious surfaces such as parking lots and roofs the opportunity to be collected and infiltrated into the groundwater supply or returned to the atmosphere through evaporation and evapotranspiration.

REGULAR MUNICIPAL ELECTIONS Held on the first Tuesday in November in odd-numbered years.

RENEWABLE ENERGY Energy resources that are naturally replenishing such as biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

RESILIENT COMMUNITY The capability to anticipate, prepare for, respond to, and recover from significant multihazard threats with minimum damage to social well-being, the economy, and the environment.

RETROFITS Involve the installation of more efficient equipment into an existing building or process.

RIDE SHARING Refers to carpooling and vanpooling, in which a vehicle carries additional passengers when making a trip, with minimal additional mileage.

S

SAFE ROUTES TO SCHOOLS PROGRAM Sustained efforts by parents, schools, community leaders and local, state, and federal governments to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school.

SELF-RELIANT LOCAL ECONOMY Economic self-reliance refers to an individual's ability to supply his or her own needs without external assistance. It refers to the amount of income needed to satisfy basic needs, such as food, clothing, and shelter, without receiving public assistance like food stamps, Medicaid, child care, public housing or aid from family or friends. A self-reliant local economy extend this concept to the community as a whole.

SENSE OF PLACE A term that includes a broad range of factors. It is the combination of natural location and created features that makes each place unique.

SEVERE DROUGHT As defined by the U.S. Department of Agriculture Drought Mitigation Center: Crop or pasture losses likely; water shortages common; water restrictions imposed.

SHARING ECONOMY An economic model in which individuals are able to borrow or rent assets owned by someone else.

SLASH Debris from trees and other plants.

SOCIAL CAPITAL The collective value of all social networks, and interactions and the inclinations that arise from these networks to do things for each other. The term social capital refers to a wide variety of specific benefits that flow from the trust, reciprocity, information, and cooperation associated with social networks. Social capital creates value for the people who are connected and, at least sometimes, for bystanders as well.

SOCIAL COST OF CARBON A monetary estimate of the economic damages associated with a small increase in carbon dioxide (CO2) emissions. Used to determine the benefit of policies that reduce carbon emissions, the SCC considers the costs to society of a range of climate impacts to agricultural productivity, human health, property, and infrastructure damage from extreme weather events and sea level rise, diminished biodiversity, and loss of ecosystem services. It is reported in dollars per metric ton of carbon dioxide.

SOCIAL EQUITY The fair, just, and equitable access to livelihood, education, and resources; full participation in the political and cultural life of the community; and self-determination in meeting fundamental needs.

SOLAR OUTPUT Also referred to as solar radiation, radiation emitted by the sun, or short-wave radiation. Solar radiation has a distinctive range of wavelengths (spectrum) determined by the temperature of the sun.

STAR COMMUNITY RATING SYSTEM A national certification program that recognizes sustainable communities through a framework of best practices intended to help community leaders assess their sustainability, set targets, and measure progress. For more information, vist www.starcommunities. org.

STATE-LISTED NOXIOUS WEEDS Nonnative, aggressive, and invasive plant species with the potential to be eradicated or controlled in the state. List A weeds are nonnative species whose distribution in Colorado is still limited. Preventing new infestations are the highest priority. Eradication of all List A species is required by law.

SUBMETERING The installation of metering devices to measure actual consumption. Submetering allows you to monitor energy or water usage for individual tenants, departments, pieces of equipment or other loads individually to account for their actual energy or water usage.

SUBSIDIZED HOUSING Economic assistance aimed at alleviating housing costs and expenses for people with low to moderate incomes. Forms of subsidies include direct housing subsidies, nonprofit housing, public housing, rent supplements, and some forms of cooperative and private sector housing. In the United States, subsidized housing is often called "affordable housing."

SUSTAINABILITY DASHBOARD An easy to read, often single page, real-time user interface, showing a graphic presentation of the current status (snapshot) and historical trends of an organization's key performance indicators to enable instantaneous and informed decisions to be made at a glance.

SUSTAINABLE BUSINESS HUB See Implementation Strategy SE1-E, Page 61.

SUSTAINABLE ENERGY AND WATER RESOURCE CENTER See Implementation Strategy BE1-C, Page 39.

SUSTAINABLE NEIGHBORHOODS PROGRAM See Implementation Strategy CC1-D, Page 102.

SUSTAINABLE SITES INITIATIVE (SSI) A program based on the understanding that built landscapes have the capacity to protect and restore our natural systems. Developed by the American Society of Landscape Architects, the U.S. Botanic Garden, and the Lady Bird Johnson Wildflower Center at the University of Texas at Austin, SSI offers a rating system and guidelines to define land development and management practices that complement the functions of healthy ecosystems.

SYSTEMIC, PERSISTENT NEUROTOXINS A toxin that specifically acts upon neurons, their synapses, or the nervous system in its entirety.

T

THREATENED SPECIES Plants and animals that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Endangered species are those plants and animals that have become so rare they are in danger of becoming extinct.

TREE CANOPY COVERAGE The proportion of land area covered by tree crowns as viewed from the air.

TRIPLE BOTTOM LINE BUSINESS MODEL A measure of a company's economic value through "people account," which measures the company's degree of social responsibility, and through "planet account," which measures the company's environmental responsibility.

U

UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) A program developed in 1972 to assess global, regional, and national environmental conditions, to develop international and national environmental instruments, and to strengthen institutions for the wise management of the environment.

UNIVERSAL DESIGN Creating places and environments that can be accessed, understood, and used regardless of age, size, and ability.

UPWARD MOBILITY The capacity or facility for rising to a higher social or economic position.

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT An independent agency that assists local governments in the Denver metropolitan area with multijurisdictional drainage and flood control problems.

V

VARIABLE RATE COLLECTION SYSTEM A trash collection program, often referred to as Pay-As-You-Throw (PAYT), where the cost of service reflects how much you throw away and provides incentives for you to recycle.

VULNERABLE POPULATIONS Groups that are not well integrated into community systems due to socioeconomic status, geography, gender, age, disability status, ethnicity, or health characteristics.

W

WALK FRIENDLY COMMUNITY A national recognition program developed to encourage towns and cities across the U.S. to establish or recommit to giving a high priority to supporting safer walking environments. The WFC program recognizes communities that are working to improve a wide range of conditions related to walking, including safety, mobility, access, and comfort.

WALKABLE NEIGHBORHOODS Places where people live within walking distance of places they commonly want to visit including schools, grocery stores, park and recreational facilities, community institutions, and neighborhood-serving commercial businesses.

WASTE CHARACTERIZATION STUDIES Studies that identify categories of waste generated and methods of disposal. Waste characterization studies can be conducted on a variety of scales including individual buildings and entire communities or regions.

WASTE DIVERSION The prevention and reduction of generated waste through source reduction, recycling, reuse, or composting.

WASTE-TO-ENERGY TECHNOLOGIES The conversion of nonrecyclable waste materials into useable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolization, anaerobic digestion, and landfill gas (LFG) recovery.

WATER USE INTENSITY A measure of water use as a function of a building or site size or other characteristics.

WATERSHED An area from which water drains and contributes to a given point on a stream or river.

WAYFINDING SYSTEMS A system of signs, maps, and other graphic or audible methods used to convey location and directions to travelers.

WINDSOURCE A voluntary program from Xcel Energy that allows customers to pay a monthly fee to purchase renewable energy generated from wind.

WORKFORCE The number of people in a community engaged in or available for work.

WORKFORCE READINESS SCORE A Colorado Department of Education diploma endorsement criteria that measures the level of preparedness of students for postsecondary education or the workforce upon completing high school. The indicator reflects student graduation rates, dropout rates, and school averages of the Colorado ACT composite scores.

WORLD METEOROLOGICAL ORGANIZATION (WMO) A specialized agency of the United Nations (UN) that is the UN system's authoritative voice on the state and behavior of the Earth's atmosphere, its interaction with the oceans, the climate it produces, and the resulting distribution of water resources.

X

XERISCAPE Landscape with water conservation and environmental protection as a major objective. Features may include efficient irrigation, limited turf areas, and native plant selection.

Z

ZERO WASTE A goal that is ethical, economical, efficient, and visionary to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and avoid burning or burying them. Implementing zero waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

APPENDIX **A**

STRATEGY BENEFITS AND STRATEGY FEASIBILITY ASSESSMENTS

THE STRATEGY BENEFITS AND STRATEGY FEASIBILITY TABLES included after each goal summarize the potential environmental, economic, and social benefits of each strategy as well as implementation costs, potential for payback or revenue, and communitywide financial impacts for each strategy. This analysis provides residents, stakeholders, City staff, and elected officials with an overall summary of the range of benefits and costs associated with each strategy and can be used to assist in identifying funding and implementation priorities.

STRATEGY BENEFITS ASSESSMENT

The Strategy Benefits Table provides a ranking for each strategy found in the plan for six different benefit factors within three benefit categories.

BENEFIT FACTORS AND CATEGORIES	
ENVIRONMENTAL BENEFITS	
GHG REDUCTION POTENTIAL: The potential to reduce emissions of greenhouse gases	ECOSYSTEM HEALTH: The potential to enhance or protect ecosystems, ecosystem services, or biological diversity
ECONOMIC BENEFITS	
SELF-RELIANCE: The potential to support the growth and development of local resources, goods and services, and economy	HOUSEHOLD BENEFITS: The potential to enhance opportunities, services, or economic well-being for Lakewood households
SOCIAL BENEFITS	
COMMUNITY COHESION: The potential to foster supportive social networks, civic participation, and diversity	PUBLIC HEALTH: The potential to enhance physical or mental health of community members

BENEFIT FACTOR	RANKING METHOD	LOW	MED	HIGH
ECOSYSTEM HEALTH	Each strategy was assessed for its potential to directly or indirectly support nine objectives (found across each of the plan's chapters) that relate to ecosystem health. The results were ranked based on the number of objectives supported.	1–3 Objectives supported	4–6 Objectives supported	7–9 Objectives supported
SELF-RELIANCE	Each strategy was assessed for its potential to directly or indirectly support seven objectives (found across each of the plan's chapters) that relate to self-reliance. The results were ranked based on the number of objectives supported.	1–2 Objectives supported	3–5 Objectives supported	6–7 Objectives supported
HOUSEHOLD BENEFITS	Each strategy was assessed for its potential to directly or indirectly support eight objectives (found across each of the plan's chapters) that relate to household benefits. The results were ranked based on the number of objectives supported.	1–2 Objectives supported	3–5 Objectives supported	6–8 Objectives supported
COMMUNITY COHESION	Each strategy was assessed for its potential to directly or indirectly support eight objectives (found across each of the plan's chapters) that relate to community cohesion. The results were ranked based on the number of objectives supported.	1–2 Objectives supported	3–4 Objectives supported	5–6 Objectives supported
PUBLIC HEALTH	Each strategy was assessed for its potential to directly or indirectly support 12 objectives (found across each of the plan's chapters) that relate to public health. The results were ranked based on the number of objectives supported.	1–3 Objectives supported	4–6 Objectives supported	7+ Objectives supported

GREENHOUSE GAS REDUCTION (GHG) POTENTIAL:

An assessment was completed for each individual strategy to identify the potential GHG emissions reduction that would result from implementation. The potential emission reduction for each strategy is expressed in metric tons of carbon dioxide equivalent ($MtCO_2e$).

BENEFIT FACTOR RANKINGS:

Each strategy was ranked and assigned a value of "Low," "Medium," "High," or "Not Applicable." The rankings were conducted as described above.

STRATEGY FEASIBILITY ASSESSMENTS

The Strategy Feasibility Table provides a broad estimate of the costs associated with implementation of each strategy found in the plan along with an indication of whether the strategy will likely have ongoing costs, whether the strategy has the potential to pay for itself through cost saving or revenue generation, and whether the strategy provides a potential financial benefit or cost savings to Lakewood residents or the business community.

UPFRONT COSTS:

Upfront costs were determined by estimating costs associated with staffing, supplies, technical equipment and software needs and whether the strategy included major capital improvements. The total estimated costs were then assigned a ranking based on the following structure:

$** < 50,000 **$$ = 50,000–100,000

$$$** = 100,000–1,000,000 **$$$$ > 1,000,000

ONGOING COST:

Each strategy was assessed to determine whether there were ongoing costs associated with implementation.

PAYBACK/POTENTIAL FOR REVENUE:

Each strategy was assessed to determine whether the City could expect to directly recoup implementation costs within a reasonable time frame.

FINANCIAL BENEFITS FOR RESIDENTS:

Each strategy was assessed to determine whether implementation would likely result in household savings or other benefits related to household economics for Lakewood residents.

FINANCIAL BENEFITS FOR BUSINESSES:

Each strategy was assessed to determine whether implementation would likely result in a reduction of expenses or potential increases in revenue for Lakewood businesses.

UPFRONT COSTS MATRIX:

STAFF		CONSULTANT		SUPPLIES AND OTHER SERVICES		SOFT INFRASTRUCTURE		HARD INFRASTRUCTURE	
Salary & Wages: Assumes staff time of a City of Lakewood average salaried full-time employee (FTE)		Contract-Based: Assumes use of a consultant with technical expertise		Advertising, Postage, Printing, Training, Travel, Office Supplies, Software		Software Development, Web Development, Fees, Other Small Capital Improvements		Requires Construction or Major Capital Improvements	
High=FTE+ Med=.5FTE Low=.25FTE		$100/hr							
High	$60,000	High	$75,000	High	$20,000	High	$50,000	High	$10,000,000
Med	$30,000	Med	$50,000	Med	$10,000	Med	$25,000	Med	$1,000,000
Low	$15,000	Low	$15,000	Low	$5,000	Low	$10,000	Low	$100,000

APPENDIX **B**

TARGET METHODOLOGY

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: CCA1	**REDUCE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS BY 20% BELOW 2017 LEVELS BY 2025.**	Target was set based on the cumulative GHG emissions reduction potential of Plan strategies.	▪ 2007 City of Lakewood Communitywide GHG Emission Inventory ▪ Periodic communitywide GHG emission inventories ▪ Assorted data sources detail in City of Lakewood GHG emission calculators
	REDUCE COMMUNITYWIDE GREENHOUSE GAS EMISSIONS BY 50% BELOW 2007 LEVELS BY 2050.	Worldwide and national recommendations for levels necessary to avoid catastrophic impacts associated with climate change would establish this to be 80%. Based on 2025 goals and local limitations on control of energy generation and transmission, the target was set at 50%.	▪ 2007 City of Lakewood CommunityWide GHG Emission Inventory ▪ Periodic communitywide GHG emission inventories ▪ Assorted data sources detailed in City of Lakewood GHG emission calculators
	REDUCE MUNICIPAL GREENHOUSE GAS EMISSIONS EACH YEAR THROUGH 2025.	It is important for the City to demonstrate leadership in efforts to reduce GHG emissions. The 2007 GHG Inventory did not provide data specific to Lakewood municipal operations. A specific reduction target should be established once the data is available.	Periodic municipal GHG emission inventories

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
Customized GHG calculators developed for the City of Lakewood to track trends and cumulative GHG reductions	President's Climate Action Plan, June 2013 – Reduce U.S. GHG emissions by 17% by 2020 (2005 baseline)	▪ Philadelphia – Reduce GHG emissions by 20% by 2015 (1990 baseline) ▪ Boston – Reduce GHG emissions by 25% by 2020 (2005 baseline) ▪ Houston – Reduce GHG emissions by 36% by 2016 (2007 baseline) ▪ Vancouver – Reduce GHG Emissions by 33% by 2020 (2007 baseline)	▪ Aurora – Reduce GHG emissions by 10% by 2025 (2007 baseline) ▪ Denver – Reduce GHG emissions to below 1990 levels by 2020 ▪ Ft. Collins – Reduce GHG emissions by 20% by 2020 (2005 baseline) ▪ Tacoma – Reduce GHG emissions by 40% by 2020 (1990 baseline) ▪ Evanston – Reduce GHG emissions by 17% by 2020 (2007 baseline)
Customized GHG calculators developed for the City of Lakewood to track trends and cumulative GHG reductions	▪ U.S. Conference of Mayors Climate Protection Agreement – Reduce communitywide GHG emissions by 80% by 2050 ▪ STAR Communities – Reduce communitywide GHG emissions by 80% by 2050	▪ Austin – Net-zero communitywide GHG emissions by 2050 ▪ Chicago – Reduce GHG emissions by 80% by 2050 (1990 baseline) ▪ Portland – Reduce GHG emissions by 80% by 2050 (1990 baseline)	▪ Ft. Collins – Reduce GHG emissions by 100% by 2050 (2005 baseline) ▪ Tacoma – Reduce GHG emissions by 80% by 2050 (1990 baseline)
Customized GHG calculators developed for the City of Lakewood to track trends and cumulative GHG reductions	U.S. Conference of Mayors Climate Protection Agreement – Reduce communitywide GHG emissions by 80% by 2050	Cleveland – Reduce municipal GHG emissions by 20% by 2020 (2010 baseline)	Ft. Collins – Reduce GHG emissions from municipal operations by 20% by 2020 (2005 baseline)

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: BE1	**GENERATE 45% OF MUNICIPAL ENERGY FROM RENEWABLE SOURCES BY 2025.**	State renewable energy portfolio standards require 30% of energy from renewable source by 2020. This target was established to encourage the City to secure an additional 15% of its energy from renewable sources by 2025.	Municipal energy bills and reports
	GENERATE 45% OF RESIDENTIAL ENERGY FROM RENEWABLE SOURCES BY 2025.	State renewable energy portfolio standards require 30% of energy from renewable source by 2020. This target was established to encourage Lakewood residents to secure an additional 15% of their energy from renewable sources by 2025.	Xcel annual community energy report, city building permit data
	GENERATE 45% OF COMMERCIAL AND INDUSTRIAL ENERGY FROM RENEWABLE SOURCES BY 2025.	State renewable energy portfolio standards require 30% of energy from renewable source by 2020. This target was established to encourage Lakewood commercial and industrial entities to secure an additional 15% of their energy from renewable sources by 2025.	Xcel annual community energy report, city building permit data
GOAL: BE2	**REDUCE MUNICIPAL BUILDING AND FACILITY ENERGY USE INTENSITY BY 30% BY 2025** ***(Baseline: 2008-2010 normalized data)*****.**	Based on other communities and research on potential energy and cost savings from building efficiency improvements. Target was set above communitywide level to demonstrate leadership and because of the City's ability to control its energy use.	Municipal energy bills and reports
	REDUCE CITYWIDE BUILDING ENERGY USE INTENSITY BY 20% BY 2025 ***(Baseline: 2007)*****.**	Based on targets from other communities and research on potential energy and cost savings from building efficiency improvements.	Xcel annual community energy report; Voluntary data from participants in benchmarking programs
	REDUCE CITYWIDE WATER USE BY 20% BY 2025 ***(Baseline: 2007)*****.**	Based on targets from other communities and the Colorado Water Conservation Board's projection of 163 billion gallon shortfall for the state by 2050.	Denver Water and other local water provider consumption reports
GOAL: BE3	**INCREASE THE PERCENTAGE OF CERTIFIED GREEN BUILDINGS EACH YEAR FROM 2015 TO 2025.** ***(new construction and renovations receiving occupancy permits)***	Green building certifications indicate community recognition of the value of resource efficiency and occupant health and well-being in building design. Recognizing that buildings can achieve these benefits without certification, no mandate or specific numeric target was set.	Green Globes, U.S. Green Building Council, Living Building Challenge

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
–	–	Orlando – 5% of municipal energy from renewable sources by 2017, 100% by 2030	▪ Golden – 50% of municipal energy from renewable sources by 2017 (2007 baseline) ▪ Ft. Collins – Purchase 20% of energy from renewable sources by 2020 with 10% provided by on-site distributive energy ▪ Flagstaff – Increase renewable energy production to 50% of annual municipal energy consumption (long-term goal)
Reported kwh generation from Xcel report and additional generation from sources not integrated into the grid (from permit data)	Star Communities – Increased number of renewable energy certificates (RECs) purchased by residents annually	San Diego – 100% electricity used in the City to be from renewable sources by 2035	▪ Golden – 20% of communitywide energy from renewable sources by 2017 (2007 baseline) ▪ Colorado Springs – 50% of Pike's Peak energy from sustainable sources by 2030 ▪ Denver – 50% of communitywide energy from renewable sources by 2020
Reported kwh generation from Xcel report and additional generation from sources not integrated into the grid (from permit data)	–	–	▪ Golden – 20% of communitywide energy from renewable sources by 2017 (2007 baseline) ▪ Colorado Springs – 50% of Pike's Peak energy from sustainable sources by 2030 ▪ Denver – 50% of communitywide energy from renewable sources by 2020
–	Star Communities – 80% reduction in energy use by selected public infrastructure by 2050	▪ Philadelphia – Lower city government energy consumption by 30% by 2015 (2008 baseline) ▪ Orlando – 10% reduction in municipal energy consumption by 2017, 50% by 2030	▪ Golden – Reduce City energy consumption by 25% by 2017 (2007 baseline) ▪ Denver – Reduce energy consumed in city-operated buildings and vehicles by 20% by 2020 ▪ Ft. Collins – Reduce City energy consumption by 20% by 2020 (2005 baseline)
–	Star Communities – 80% reduction of communitywide building energy use intensity by 2050	Philadelphia – Lower citywide building energy consumption by 10% by 2015 (2006 baseline)	▪ Golden – Reduce communitywide energy use by 20% by 2017 (2007 baseline) ▪ Colorado Springs – Reduce Pike's Peak regional energy use by 20% by 2030 (2010 baseline)
–	▪ Star Communities – 80% reduction of communitywide building water use intensity by 2050 ▪ Denver Water – Reduce overall water use by 22% by 2016 (2002 baseline)	Vancouver – Reduce per capita water consumption by 33% from 2006 levels by 2020.	▪ Golden – Reduce per capita water use by 15% by 2012 (2007 baseline) ▪ Denver – Reduce per capita use of potable water in Denver by 22% by 2020 (2001 baseline)
Sum of certified buildings according to each of the program's certified projects maps	Star Communities – Increase percentage of buildings achieving certification in LEED, Green Globes, and Living Building Challenge programs	Vancouver – Require all buildings constructed from 2020 onward to be carbon neutral in operations.	Golden – 90% of all new construction and 50% of remodels are built to green building standards by 2017 (2007 baseline)

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: SE1	**INCREASE LOCAL FOOD ASSETS ANNUALLY THROUGH 2025 *(baseline to be established after the completion of Implementation Strategy SE1-A)*.**	Subject to change after local food asset assessment is completed – Target reflects estimated opportunities in Lakewood based on recently adopted zoning ordinance facilitating urban agricultural production and sales.	To be established as part of implementation strategy
	ACHIEVE PARTICIPATION FROM 20 LOCAL BUSINESSES IN THE FIRST THREE YEARS OF IMPLEMENTING A GREEN BUSINESS CERTIFICATION PROGRAM.	Based on number of participating and certified and businesses in Certifiably Green Denver's program and normalized to Lakewood based on number of commercial businesses.	To be established as part of implementation strategy
GOAL: SE2	**INCREASE THE PERCENTAGE OF HOUSEHOLDS IN CDBG QUALIFIED NEIGHBORHOODS SPENDING LESS THAN 45% OF INCOME ON HOUSING AND TRANSPORTATION COSTS TO 60% BY 2025.**	The 45% of income on housing and transportation costs is based on recommendations from the Department of Housing and Urban Development and the Center for Neighborhood Technology.	Center for Neighborhood Technology Housing + Transportation Affordability Index
	INCREASE NUMBER OF HOUSEHOLDS ABOVE LIVING WAGE STANDARD BY 15% BY 2025, *(Baseline: 2010)*.	Increasing the percentage of those who meet the living wage standard (wage rate necessary to meet basic needs), allows workers to achieve financial independence and live where they work and has also been linked to employer benefits from decreased turnover, increased morale, and increased productivity.	Massachusetts Institute of Technology Living Wage Calculator
	INCREASE NUMBER OF HOUSING UNITS WITHIN A DESIGNATED COMPLETE NEIGHBORHOOD BY 25% BY 2025.	Established as a key strategy to reduce greenhouse gas emissions and support other sustainability goals. Target reflects recently adopted zoning ordinance facilitating high density around transit hubs and transportation corridors.	To be established as part of implementation strategy

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
Number of food hubs, community kitchens, farmers markets, community produce stands, community food composting facilities, community garden plots, and urban farms	Star Communities – Increase over the past three years in the amount of fresh food produced through local urban agriculture or sold through direct farm-to-consumer activities	Vancouver – Increase citywide and neighborhood food assets by a minimum of 50% over 2010 levels by 2020.	Denver – Grow and process at least 20% of the food purchased in Denver entirely within Colorado
–	–	Vancouver – Double the number of companies that are actively engaged in greening their operations over 2011 levels by 2020.	Breckenridge – Positive yearly growth trend of certified "green businesses"
–	Star Communities – 60% of Census block groups with households earning 80% AMI spend less than 45% on housing and transportation	–	Denver – At least 80% of neighborhoods in Denver are rated as affordable using the H+T Index while preserving the diversity of the neighborhoods
Use the formula included in the Star Community Index = local living wage X average household size X work hours per year	Star Communities – 90% of median household incomes meet or exceed the living wage standard	Corvallis – Living Wage Ordinance for City employees and contractors that service the city, adjusted each year based on consumer price index	–
–	Star Communities – Increased access and proximity to residents of diverse income levels and race/ethnicity to the community facilities, services, and infrastructure	Seattle – 45% of households in urban centers/villages	–

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: ZW1	**ACHIEVE A 60% COMMUNITYWIDE DIVERSION RATE BY 2025.**	Based on Colorado Association for Recycling statewide diversion target and strong work group recommendations.	Hauler reports and/or waste characterization study
	ACHIEVE AN 80% DIVERSION RATE AT THE CIVIC CENTER BY 2025.	Established to demonstrate leadership and determined to be achievable based on existing programs (recycling, composting, green purchasing) and participation rates.	Hauler reports
	ACHIEVE INCREASED DIVERSION RATES FOR SPECIFIC MUNICIPAL FACILITIES ***(to be established after the completion of Implementation Strategy ZW1-B).***	To be established as part of implementation strategy.	To be established as part of implementation strategy
	ACHIEVE A 90% DIVERSION RATE AT CITY OF LAKEWOOD EARTH DAY AND CIDER DAYS EVENTS.	Standard for zero waste event according to Zero Waste International Alliance.	Self and/or hauler reported
GOAL: ZW2	**ACHIEVE A 60% RESIDENTIAL DIVERSION RATE BY 2025** ***(single-family residences and complexes with eight units or fewer).***	Based on Colorado Association for Recycling statewide diversion target and strong work group recommendations.	Hauler reports and/or waste characterization study
GOAL: ZW3	**ACHIEVE A 60% CONSTRUCTION AND DEMOLITION DIVERSION RATE BY 2025.**	Based on Colorado Association for Recycling statewide diversion target and the U.S. EPA national target for the construction and demolition industry.	Hauler reports and/or waste characterization study
	ACHIEVE A 60-90% DIVERSION RATE FOR PRIORITY WASTE STREAMS ***(priority waste streams will be established through implementation Strategy ZW3-A).***	To be established as part of implementation strategy.	To be established as part of implementation strategy

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
–	▪ Colorado Association for Recycling – 66% diversion of total solid waste in Colorado by 2021 (2009 baseline – 36%) ▪ Star Communities – Achieve 100% reduction in communitywide solid waste that is disposed of via landfill or incinerator by 2050	Philadelphia – Divert 70% of solid waste from landfill by 2015	▪ Golden – Reduce waste by 25% by 2017 (2007 baseline) ▪ Colorado Springs – 70% diversion by 2030 ▪ Denver – Reduce waste disposed of by delivery to a landfill by 20% by 2020 (2012 baseline) ▪ Boulder – 85% waste diversion by 2017 ▪ Tacoma – 70% solid waste diversion by 2028
–	–	–	–
–	–	Orlando – 60% recycling rate at all city facilities	Ft. Collins – Reduce waste from publicly accessible facilities by 5% per year; municipal workplaces and offices by 10% per year; and industrial operations by 10% per year based on data reported for previous year
–	–	–	–
–	▪ Colorado Association for Recycling – 66% diversion of total solid waste in Colorado by 2021 (2009 baseline – 36%) ▪ Star Communities – Achieve 100% reduction in communitywide solid waste that is disposed of via landfill or incinerator by 2050	Philadelphia – Divert 70% of solid waste from landfill by 2015	▪ Golden – Reduce waste by 25% by 2017 (2007 baseline) ▪ Denver – Reduce waste disposed of by delivery to a landfill by 20% by 2020 (2012 baseline) ▪ Tacoma – 70% solid waste diversion by 2028
–	U.S. EPA – 75% diversion of construction and demolition waste in the U.S. by 2015	▪ Seattle – 70% construction and demolition waste diversion by 2020 ▪ San Diego – Requires the majority of construction and demolition projects to divert at least 50% of waste	–
–	–	–	–

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: CC1	**INCREASE THE PERCENTAGE OF RESIDENTS REPORTING "GOOD" OR "VERY GOOD" SATISFACTION RATINGS FOR LAKEWOOD'S EFFORTS AT WELCOMING CITIZEN INVOLVEMENT AS REPORTED IN THE CITY OF LAKEWOOD CITIZEN SURVEY TO 60% BY 2025.**	Identified as measurable indicator of civic engagement in conjunction with City Manager's Office.	City of Lakewood Citizen Survey
	INCREASE RESIDENT SUBSCRIPTIONS TO CITY COMMUNICATION TOOLS EACH YEAR THROUGH 2025.	Identified as measurable indicator of civic engagement in conjunction with City Manager's Office.	City of Lakewood Communications Division
	CERTIFY 12 NEIGHBORHOODS AS "OUTSTANDING SUSTAINABLE NEIGHBORHOODS" IN THE SUSTAINABLE NEIGHBORHOODS PROGRAM BY 2025.	Based on existing interest and growth potential of the program.	City of Lakewood Sustainability Division
GOAL: CC2	**INCREASE RECREATION PROGRAM PARTICIPATION EACH YEAR THROUGH 2025.**	Identified as measurable indicator of public health in conjunction with the Community Resources Department.	City of Lakewood Community Resources Department
	ELIMINATE USDA-DEFINED FOOD DESERTS IN LAKEWOOD.	Based on a combination of opportunities for additional food outlets and momentum of local food movement.	U.S. Department of Agriculture Food Access Research Atlas
GOAL: CC3	**ACHIEVE COMMUNITY AFFORDABLE HOUSING TARGETS *(to be established after the completion of Implementation Strategy CC3-A*).**	To be established as part of implementation strategy.	To be established as part of implementation strategy
	INCREASE THE PERCENTAGE OF RESIDENTS REPORTING "GOOD" OR "VERY GOOD" SATISFACTION RATINGS FOR LAKEWOOD PROGRAMS FOR PEOPLE WITH SPECIAL NEEDS, OLDER ADULTS, LOW-INCOME PERSONS, AND HOMELESS PEOPLE TO ABOVE FRONT RANGE BENCHMARKS.	Identified as measurable indicator of civic satisfaction in conjunction with City Manager's Office.	City of Lakewood Citizen Survey

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
–	Star Communities – Increase percentage of residents who believe they are able to have a positive impact on their community	–	–
–	–	–	–
–	–	–	Denver – Additional two neighborhoods every six months supported by two full time employees
–	–	–	–
–	Star Communities – Decrease over the past three years in the percentage of residents living in an urban or rural food desert	–	–
–	Star Communities – Achieve targets for creation of new affordable housing identified in local housing strategy	–	–
–	–	–	–

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: NS1	**INCREASE THE ACREAGE OF FUNCTIONAL AND HEALTHY NATURAL ECOSYSTEMS.** ***(Specific target to be established after the completion of Implementation Strategy NS1-C).***	To be established as part of implementation strategy.	To be established as part of implementation strategy
	ENSURE THAT ALL WATERS WITHIN LAKEWOOD MEET OR EXCEED THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT'S WATER QUALITY STANDARDS FOR THE USES ASSIGNED.	Based on the Clean Water Act requirements and recommendations from city staff.	U.S. EPA and Colorado Department of Public Health and Environment (CDPHE)
GOAL: NS2	**ACHIEVE 30% TREE CANOPY COVERAGE BY 2025.**	Based on recommendations from the 2013 Metro Denver Urban Forest Assessment and work group recommendations.	To be established as part of implementation strategy

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
–	Star Communities – Achieve targets for acres of land conserved in priority natural system areas identified in a locally adopted natural systems or land conservation plan	–	–
–	Star Communities – All nonindustrial water bodies are swimmable and fishable during 90% of days in the past year	Baltimore – Ensure that Baltimore water bodies are fishable and swimmable	Denver – Make all Denver rivers and creeks swimmable and fishable
–	▪ 2013 Metro Denver Urban Forest Assessment estimated a 20% existing tree canopy coverage for Lakewood and recommended a 34% target to fill 50% of potential planting sites. ▪ Star Communities – 35% of land area has protected vegetated surface performing a minimum of two of the following: cooling, water management, recreation	▪ Philadelphia – Increase tree coverage toward 30% in all neighborhoods by 2025 ▪ Orlando – 95% of potential street tree spaces contain living trees by 2030	Ft. Collins – Maintain a 30% forest canopy density in suitable areas of City Parks and 70% of native vegetative cover in Natural Areas

	TARGET	JUSTIFICATION	DATA SOURCES
GOAL: T1	**CONVERT ALL STREETLIGHTS TO LED OR OTHER HIGH-EFFICIENCY LIGHTING TECHNOLOGIES BY 2025.**	Significant energy and financial savings with quick payback period. This target requires cooperation from Xcel.	City of Lakewood Traffic Engineering and Xcel
GOAL: T2	**REDUCE LAKEWOOD'S DAILY PER CAPITA VEHICLE-MILES-TRAVELED BY 10% BY 2025 *(Baseline: 2007)*.**	Based on DRCOG Metro Vision 2035 target.	Denver Regional Council of Governments (DRCOG)
	REDUCE THE PERCENT OF TRIPS TO WORK BY SINGLE-OCCUPANCY VEHICLES FROM 75% TO 65% BY 2025 *(Baseline: 2007)*.	Based on DRCOG Metro Vision 2035 target.	Denver Regional Council of Governments (DRCOG)
	DECREASE PETROLEUM-BASED FUEL CONSUMPTION OF THE CITY FLEET BY 10% BY 2025 *(Baseline: 2014)*.	Based on a combination of increased fuel-efficiency standard and evolving alternative fuel vehicle market.	City of Lakewood Fleet Division

CALCULATION TOOLS/METHODS	INDUSTRY ORGANIZATION & SCIENTIFIC RECOMMENDATIONS	NATIONAL EXAMPLES	COLORADO & SIMILAR EXAMPLES
–	–	▪ Los Angeles – Convert 147,700 streetlights converted, 61% energy savings, $7.7 million energy cost savings, 7 year payback ▪ Seattle – 41,000 streetlights, 15 million kWh energy savings, $2.6 million annual energy cost savings, 7.6 year payback	–
DRCOG travel modelling	▪ The DRCOG Metro Vision 2035 aims to reduce daily vehicle-miles-traveled per capita in the Denver metro area by 10%. ▪ Star Communities – Annual decrease in VMT	▪ Philadelphia – Reduce VMT by 10% by 2015 (2008 baseline) ▪ Seattle – 20% VMT reduction by 2030	Golden – Reduce communitywide VMT by 15% by 2017 (2007 baseline)
DRCOG travel modelling	▪ The DRCOG Metro Vision 2035 aims to lower single-occupancy vehicle trips to work in the Denver metro area from 74% to 65%. ▪ Star Communities – 60% maximum for drive alone for journey-to-work trips	Vancouver – Make the majority (over 50%) of trips by foot, bicycle, and public transit.	Denver – Provide mobility options that reduce personal travel in Denver done in single-occupant vehicles to no more than 60% of all trips.
–	–	▪ Philadelphia – Reduce fuel consumption of the city fleet by 15% by 2015 (2006 baseline) ▪ Columbus – Reduce fuel consumption of the City fleet by 2% by 2014 (2010 baseline) ▪ San Jose – 100% alternative fuel vehicles by 2022 ▪ Seattle – 42% reduction in petroleum-based fuel use by 2020 ▪ Austin - Carbon Neutral Fleet by 2020	▪ Littleton - Reduce city vehicle fuel consumption by 10% by 2010 (2008 baseline) ▪ Ft. Collins - Reduce the traditional fuel use of the city's fleet by 20% by 2020 ▪ Flagstaff - Phase out 100% of inefficient and underutilized vehicles from fleet (long-term goal)

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