



## Lakewood Sustains

**Lakewood will be a leader in sustainability principles, practices, and education.**

**City Leadership & Role**

**Air Quality & Climate**

**Water**

**Biodiversity, Natural Resources & Ecosystem Services**

**Energy in Built Environments**

**Waste**



# LAKWOOD SUSTAINS

## Guiding Principle

**Lakewood will be a leader in sustainability principles, practices, and education.**

Lakewood is committed to the well-being and health of its citizens and environment. The city will reduce its impact on natural systems, instill greater awareness of waste output and reduce waste, seek renewable energy sources, and provide for a sustainable community through education, programs, and services. Lakewood will be a steward in the metropolitan area for environmental health, economic prosperity, and social well-being and will continue to work toward providing a high quality of life for its current residents and for future generations.

## Introduction

Sustainability balances community, economic, and environmental systems and values. As cities continue to adapt to growing populations, support for strategies that contribute to the sustainability of communities becomes essential. Not only is a sustainable city a highly desirable place to live, work, play, and learn, it contributes to overall quality of life, provides economic stability, and values and protects the natural environment and human health.

Sustainability generally encompasses the built environment, climate, air and water quality, energy, economy, education, arts and culture, equity, civic engagement, health and safety, and natural systems. It is the goal of sustainability to achieve balance between the economy, the natural environment, and social values; however, human society depends on the environment first and foremost in order to achieve social and economic sustainability. In other words, without a healthy environment, a community would be unable to achieve economic success and social well-being.

Strategies for achieving a sustainable community are integrated throughout the comprehensive plan and are not limited to this chapter alone. Specifically, the *Lakewood Sustains* chapter addresses the environmental component of sustainability. While the social and economic elements of sustainability are equally as important, they are addressed throughout the Comprehensive Plan.

The City of Lakewood recognizes the importance of protecting its natural resources and providing for the well-being of the community and the natural environment. The city continues to make progress in meeting the challenges of becoming a sustainable city.

### What is Sustainability?

There are many ways in which sustainability can be defined in the context of this plan. Some of the most common definitions include:

- **Brundtland Commission, 1987:** Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- **David Orr, 2011:** Sustainable design is the careful nesting of human purposes with the larger patterns and flows of the natural world.
- **IUCN, UNEP, WWF, 1991:** Sustainable development means improving the quality of life of humans, while living within the carrying capacity of supporting ecosystems.

# CITY LEADERSHIP & ROLE

## Overview

Sustainability of the city depends greatly on environmental stewardship. The City of Lakewood strives to be an environmental steward and lead by example in order to demonstrate a commitment to sustainability and to build and strengthen partnerships with the community. It will build upon the steps it is already taking to create a sustainable community. The City will work to take a leading role for environmental stewardship in its operations and delivery of public services, while encouraging private sector development and services to utilize sustainable practices as well. Additionally, the City will lead by example by providing sustainability education and creating awareness of sustainability issues, efforts, and challenges. Additionally, the City will aim to become more resource and energy efficient, meet ecological and economic challenges, and protect vital resources including air, water, climate, and the natural environment through measurable goals and strategies within the City's *Sustainability Plan*.

### GOAL S-CL1

**The City shall be a leader in sustainability.**

#### ACTION STEPS

- a. Evaluate municipal operations and management of facilities to identify opportunities to incorporate sustainability efforts and operations.
- b. Evaluate policy decisions to identify opportunities to increase sustainability efforts.
- c. Create criteria to incorporate sustainable elements within public improvement projects.

### GOAL S-CL2

**Educate the public on the benefits of sustainability.**

#### ACTION STEPS

- a. Develop and provide materials for the public that address the economic, environmental, and social elements of sustainability.
- b. Develop a program that can be offered to schools and colleges to educate students about the importance of sustainability for a strong and viable city.
- c. Develop targeted outreach programs to meet project-specific strategies within the *Sustainability Plan*.

### City of Lakewood Sustainability Plan

The *Sustainability Plan* is used to guide the community to reach economic prosperity, social equity, and environmental health. It provides measurable strategies for Lakewood to become more resource and energy efficient, to meet ecological and economic challenges, and to protect vital resources including air, water, climate, and the natural environment.





### What is the City Already Doing as an Environmental Steward?

The City has undertaken many steps toward sustainability and will continue to contribute to the sustainability of the community. The following illustrates some of the ways the City has implemented, and continues to implement, sustainability practices.

- Developed an employee bike sharing program
- Uses 30 percent recycled asphalt in city paving operations
- Purchased a solar array from the Jefferson County community solar garden
- Purchased a number of hybrid and electric vehicles for the City vehicle fleet
- Operates the Lakewood Recycling Center and supports the Rooney Road Recycling Center
- Provides recycling in municipal buildings
- Utilizes green procurement efforts
- Developed a sustainability framework to demonstrate the City's efforts to be a leader in enhancing community sustainability through a holistic approach for community health and well-being
- Created the Morse Park rain garden
- Constructed a demonstrative xeric garden at Kendrick Lake Park
- Diverted waste from landfills at community events
- Updated the Lakewood Zoning Ordinance to include accessory dwelling units

### Sustainable Elements of Public Improvement Projects

There are many opportunities to integrate natural systems into public infrastructure improvements. These elements range anywhere from the use of best management practices to control stormwater runoff to the inclusion of multi-modal infrastructure as a part of street design to accommodate various forms of transportation that are alternative to the single-occupant vehicle.

Integration of public infrastructure into the existing natural and built environment is important. Sustainable approaches to this integration may include creating complete, multi-modal, green streets with energy efficient components. The street may use recycled asphalt and be lined with street trees. The amenity zone may include adequate seating, recycling bins, and energy efficient street lighting. Whatever the chosen component, public improvement projects can provide livability and environmental benefits while achieving their primary objectives.





### Sustainability Awards

The City of Lakewood Sustainability Awards recognize leadership in sustainability by residents, businesses, nonprofits, community organizations, individuals, and schools within the city. The Sustainability Awards include three categories:

- **Community Sustainability Award:** The Community Sustainability Award is given to groups or individuals who promote a sustainable community through projects and initiatives in Lakewood.
- **Defender of the Planet Youth Award:** The Defender of the Planet Youth Award is given to Lakewood's young residents who participate in projects demonstrating leadership and promoting sustainability. There are three school-level categories for this award including elementary, middle, and high school.
- **Bruce Peoples Eco-Employee Award:** The Bruce Peoples Eco-Employee Award, named in memory of Bruce Peoples for his outstanding work, involvement, and dedication to sustainability during his 37-year career with the city, recognizes the efforts of city employees who incorporate sustainability practices into their daily activities.





# AIR QUALITY & CLIMATE

## Overview

The changing climate significantly affects human and environmental health. As extreme weather conditions increase in frequency and severity, cities may be at risk for flooding, high winds, and other threats. Warmer average temperatures lead to severe heat waves and increased concentrations of air and water pollutants, and can exacerbate an already dry climate.

Given the city's proximity to the foothills and the wildland-urban interface, portions of the city are at risk for wildfires from steady rising temperatures and dry climate. In addition, the city is susceptible to increasing air pollution from emissions and other sources. The major pollutants affecting the region in which Lakewood is situated are ground-level ozone, —Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NOx)—Carbon Monoxide (CO), and Particulate Matter (PM). The sources of these pollutants include mobile sources, people, area sources, and point sources.

Managing air pollution and developing climate change resilience is critical to the human, economic, and environmental health of communities. By understanding how we contribute to greenhouse gas (GHG) emissions and poor air quality, changes can be made in daily activities that can positively impact the climate and reduce pollutants. Air quality may be enhanced using multiple techniques, such as the examples shown below including increasing and protecting the healthy urban tree canopy, providing efficient public transportation options, and incorporating alternative fuel infrastructure throughout the community.

### GOAL S-AQ1

**Educate the community on the importance of protecting air quality.**

#### ACTION STEPS

- a. Create public information materials regarding clean air initiatives through the City's Sustainability website and other print materials, or direct the public to where this information can be obtained.
- b. Provide the public with a list of everyday actions that can reduce emissions, protect air quality, and save money.



**GOAL S-AQ2****Engage the public regarding climate change and its impact.****ACTION STEPS**

- a. Develop programs to assist residents, neighborhoods, and businesses in identifying sources of greenhouse gas (GHG) emissions and strategies to reduce emissions.
- b. Assess the community's vulnerability to climate change impacts and develop plans and adaptation strategies to reduce community vulnerability, increase resiliency, and minimize adverse effects of climate change on the environment, economy, and public health.

**GOAL S-AQ3****Improve air quality and reduce greenhouse gas (GHG) emissions by working towards compliance with state and local air quality standards.****ACTION STEPS**

- a. Establish a target for planting new trees and vegetation to remove CO<sub>2</sub>, reduce urban heat island effect, and enhance urban aesthetics.
- b. Reduce GHG emissions by providing strategies for improving the transportation system and transportation infrastructure; promoting the use of public transit; and providing for multi-modal transportation options. (See the *Lakewood Moves* chapter on additional methods to reduce environmental impacts from automobile use and associated vehicle emissions.)
- c. Research and implement programs to incentivize the use of transit.
- d. Develop an educational campaign to encourage the public to use transportation options that are alternative to the single-occupant vehicle, such as walking, biking, car share, bike share, light rail, shuttle, or bus, to reduce air pollution.
- e. Develop a strategic plan to increase fuel efficiency and incorporate alternative fuel vehicles into the City vehicle fleet.
- f. Develop strategies to expand infrastructure for alternative fuel vehicles.
- g. Develop and promote an air quality checklist for developers and property managers to make them aware of development strategies that may be applied to help air quality.
- h. Evaluate street sweeping and snow plowing services for opportunities to improve air and water quality, and mitigate environmental impacts of such processes.





# WATER

## Overview

Water is a factor of environmental health and sustainability. It is essential for all forms of life, yet is often taken for granted. One of the greatest challenges for environmental sustainability is ensuring water quality and an adequate water supply. Water management efforts and the sustainability of water supplies are made more challenging in the face of a changing climate and growing populations. Additionally, the availability of fresh water for use is constantly changing and lacks predictability from year-to-year—some areas receive a plentitude of water, whereas other areas may suffer from droughts.

Lakewood values its water resources and takes numerous steps in protecting its bodies of water, managing the flood plain, maintaining its watersheds, and managing urban stormwater runoff for water quality. One of the valuable ways in which the City protects water is through public education efforts.



## GOAL S-W1

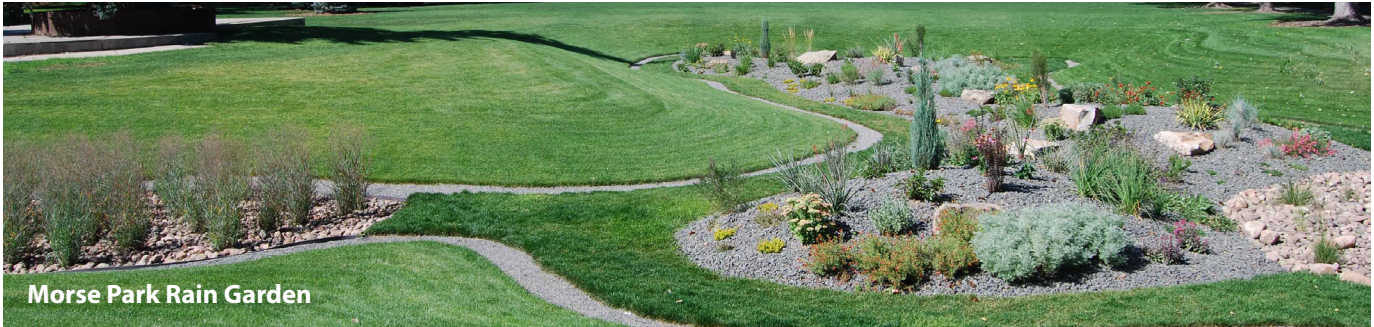
**Protect and manage bodies of water, watersheds, and flood plains.**

### ACTION STEPS

- a. Implement the *Bear Creek Watershed Association Plan*.
- b. Manage flood plains and minimize disturbance of stable, natural flood plains to the greatest extent possible in order to reduce flood risk.
- c. Develop policies and incentives to reestablish natural flow patterns and incorporate these areas as an amenity to the site in new development and redevelopment projects.
- d. Identify potential incentives to encourage developers to dedicate or donate flood plain and floodway areas as drainage easements.
- e. Determine a fee program or a funding mechanism for the purchase of parcels in the flood hazard area.
- f. Develop policies and incentives for the preservation and restoration of riparian and wetland buffers on public and private property to protect and restore hydrologic function.

**GOAL S-W2****Increase responsible and efficient use of water resources.****ACTION STEPS**

- a. Develop and distribute educational information to provide outreach and resources to the Lakewood community that provides water conservation education, water-wise landscaping techniques, and identifies incentives for retrofitting homes for water efficiency.
- b. Review and update development standards to ensure increased water efficiency.
- c. Evaluate opportunities to reduce City water usage for buildings and irrigation.



Morse Park Rain Garden

**GOAL S-W3****Enhance stormwater management and water quality.****ACTION STEPS**

- a. Continue to work cooperatively with front range communities to utilize a regional stormwater quality approach.
- b. Identify and evaluate natural infiltration methods and develop ways to incorporate these methods into the site plan review process.
- c. Develop and distribute educational materials for property owners about stormwater runoff mitigation techniques and pollution prevention.
- d. Provide the public with a list of everyday actions that can protect water quality.

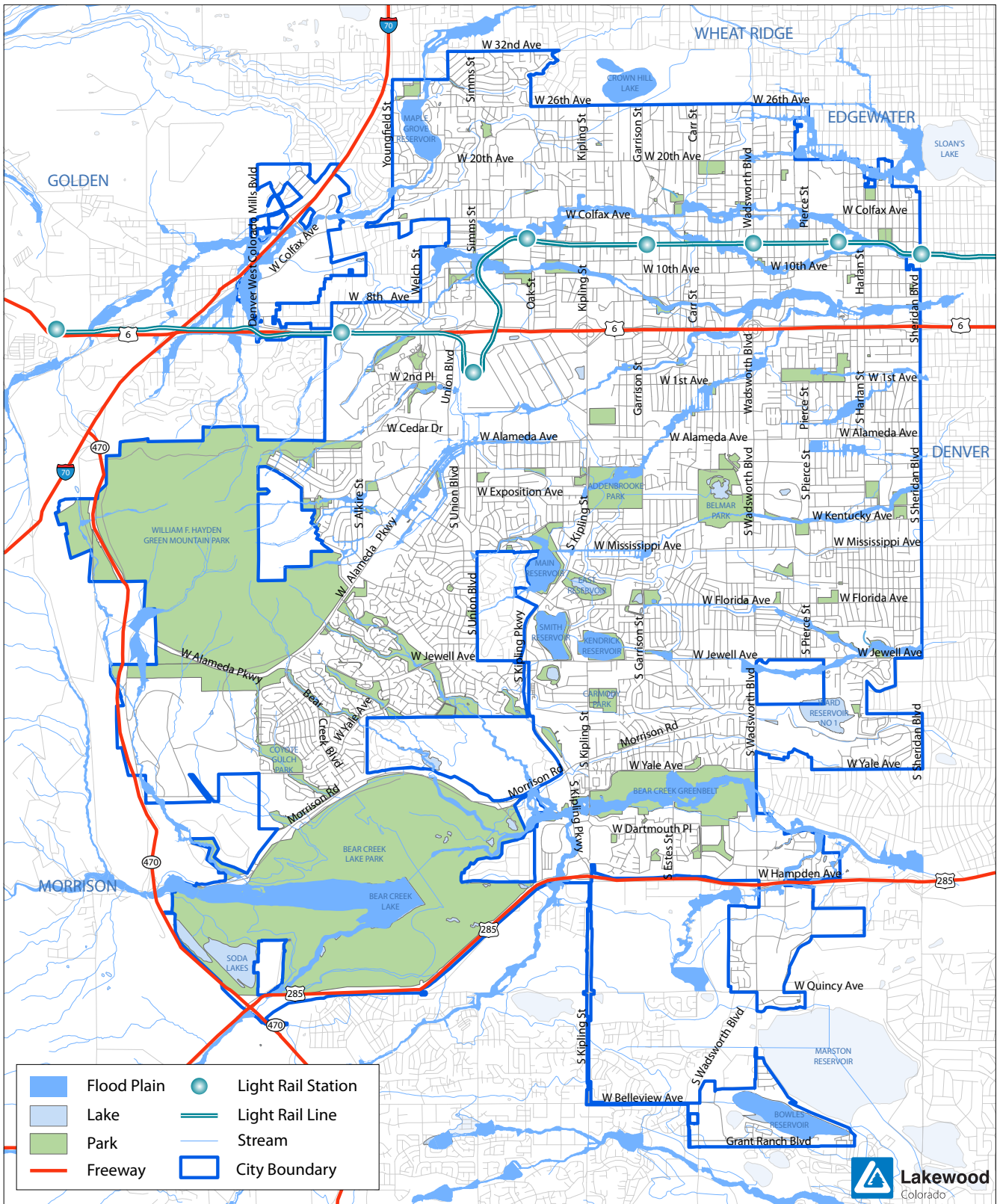
**Use of Green Infrastructure for Managing Stormwater & Water Quality**

Green infrastructure can be used to manage water, protect against flooding and heat, and improve water and air quality using vegetation, soils, and natural processes. It incorporates the natural environment and built systems to contribute to the health and livability of the community.

Examples of green infrastructure include rain gardens, planter boxes, permeable pavements, bioswales, green roofs, the urban tree canopy and street trees, and even land conservation and protection of open spaces and sensitive natural areas. For example, protection of natural open spaces and sensitive lands can reduce water quality issues from stormwater runoff and minimize flooding impacts.

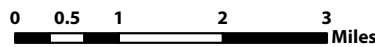
Green infrastructure aids in community resiliency and creates healthier urban environments. Green infrastructure can manage flooding, prepare for droughts, reduce urban heat island effect, lower energy demands in buildings, and can reduce costs associated with managing stormwater.





**Map 7-a**  
Representative Map Only

## Flood Plain



## Overview

Biodiversity refers to the variety of plants, animals, and other living organisms on earth. Diversity of species in each ecosystem is necessary to sustain living things. Ecosystem services generally refer to any direct or indirect benefit an ecosystem provides humans. These benefits may include climate regulation, water purification, soil biodiversity, and other services. Natural resources are those materials humans use to survive or to simply satisfy our needs. As humans, we rely on all of these systems and services.

One of the most alluring qualities about Lakewood is its proximity to, and inclusion of, natural and recreational lands. Lakewood values land management that provides for a combination of spaces for humans and for the natural environment including wildlife habitat. Protecting the natural environment ensures that natural resources, high quality wildlife habitat, and recreation areas remain for generations.

### GOAL S-BN1

**Preserve and restore local ecosystems and ecosystem services and protect biodiversity.**

#### ACTION STEPS

- a. Develop criteria for habitat protection and connectivity corridors to support biologic diversity.
- b. Develop mitigation strategies to enhance and protect natural habitats and natural systems on public and private property.
- c. Implement the Department of Community Resources *Natural Areas Plan* in order to maintain the integrity of ecosystems in the City's public parks and open spaces.
- d. Develop strategies to prevent and mitigate environmental contamination of soils, water, and air from hazardous chemicals.

### Natural Areas & Natural Areas Plan

Natural areas are generally characterized as being largely undeveloped geographic areas having natural vegetation. In the urban context, natural areas are primarily used for recreation activities. Natural areas are found on both public and private land.

Natural areas are important to the urban environment because they are a part of natural ecosystems, provide recreation space for citizens, and sustain biologic diversity in the urban landscape. Preserving and maintaining these natural areas is important for Lakewood because, among their many benefits, these areas represent the native landscape and native heritage of the area.

The Department of Community Resources developed a *Natural Areas Plan* to conserve quality natural open space and wildlife habitat and to provide quality outdoor recreational experiences throughout the city. The plan addresses efficient vegetation and wildlife management in the urban interface and responds to the challenges imposed by the interaction between human recreational activity and natural areas.



## GOAL S-BN2

**Provide and protect green infrastructure, including parks, greenways, wetlands, riparian corridors, and the urban tree canopy.**

### ACTION STEPS

- a. Identify and evaluate opportunities to expand or enhance parks and open space.
- b. Develop strategies to connect parks and open space by greenway recreational corridors.
- c. Evaluate the effectiveness of the existing tree preservation program and identify ways to strengthen its enforcement, penalties, and mitigation strategies for removal or destruction of healthy, mature shade trees.
- d. Develop an educational program to promote drought-resistant, resilient tree planting by property owners and the City.
- e. Create educational materials and determine funding strategies for care and maintenance of the existing healthy tree canopy.
- f. Identify opportunities to protect and restore riparian vegetation and wetlands through the site planning review process or through land acquisition, conservation easements, and other means.

### Natural Areas Restoration

Development and other human alterations to the natural land has led to loss of critical habitats, displacement of native species, and increased degradation of lands. To reduce these impacts, the City has the opportunity to encourage and promote restoration efforts. Restoration of lands to natural areas provides habitat and promotes biodiversity. Additional benefits of natural areas restoration include improved aesthetics, increased property values, environmental health, and well-being of citizens.

Natural area restoration is most often needed because of the impacts of development. Natural area restoration means developing mitigation criteria for development on private or public property which alters natural areas so that these alterations may be offset by on-site or off-site restoration efforts. This means natural areas that has been eliminated or impacted by development may be restored either on the site itself, or may be balanced by restoration of other natural systems.



# ENERGY IN BUILT ENVIRONMENTS

## Overview

A large percentage of energy used in communities is consumed in buildings and in the production of materials used in buildings. Energy is most often generated by the burning of fossil fuels, which releases GHG emissions. Reduction of energy input in buildings reduces GHG emissions and other various harmful impacts to the environment. Lakewood has the opportunity to reduce contributions to GHG emissions and other environmental impacts by promoting energy efficiency and energy production in buildings throughout the city. Energy efficiency lowers energy costs, increases the value of buildings, and reduces impact on the environment. Education and awareness of financial and environmental benefits of energy efficiency can support a cleaner, more sustainable community.

New construction techniques incorporate some level of energy efficiency, but development and building standards that include renewable energy requirements may assist in these sustainability efforts. Existing buildings, however, are the primary culprits of energy consumption and energy waste. According to the *City of Lakewood Greenhouse Gas Inventory (2007)*, buildings in Lakewood account for 44 percent of the city's total emissions, compared to the national average of 38 percent. Retrofitting existing buildings may be the most efficient way to reduce energy consumption and have the greatest impact for the community.

According to the City of Lakewood's *Community Wide Energy Use Assessment*, Lakewood loses approximately \$640 million each year from wasted energy. Increasing energy efficiency in buildings throughout the city can reduce energy use, carbon emissions, water use, solid waste, operating costs, increase building value, and improve conditions for building occupants. Another method for reducing energy use towards buildings is to preserve existing buildings and allow for their reuse in place of razing them for new development.

The City has taken immense strides towards reducing energy use in buildings by retrofitting many of its facilities, including the Lakewood Link Recreation Center, Whitlock Recreation Center, Civic Center buildings, Public Safety Center, Clements Community Center, Fleet Maintenance Center, Green Mountain Recreation Center, The City Greenhouse, Washington Heights Arts Center, and the Heritage Center. Continued energy reduction efforts will contribute to a cleaner, more sustainable city.

## GOAL S-EB1

### Increase resource efficiency in buildings.

#### ACTION STEPS

- a. Develop a comprehensive strategy for energy efficiency.
- b. Assemble educational material for green building practices to assist developers in new development projects or enhancement of existing sites and buildings.
- c. Provide commercial property owners, developers, and homeowners with information about how to enhance resource efficiency of homes and commercial buildings, including retrofitting existing structures.
- d. Determine potential incentives for enhancement of resource efficiency of homes and commercial buildings, including retrofitting existing structures.

## GOAL S-EB2

### Increase energy provided from renewable energy sources.

#### ACTION STEPS

- a. Research the feasibility of integrating renewable energy requirements into development and building standards.
- b. Evaluate possible incentives for the use of renewable energy resources in private development.
- c. Determine the feasibility and funding options for the installation of renewable energy facilities throughout the city, and facilitate and support the use of, and access to, renewable energy sources for community-wide usage.
- d. Create goals and strategies to increase the use of renewable energy sources for government energy needs.
- e. Every two years, review emerging technologies and delivery methods for renewable energy to ensure equitable access for all residents.

### Solar Friendly Community

In March of 2013, the City of Lakewood was recognized for its sustainability efforts in supporting solar installations. The City earned a Silver Level Certification as a Solar Friendly Community for making it easier, faster, and more affordable for residents and businesses to install solar collection systems. The City's adopted policies reduced the amount of time required for permitting and inspection for the installation of rooftop solar systems, making it more affordable to go solar.



Photovoltaic Panel System, Parking Structure in Belmar

### Community Solar Garden

A solar garden is a shared solar array with grid-connected users within a community.

The City of Lakewood has purchased 2,912 panels from two solar arrays in Jefferson County for a 20-year period. Energy produced by the panels will be put into the power grid, giving Lakewood credits on its electric bill.

Utilizing panels from solar arrays will reduce both the city's energy costs and emissions.



LEED® Gold Certified Office Building at Garrison Station

# WASTE

## Overview

Waste prevention and materials management is a significant component of a sustainable city. The generation of energy required to manufacture, distribute, and utilize goods and consumables produces greenhouse gas (GHG) emissions that negatively impact our climate. Additionally, decomposition of waste produces methane — a greenhouse gas — which contributes significantly to emissions. These impacts can be mitigated by what we choose to purchase, how we use these products, and how we choose to dispose of them.

The most preferred mechanism for reducing waste output and associated greenhouse gas emissions is to use less. When that is not an option, waste output may be reduced by reusing, recycling, and composting products. Since energy is used to extract and process materials for production, recycling most often uses less energy than processing raw materials and, in turn, reduces GHG emissions and other environmental impacts. The City of Lakewood ensures that recycling options are available to residents through the Lakewood Recycling Center and support for the Rooney Road Recycling Center. The Lakewood Recycling Center provides containers to sort recyclables. The Rooney Road Recycling Center provides residents of Jefferson County a place to recycle hard-to-recycle items and hazardous waste, including household chemicals, electronic items, solvents, and batteries.

### GOAL S-WA1

**Decrease the amount of waste generated.**

#### ACTION STEPS

- a. Create guidelines and resources for city and private events to maximize resource recovery and longevity of products in order to work toward a culture of zero waste.
- b. Annually review and update educational and promotional materials to share with the Lakewood community to encourage environmentally responsible purchasing.
- c. Identify and evaluate strategies to reduce or eliminate the use of single use bags in retail and grocery stores.

### Zero Waste

Zero Waste is a whole systems approach to the flow of resources and waste through society. Rather than manage waste, the zero waste concept encourages people to manage resources and eliminate waste. In a zero waste approach consideration is given to the source of the materials required to create a product, the impacts of the manufacturing and distribution process, the longevity of the life of the product, and how the product materials can be reused to create something new. In simplest terms, zero waste means responsible production, waste reduction, reuse, and recycling.



## GOAL S-WA2

### Increase recycling, composting, and municipal solid waste disposal education.

#### ACTION STEPS

- Create and promote the City's online resource guide and develop informational handouts for citizens on the concept of zero waste, including recycling hard-to-recycle items, yard waste disposal, and composting services within and near the City.
- Develop educational material about small-scale composting for residents and businesses.



## GOAL S-WA3

### Increase waste diversion rates.

#### ACTION STEPS

- Evaluate the feasibility of providing recycling receptacles in public places throughout the city.
- Identify and evaluate ways to establish diversion targets for construction and demolition waste.
- Ensure that compost services and facilities are provided to residents and businesses for composting organic waste, including yard waste.
- Evaluate options to more efficiently manage trash hauling throughout the city, including implementing a variable-rate waste diversion system for residents.
- Determine user friendly, convenient recycling options for city residents and businesses, such as single-stream recycling, a materials recovery facility, and others.
- Create guidelines and resources for the provision of recycling and composting facilities at events held in public buildings or parks.
- Update the Zoning Ordinance to require recycling infrastructure as a part of site development in new commercial, mixed-use, and multifamily development.

**GOAL S-WA4****Support proper disposal of hazardous materials and hard-to-recycle items.****ACTION STEPS**

- a. Identify and evaluate opportunities to improve existing services and provide additional services that allow residents to dispose of hazardous materials and hard-to-recycle items including household hazardous waste, used oil, paint, and other materials.
- b. Identify and assess gaps in available recycling and disposal services for hard-to-recycle items and determine strategies to close those gaps.

**Materials Recovery Facility (MRF)**

One strategy that can be used to increase waste diversion rates is the use of a Materials Recovery Facility (MRF). A MRF is a materials recycling facility where large amounts of recyclables are sorted and prepared for market. These facilities help to increase the amount of recycled materials recovered from the waste stream. MRFs can be single-stream, where recyclables are mixed, or dual stream, where recyclables are separated by type of material. Recyclables are separated through manual and/or mechanical sorting techniques. These recycled materials are then processed to meet established requirements for end-markets. The recyclables are shipped to market and made into recycled products.