



City of Ypsilanti
SUSTAINABILITY COMMISSION MEETING
One South Huron Street
Ypsilanti, Michigan 48197

Monday, April 8, 2019
7:00 P.M.

I. CALL TO ORDER

II. ROLL CALL

Keith Michalowski	P	A	Nancy Heine	P	A
Emily Drennen	P	A	Thomas McKee	P	A
Bryan Foley	P	A	Katy Greenwald	P	A
Brett Zeuner	P	A	Julia Bayha	P	A
Christian Cannon	P	A			

III. AGENDA APPROVAL

IV. PRESENTATIONS

V. AUDIENCE PARTICIPATION

VI. CONSENT AGENDA

- A. Approval of March 11, 2019 minutes [1](#)

VII. RESOLUTIONS/MOTIONS/DISCUSSIONS

- A. Sustainability Plan discussion [1](#) [2](#) [3](#) [4](#) [5](#)

VIII. COMMUNICATIONS

- A. Solar installation at Perry Elementary update
B. Earth Day 2019 event discussion

IX. COMMISSIONER REPORTS

- A. Commissioner Heine
B. Commissioner Bayha
C. Commissioner Drennen
D. Commissioner Cannon
E. Commissioner Foley
F. Commissioner Greenwald
G. Commissioner Zeuner
H. Commissioner McKee
I. Commissioner Bayha
J. Commissioner Michalowski

X. AUDIENCE PARTICIPATION

XI. PROPOSED BUSINESS

XII. NEXT MEETING DATE

Monday, May 13, 2019

XIII. ADJOURNMENT

Action Minutes

City of Ypsilanti Sustainability Commission

Regular Meeting City Hall Council Chambers – 1 South Huron St. Ypsilanti, MI 48197

Monday, March 11, 2019 – 7:00 p.m.

I. CALL TO ORDER: 7:01pm

II. ROLL CALL:

Commissioner Michalowski	Present
Commissioner Drennen	Present
Commissioner Heine	Present
Commissioner Zeuner	Absent
Commissioner Bayha	Present
Commissioner Foley	Present
Commissioner McKee	Present
Commissioner Greenwald	Absent
Commissioner Cannon	Absent

Also Present: Council Liaison Steve Wilcoxen
Andrew Hellenga, Acting City Clerk

III. AGENDA APPROVAL:
Bayha (Second Drennen) moved to approve the Agenda as submitted.

Voice Vote: Unanimous

Motion: Carried

IV. PRESENTATIONS:

V. AUDIENCE PARTICIPATION

Brian Gieringer: Voiced concern regarding lack of kiosks to distribute information to the public. He was told this issue was in the purview of the Sustainability Commission.

Foley (Second Drennen) moved to approve recommend that the request be forwarded to the Downtown Development Authority (DDA).

Voice Vote: Unanimous

Motion: Carried

VI. CONSENT AGENDA

A. Approval of February 11, 2019 Minutes

Heine (Second Bayha) moved to approve the Consent Agenda as follows:

Approval of the February 11, 2019 Minutes as submitted.

Voice Vote: Unanimous

Motion: Carried

VII. RESOLUTIONS/MOTIONS/DISCUSSIONS

A. Resolution 2019-03-001 – Washtenaw Regional Resource Management Authority

Commissioner Heine: Not in favor of the authority based on potential effect on Department of Public Services (DPS) employees. If the Commission approves a resolution in support of the Authority it would need to be explicit in that it would not result in the termination of any employee.

Commissioner Foley: Agreed, and stated he spoke with DPS employees that were not in favor of the city entering into this authority.

Commissioner McKee: Stated the resolution would need to identify the fact the union contract would stay intact.

Theo Eggermont, Public Works Manager of the Office of the Water Resources Commissioner: The city has the potential to opt into the authority in the future. However, the board would need to vote to allow for new membership. He added the Articles of Incorporation do not dictate collective bargaining, individual members still control employee contracts.

Council Member Wilcoxon: Believes the Articles of Incorporation will be on a Council agenda within the next couple of meetings.

[Discussion ensued regarding how to express support for the authority yet at the same time protect city employee jobs]

Bayha (Second Foley) moved to table Resolution No. 2019-03-001 until later in the meeting.

Voice Vote: Unanimous

Motion: Carried

B. Resolution 2019-02-001 – Peninsular Park Dam *REVISTED*

Commissioner Michalowski: Stated there was an issue with the title when this resolution was forwarded to Council. The resolution was amended removing the title.

McKee (Second Bayha) moved to approve Revised Resolution 2019-02-001, and forward to Council for consideration.

Voice Vote: Unanimous

Motion: Carried

C. Resolution 2018-08-002 – Public Recycling Bins *REVISTED*

Commissioner Michalowski: Stated the city would greatly benefit if recycling bins were installed in the down town.

No Action Taken

VIII. LIAISON REPORTS

- A. Sustainability Plan Committee - None
- B. MGC Challenge Subcommittee – Commissioner Heine stated the subcommittee is examining metrics, and are possibly at 50%. The subcommittee is pushing to reach 100%.
 - MGC metrics data collection
- C. Outreach Committee
 - Earth Day event – Commissioner Bayha stated she met with owners of Cultivate and asked the Commission to share the event on their social media pages.
 - Solar installation student project
 - Recycling education video campaign
- D. Master Plan: Housing Affordability & Access Committee – Commissioner Foley stated a working session was held to discuss land use zoning, senior housing, and advertising techniques. There was also discussion regarding housing stock and its effect on affordability.
- E. EMU Sustainability Commission

Bayha (Second McKee) moved to extend the meeting until 9:15 p.m.

Voice Vote: Unanimous

Motion: Carried

Heine (Second Foley) moved to remove Resolution No. 2019-03-001 from the table.

Voice Vote: Unanimous

Motion: Carried

Foley (Second Drennen) moved to extend the meeting until 9:30 p.m.

Voice Vote: Unanimous

Motion: Carried

Foley (Second Drennen) moved to amend Resolution No. 2019-03-001.

Voice Vote: Unanimous

Motion: Carried

Position Statement

RE: Washtenaw Regional Resource Management Authority (As Amended)

WHEREAS, the Washtenaw Regional Resource Management Authority (WRRMA) has invited the City of Ypsilanti to join the Board of Trustees; and

WHEREAS, in partnership with our neighbors Ann Arbor Township, the City of Ann Arbor, the City of Dexter, Pittsfield Charter Township, the City of Saline, the Township of Scio, and the Charter Township of Ypsilanti; and

WHEREAS, the Climate Action Plan directs the City of Ypsilanti to seek an increase in recycling rates; and

WHEREAS, the Commission also has a strong desire to increase the quantity and quality of the recycling stream as well as a desire to move closer to zero waste over the long-term;

WHEREAS, the Commission supports the WRRMA goals of community education and outreach;

NOW THEREFORE the Sustainability Commission expresses the following concerns about Ypsilanti joining the WRRMA Board of Trustees:

- 1. That membership will not decrease the quality and quantity of existing services; and**
- 2. That membership will lead to no loss of jobs within the DPW; and**
- 3. There will be no contracted job duties that will be removed; and**
- 4. Any additional hiring within the City of Ypsilanti as a result of the WRRMA will be AFSCME union positions; and**

5. There will be no outsourcing of positions within the DPW; and
6. That the Constituent Member will vote as directed by City Council

Bayha (Second Heine) moved to approve Resolution No. 2019-03-001 as amended.

Voice Vote: Unanimous

Motion: Carried

- IX. COMMUNICATIONS**
- X. AUDIENCE PARTICIPATION**
- XI. PROPOSED BUSINESS**
- XII. NEXT MEETING DATE:**
Monday, April 8, 2019
- XIII. ADJOURNMENT:** 9:30pm

Foley (second Drennen) moved to adjourn the meeting of the Sustainability Commission.

Voice Vote: Unanimous

Motion: Carried

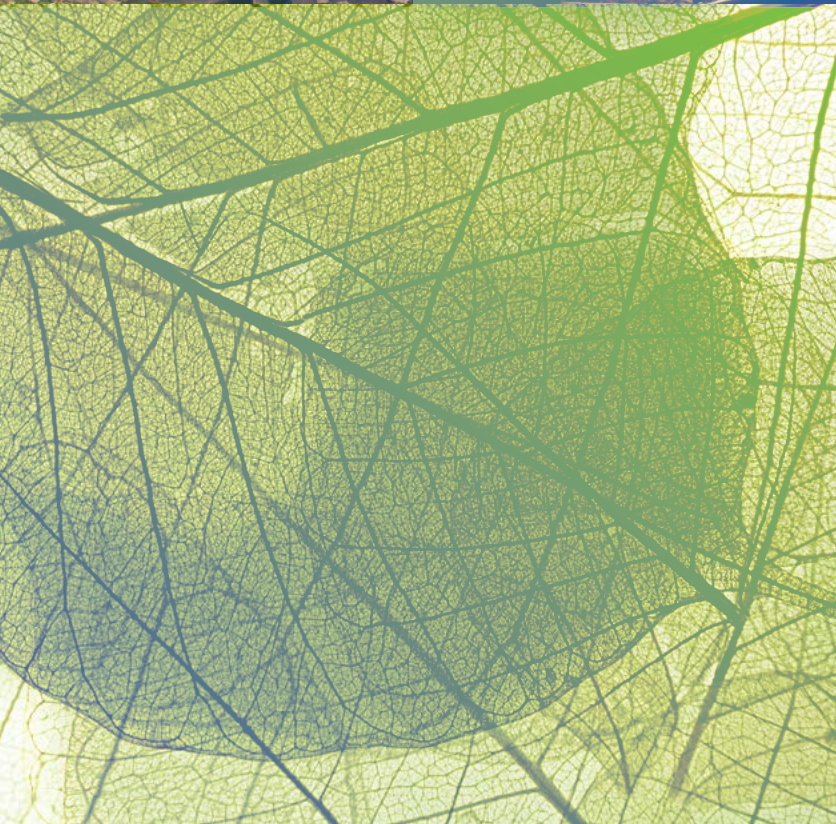


CITY OF LAKEWOOD

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

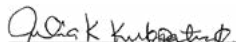
FINDINGS OF FACT AND ACTION

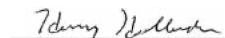
The Planning Commission finds that:

- 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.

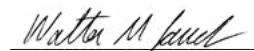

Julia Kirkpatrick, Chair


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.

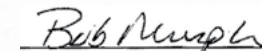
ATTEST:




Margy Greer, City Clerk

APPROVED AS TO FORM:


Tim Cox, City Attorney


Bob Murphy, Mayor

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 Hasford

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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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
Mayor

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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.

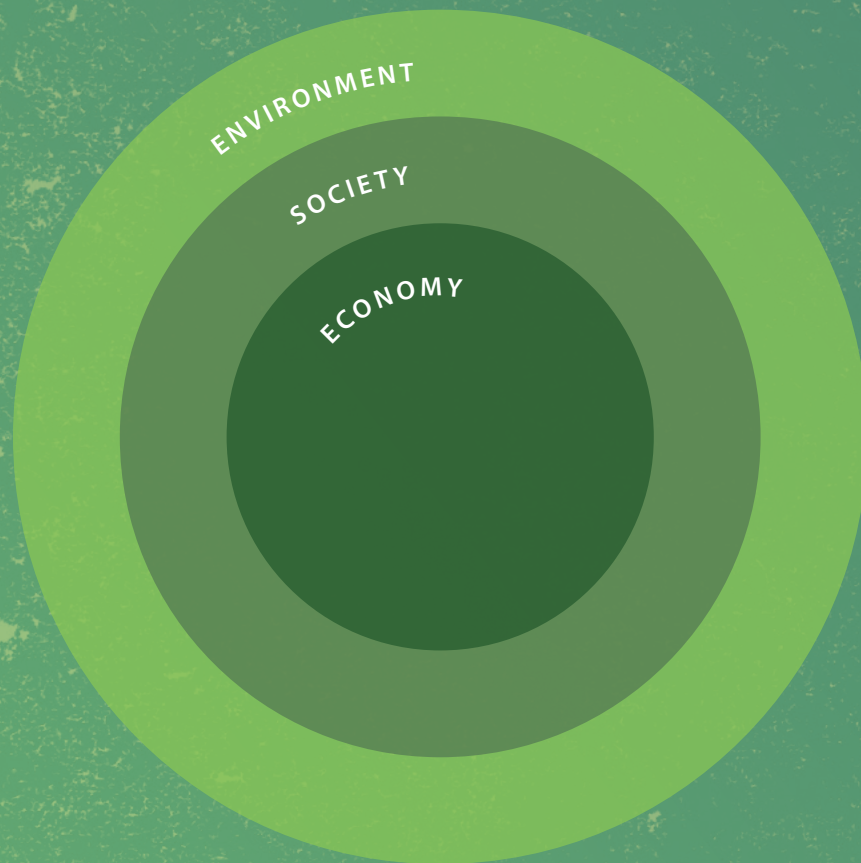
In Lakewood, the term sustainability made its first appearance in the 2003 Comprehensive Plan, which included a chapter on Community Sustainability. Since then, support for sustainability has grown throughout the Lakewood community and City organization:

- 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.

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. ■

SUSTAINABILITY PLAN STRUCTURE



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

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

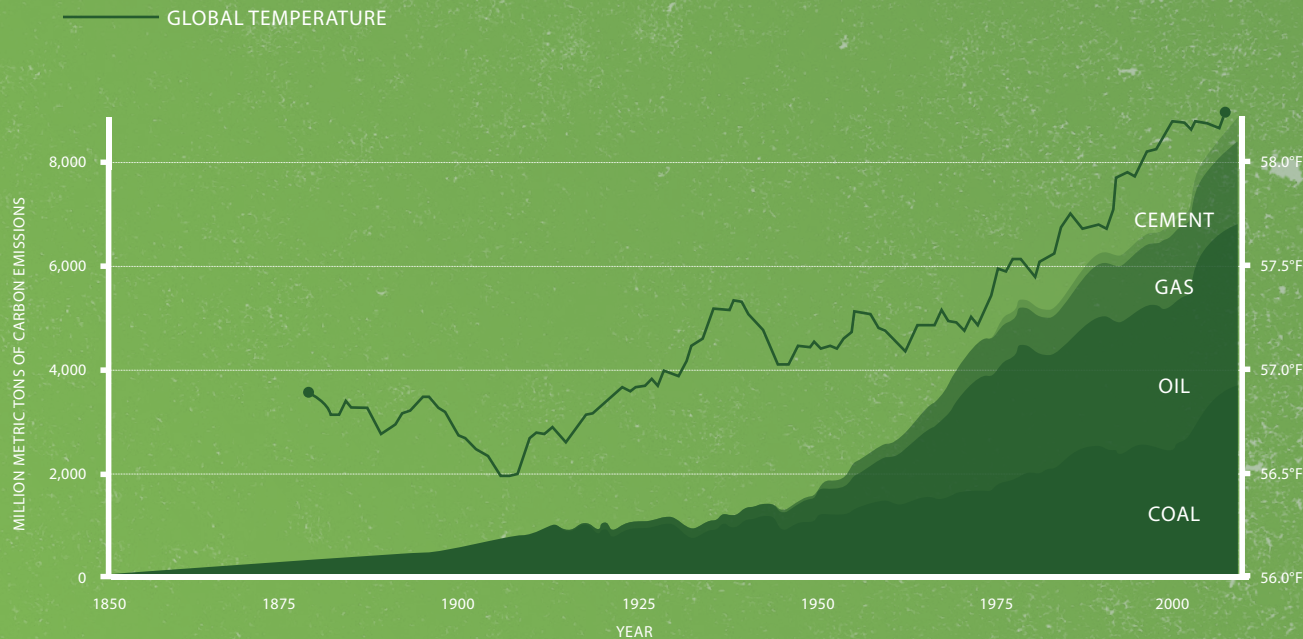
damages to forests and increasing the risk of wildfires. These developments are all consistent with scientific projections of the impacts of climate change, and these impacts are expected to become more severe as the climate continues to warm. This is particularly true if future emissions of greenhouse 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.

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

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. ■

CLIMATE CHANGE AND ADAPTATION

GOALS

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

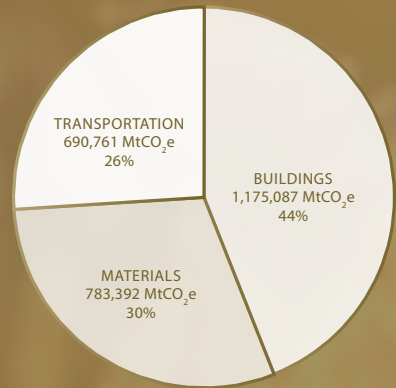
TARGETS

- 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 ₂ E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	2,646,240	100%

2007 BASELINE EMISSION BREAKDOWN



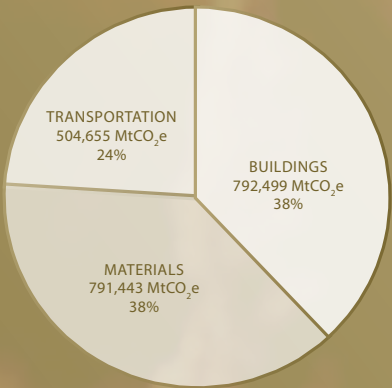
2025 BUSINESS AS USUAL (BAU)				
EMISSIONS BY SECTOR – MT CO ₂ E			CHANGE	
BUILDINGS	1,053,368	42%	–121,719	
MATERIALS	903,600	36%	+120,209	
TRANSPORTATION	539,165	22%	–151,596	
TOTAL GHG	2,496,133	100%	–153,107	

BUSINESS AS USUAL (BAU)

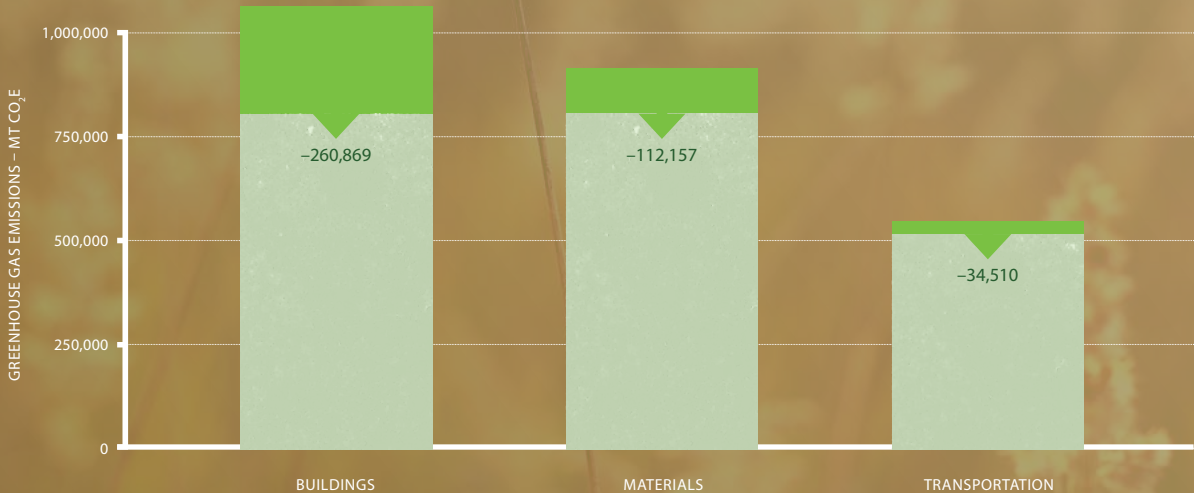
The term “business as usual (BAU)” is an emission value defined in a future year to represent emissions that would occur if an attempt had not been made to reduce emissions. The BAU considers changes to population and changes in emission factors. While the City of Lakewood’s population and material sector 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 AFTER STRATEGIES ARE IMPLEMENTED				
EMISSIONS BY SECTOR – MT CO ₂ E			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	

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 (CO₂), have when released into the atmosphere. Referred to as greenhouse gases (GHG), CO₂, methane, and several other gases, act

Beginning with the Industrial Revolution in the late 1700s, human civilization has increasingly emitted CO₂ and other greenhouse gases into the atmosphere. Using historic data from tree rings, ice cores, and coral reefs, scientists have determined that preindustrial

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

Green house gases, CO₂, methane, and several other gases, act like a blanket in the lower levels of Earth's atmosphere, causing the greenhouse gas effect.

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.

levels of CO₂ in the atmosphere were around 275 parts per million (ppm). Currently levels of CO₂ 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

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 CO₂, strongly influencing weather patterns across continents. As heat-trapping gases, primarily CO₂, 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.

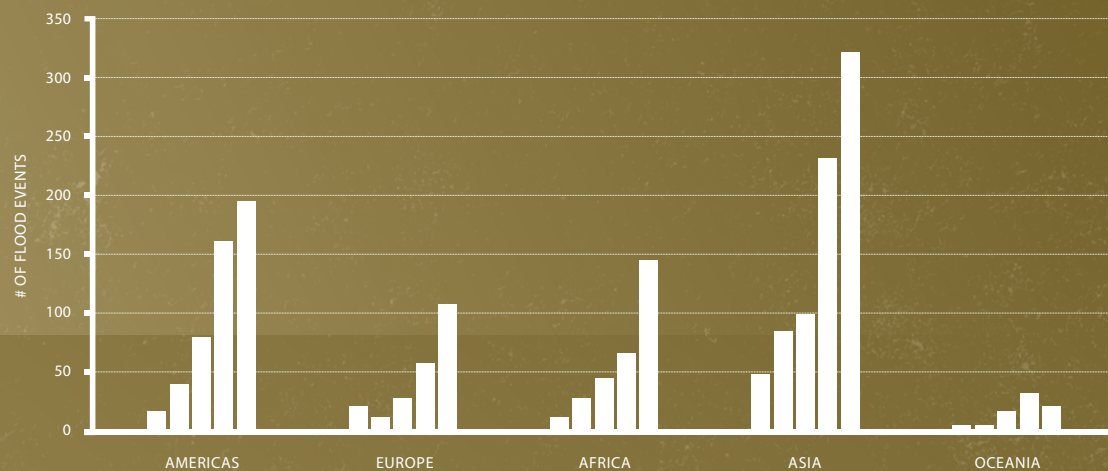
³ U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov <http://nca2014.globalchange.gov>.

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?

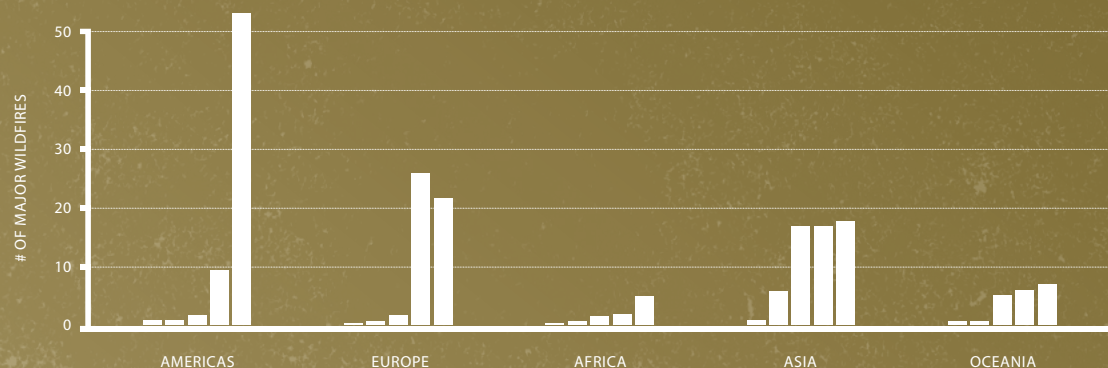
NUMBER OF FLOOD EVENTS 1950-2000

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 CO₂, the U.S. government developed the "Social

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

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.

A PATHWAY FORWARD

As GHG emissions increase and changes to climate systems escalate, so

SOCIAL COST OF CARBON (SCC)

Monetizes damages associated with CO₂ emissions (see p. 28).

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 crit-

ical 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

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 com-

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

munity 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 2010¹⁴ 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 CO₂

emissions would still lead to increased average annual temperatures of 2.5 F by 2025 and 4 F by 2050.¹⁶

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.

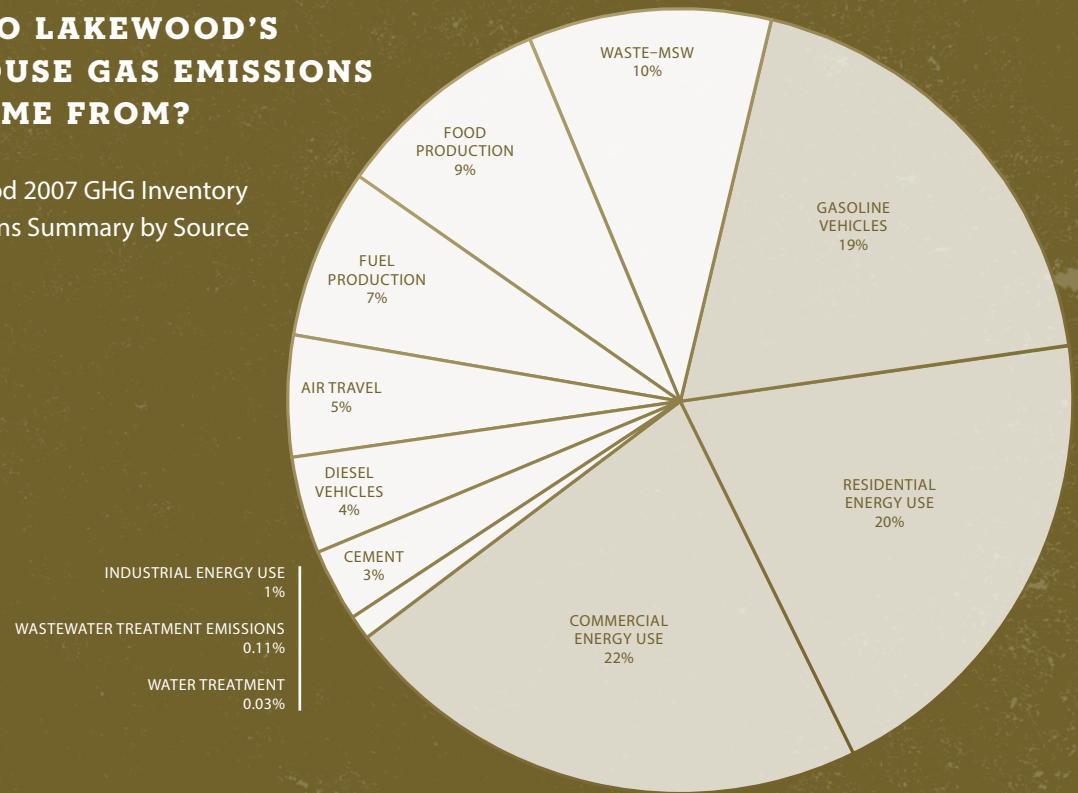
¹⁵ U.S. Global Change Research Program. "2014 National Climate Assessment." GlobalChange.gov <http://nca2014.globalchange.gov>.

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 CO₂ equivalent (MtCO₂e). 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>.

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

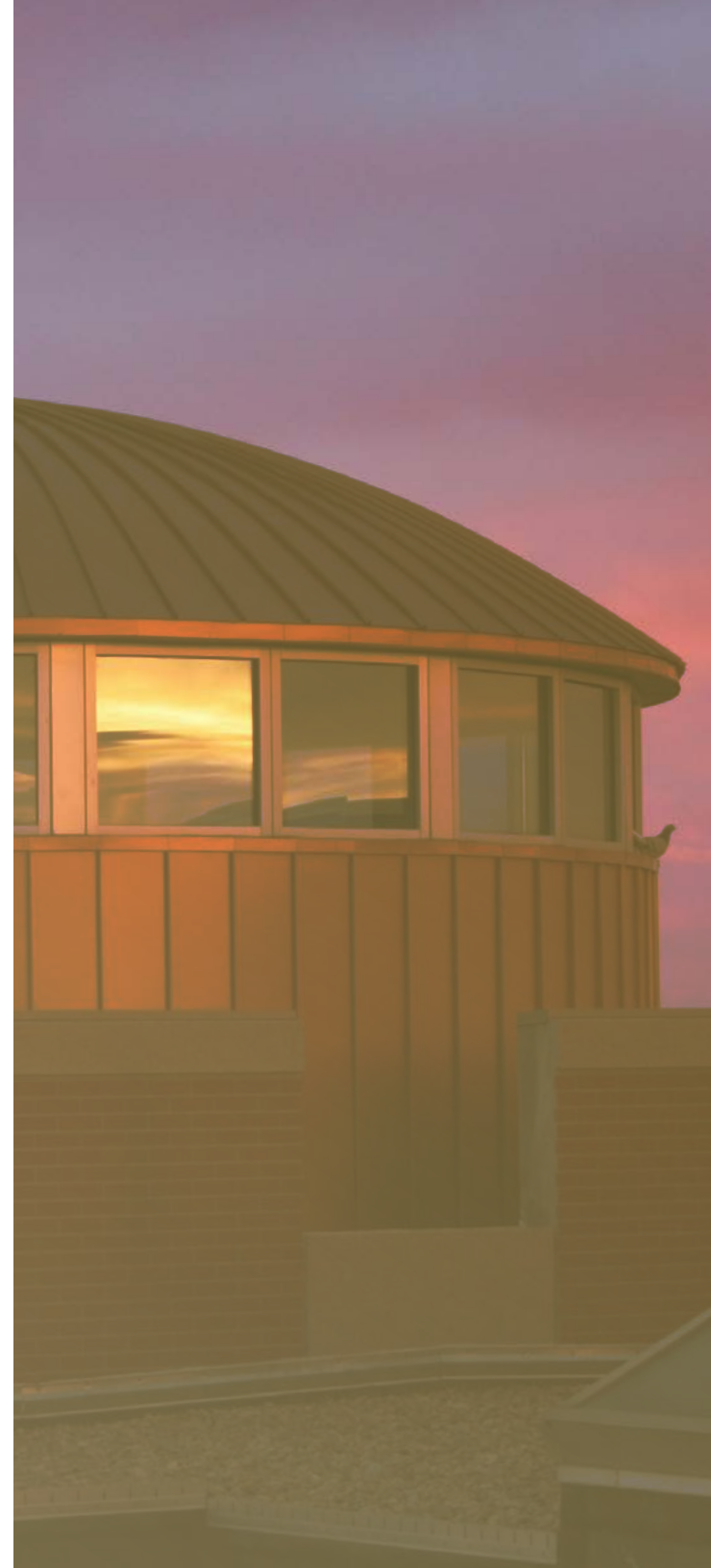
Utilize emission reduction assessments to prioritize and implement greenhouse gas reduction strategies. Specifically:

- 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.



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 (CO₂) 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 CO₂. 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 CO₂.

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.





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

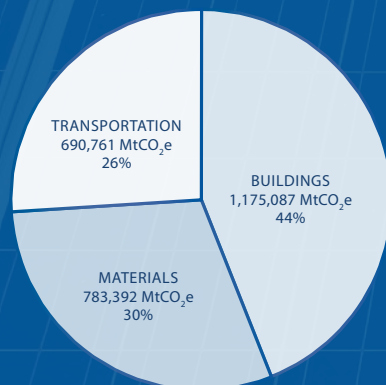
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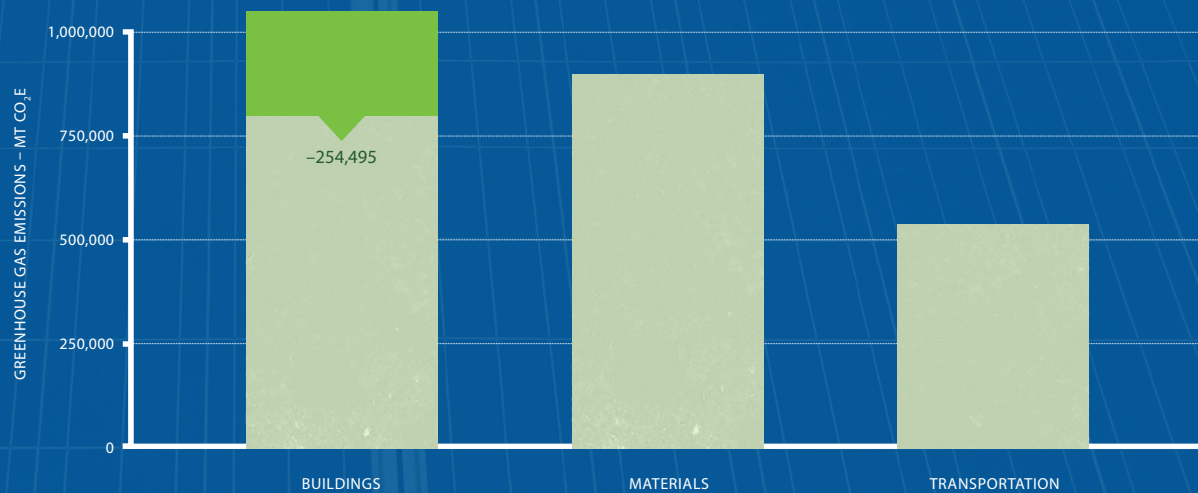
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EMISSIONS BY SECTOR – MT CO ₂ E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	2,496,133	100%	–153,107

2025 AFTER ENERGY, WATER, AND THE BUILT ENVIRONMENT STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO ₂ E			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 CO₂ 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 percent³ 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 greenhouse 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,

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.

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 wa-

ter demand. In Colorado, even with the completion of proposed water projects, projected 2050 shortfalls could total more than 500,000 acre-feet statewide.⁵

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.

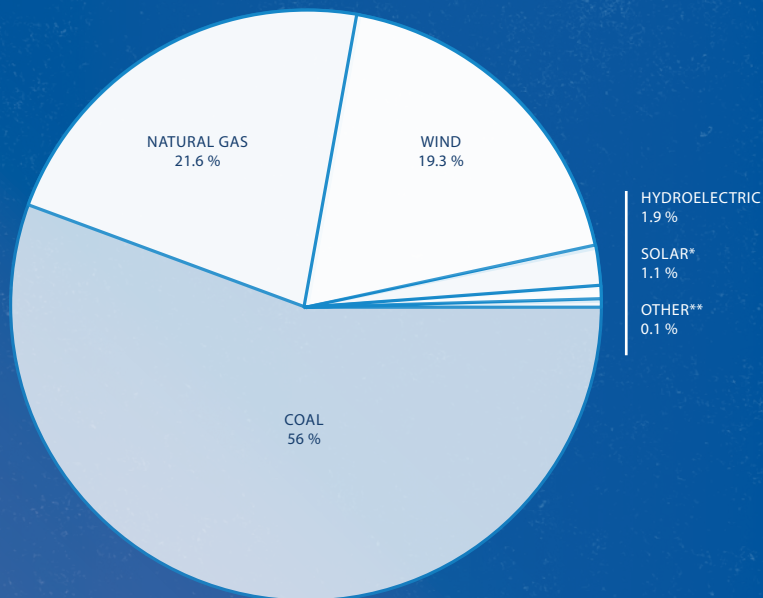
³ U.S. Energy Information Administration. Annual Energy Outlook. Washington DC: U.S. Energy Information Administration.

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 much⁷ 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://www.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

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

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 percent¹⁰ 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.

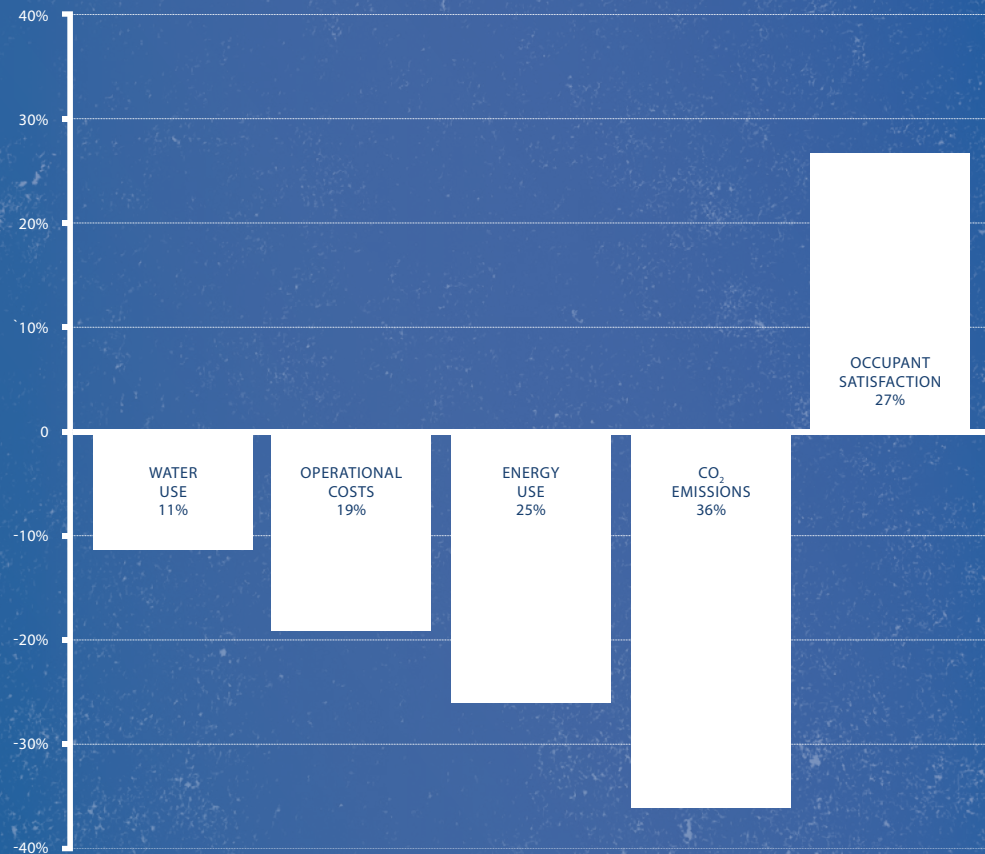
A sustainable built environment goes beyond buildings to encompass the entire building site. As we continue to develop and redevelop, we must do so in a way that honors and enhances our natural environment. This includes considering stormwater drainage, biodiversity, and microclimate regulation in order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

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>.



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. ■



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

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,

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

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

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. ■

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.

LEARN MORE ABOUT DISTRICT-SCALE SUSTAINABILITY:

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

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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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

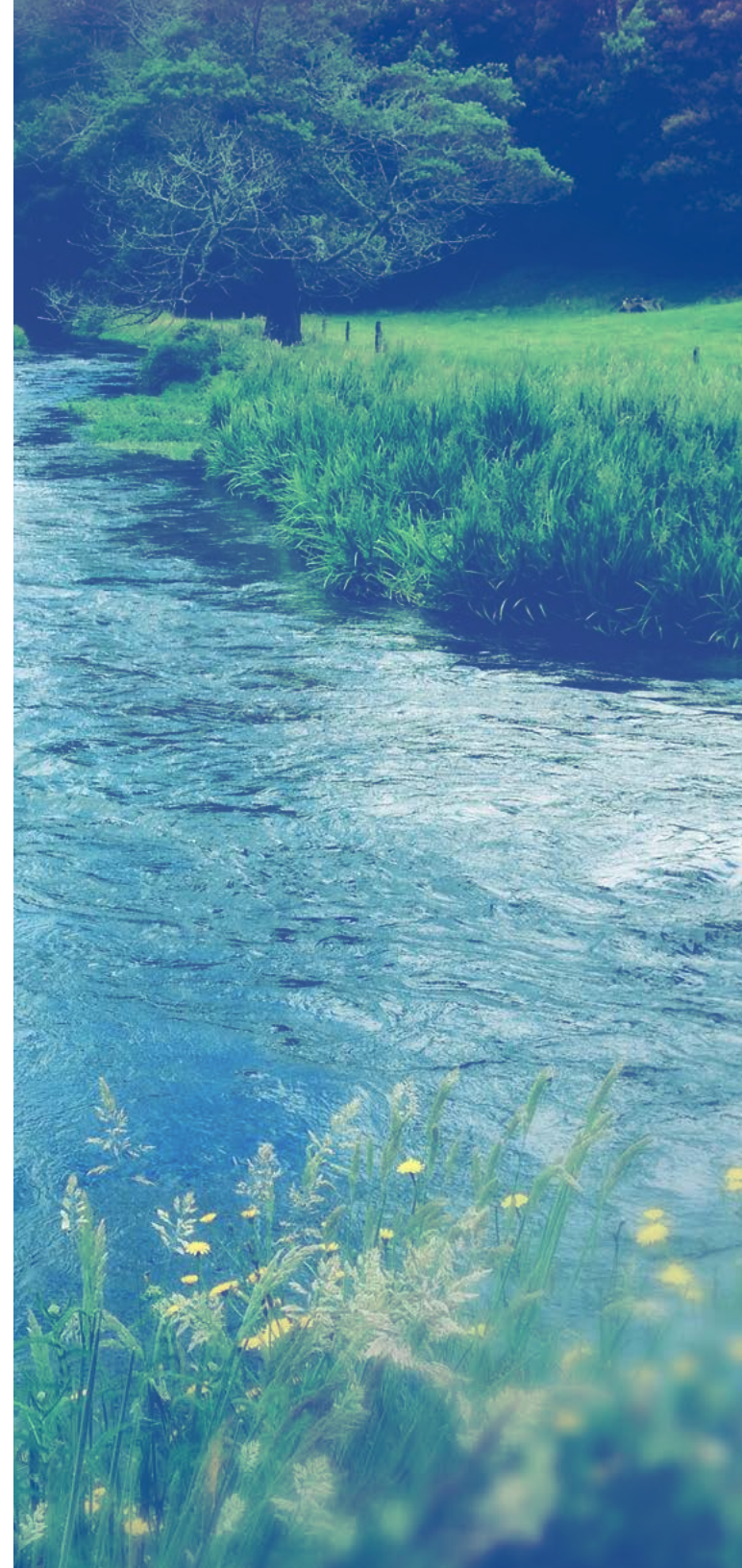
† Baseline: 2007

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.



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

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

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

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.

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. In fact, if all buildings in the U.S. participated, over 18 million metric tons of CO₂e could be saved each year. ■

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.

LEARN MORE ABOUT ENERGY STAR PORTFOLIO MANAGER:

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

* 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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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

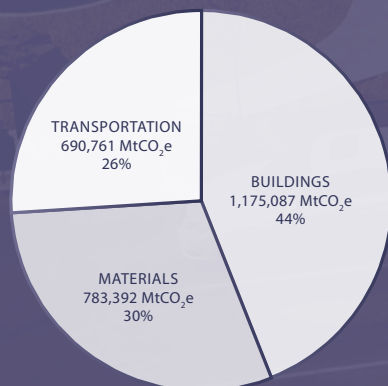
SUSTAINABLE ECONOMY: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

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

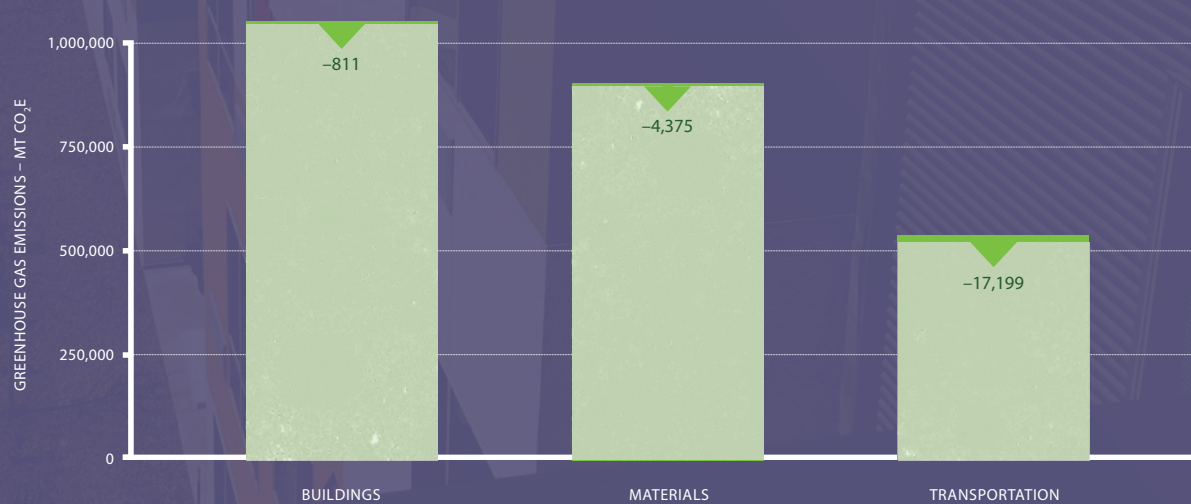
2025 BUSINESS AS USUAL (BAU)				
EMISSIONS BY SECTOR – MT CO ₂ E				CHANGE
BUILDINGS	1,053,368	42%		– 121,719
MATERIALS	903,600	36%		+ 120,209
TRANSPORTATION	539,165	22%		– 151,596
TOTAL GHG	2,496,133	100%		–153,107

2025 AFTER SUSTAINABLE ECONOMY STRATEGIES ARE IMPLEMENTED				
EMISSIONS BY SECTOR – MT CO ₂ E				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

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

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

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?

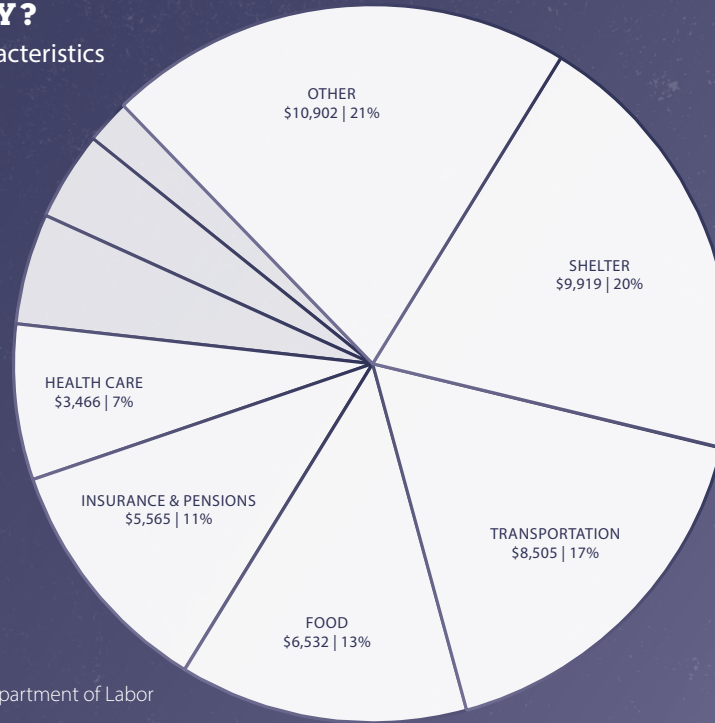
Average annual expenditures and characteristics of all consumer units, 2012.

ENTERTAINMENT	\$2,573 5%
HOUSEHOLD ENERGY FUELS	\$1,923 4%
READING & EDUCATION	\$1,243 2%

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.

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.

“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

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>.



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. ■



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 crowd-funding 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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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.

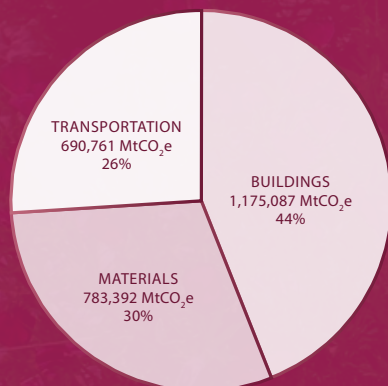
ZERO WASTE: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

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

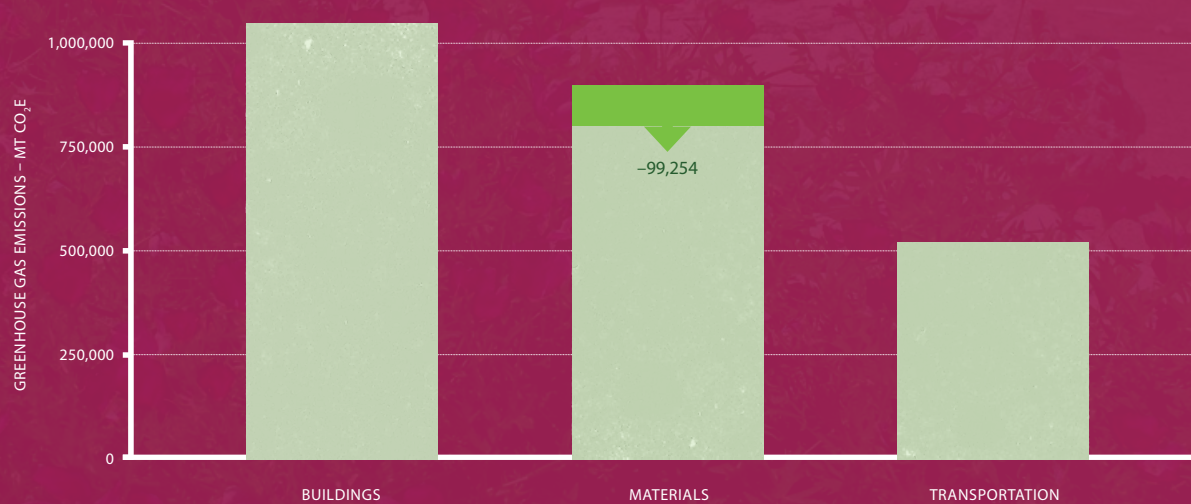
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO ₂ E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	2,496,133	100%	–153,107

2025 AFTER ZERO WASTE STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO ₂ E			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.

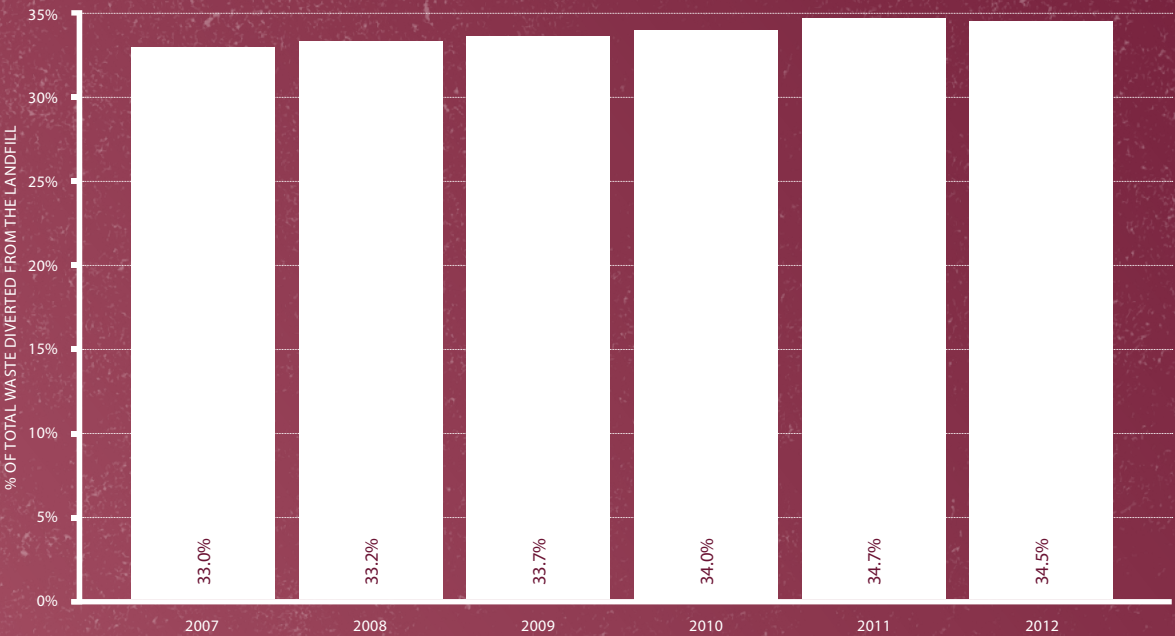
¹ Eco-Cycle. “Zero Waste: The Choice for a Sustainable Community.” 2012. <http://www.ecocycle.org/zerowaste>.

² Colorado Department of Public Health and Environment. “Annual Solid Waste Diversion Totals 2007–2013.” <https://www.colorado.gov/pacific/cdphe/swreports>.

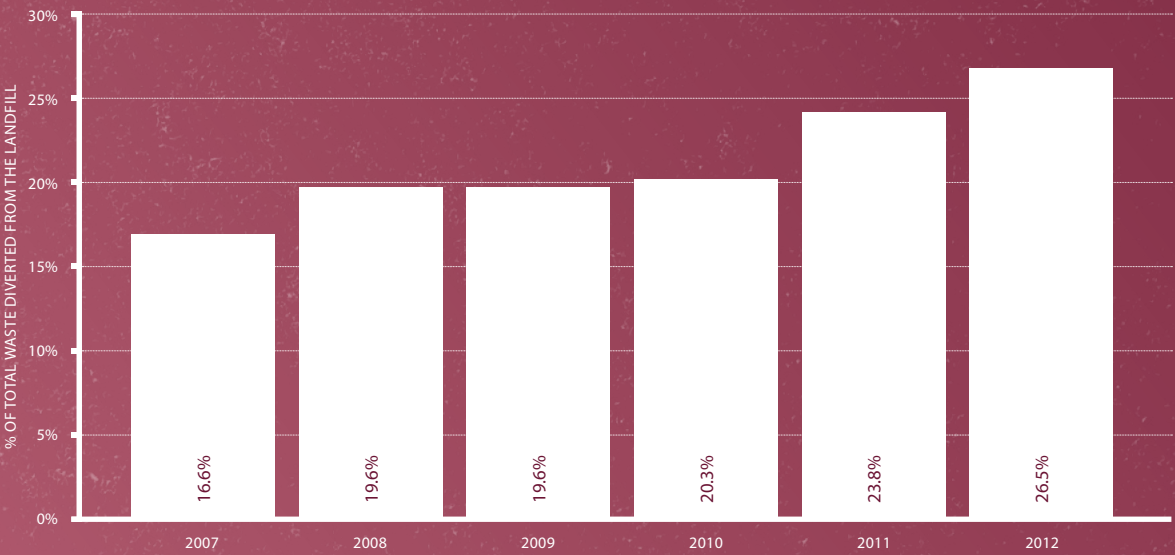
³ U.S. Environmental Protection Agency. “Municipal Solid Waste (MSW) in the United States: Facts and Figures.” Last Updated: February 28, 2014. <http://www.epa.gov/osw/nonhaz/municipal/msw99.htm>.

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

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.

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.

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



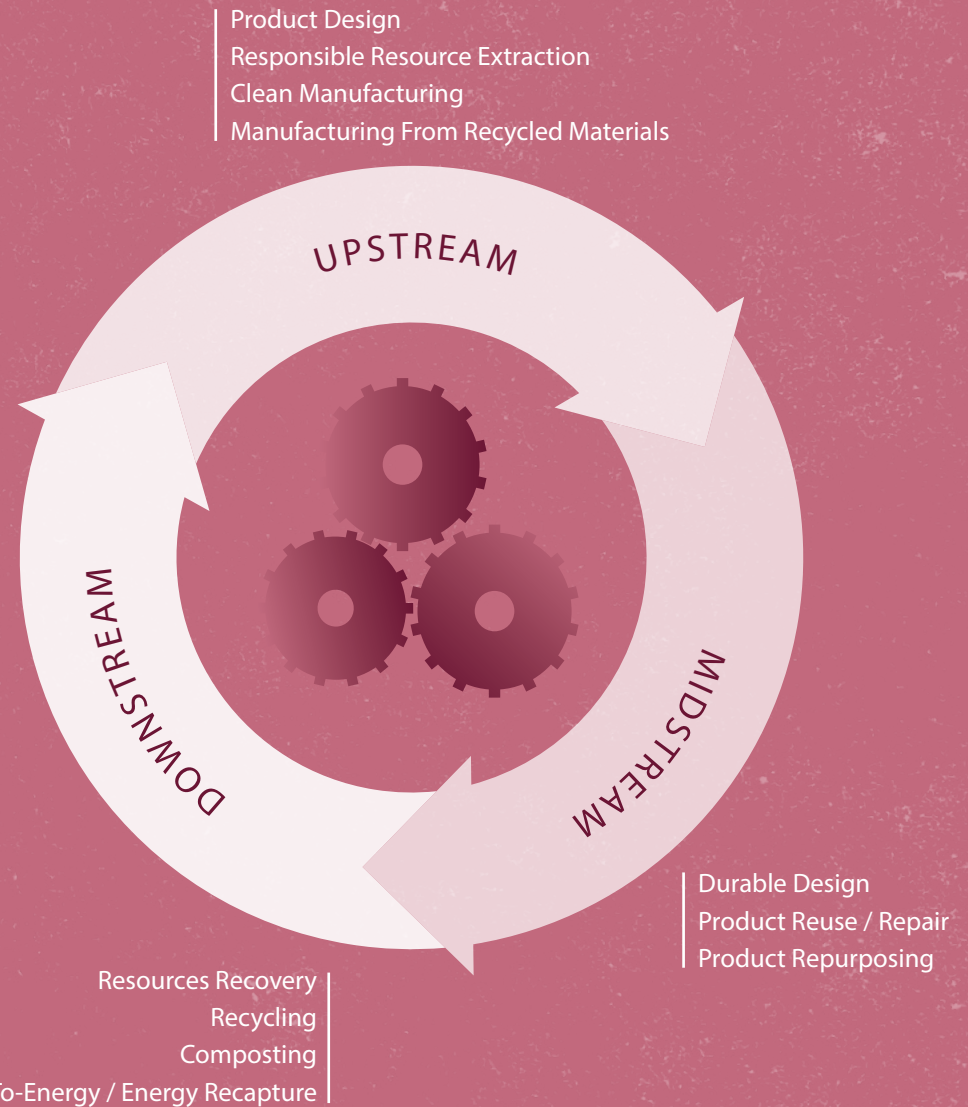
ZERO WASTE OUTPUTS

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

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



ZERO WASTE CYCLE



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

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.



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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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 fewer

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/conservation/tools/payt>

<http://www.epa.gov/osw/conservation/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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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 MtCO₂e Greenhouse Gas Emissions
  ~10,000 MtCO₂e 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

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.

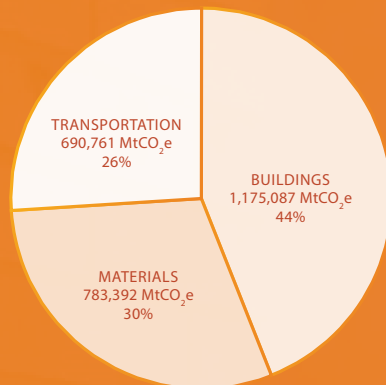
TARGETS

- Increase the 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.
- 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

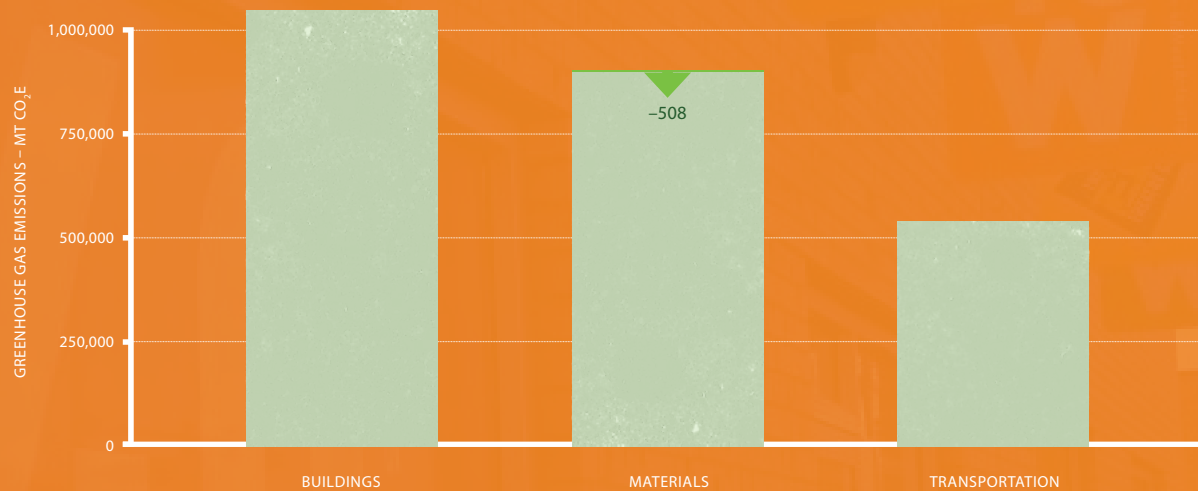
BASELINE		
EMISSIONS BY SECTOR – MT CO ₂ E		
BUILDINGS	1,175,087	44%
MATERIALS	783,392	30%
TRANSPORTATION	690,761	26%
TOTAL GHG	2,649,240	100%

2007 BASELINE EMISSION BREAKDOWN



2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO ₂ E			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

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



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

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."

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.

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 condi-

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

tions 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. 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

LAKESWOOD 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.

the happiness equivalent of getting a college degree or more than doubling your income.⁵

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

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

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

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.

public health, communities across the country are focusing on healthy eating and active living initiatives.

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://cymcdn.com/sites/www.mocities.com/resource/resmgr/march2012_review_files/healthysustainablecomm_march.pdf.



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



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

“...maybe this sharing is what sustainability is all about.”

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.

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 MtCO₂e Greenhouse Gas Emissions 🌿 ~10,000 MtCO₂e 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



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 MtCO₂e Greenhouse Gas Emissions ✂ ~10,000 MtCO₂e 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



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 MtCO₂e Greenhouse Gas Emissions 🍃 ~10,000 MtCO₂e 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



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.

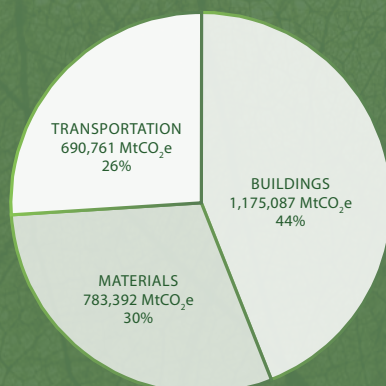
NATURAL SYSTEMS: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

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

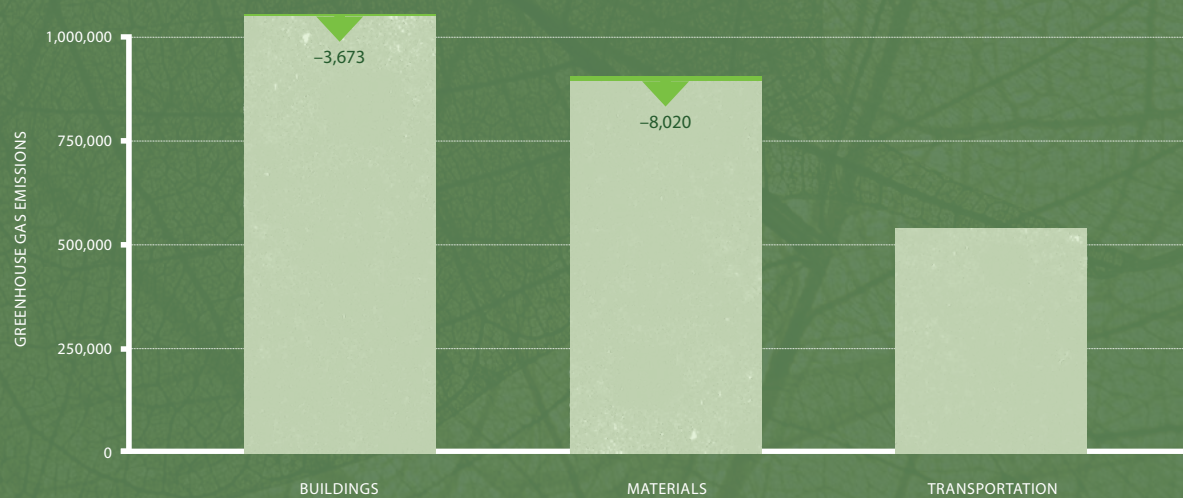
2025 BUSINESS AS USUAL (BAU)			
EMISSIONS BY SECTOR – MT CO ₂ E			CHANGE
BUILDINGS	1,053,368	42%	– 121,719
MATERIALS	903,600	36%	+ 120,209
TRANSPORTATION	539,165	22%	– 151,596
TOTAL GHG	2,496,133	100%	–153,107

2025 AFTER NATURAL SYSTEMS STRATEGIES ARE IMPLEMENTED			
EMISSIONS BY SECTOR – MT CO ₂ E			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,

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

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

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

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

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

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

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 biodiversity⁴ 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.

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.

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

² T. Tschamtko. "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.



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



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

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.

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 pro-

tect 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.

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 encoun-

ters 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.

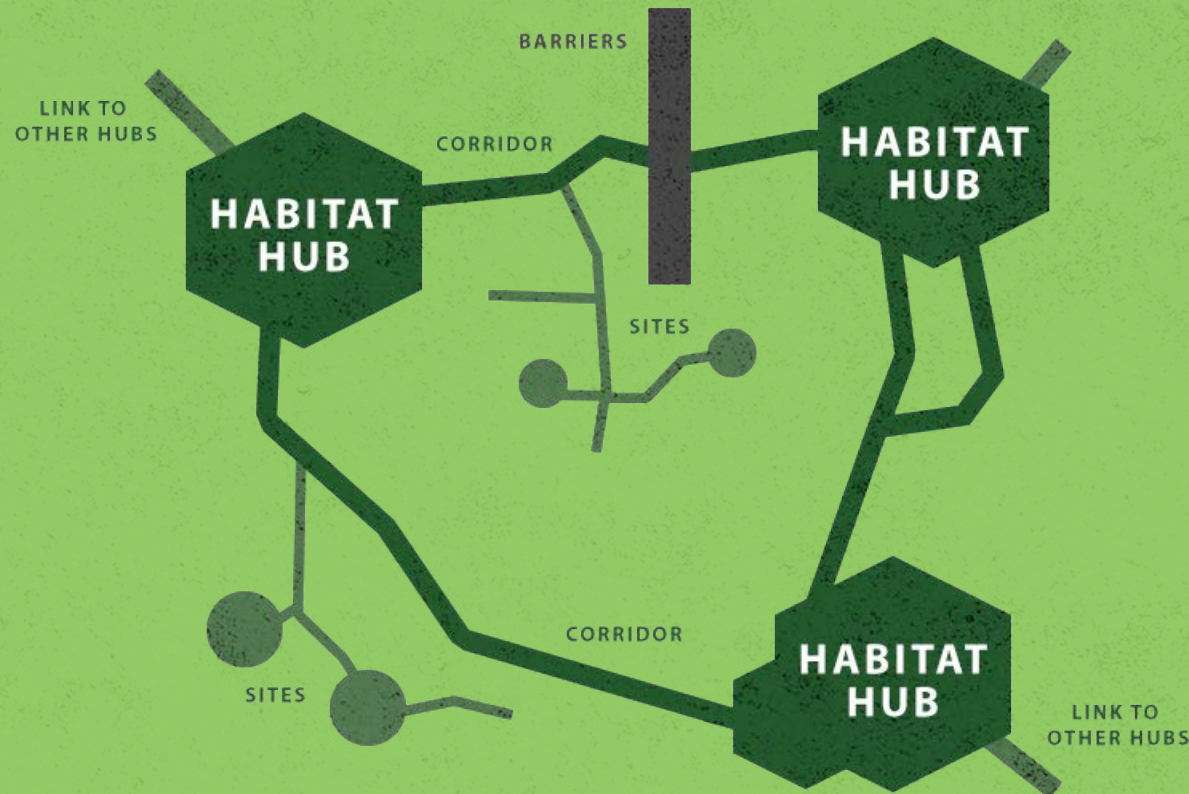
Gardening for wildlife in my yard has naturally reduced the numbers of pests, like aphids, while visibly increasing the numbers of beneficial animals living in and visiting the habitat — such as hummingbirds, ladybird beetles, and lacewings. Insect pests are naturally fecund, which means they reproduce 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



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.

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



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 crowdsourced 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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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

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.



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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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



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

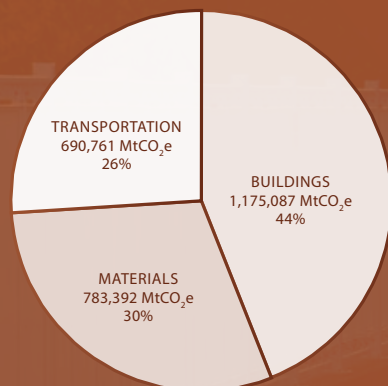
TRANSPORTATION: GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

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

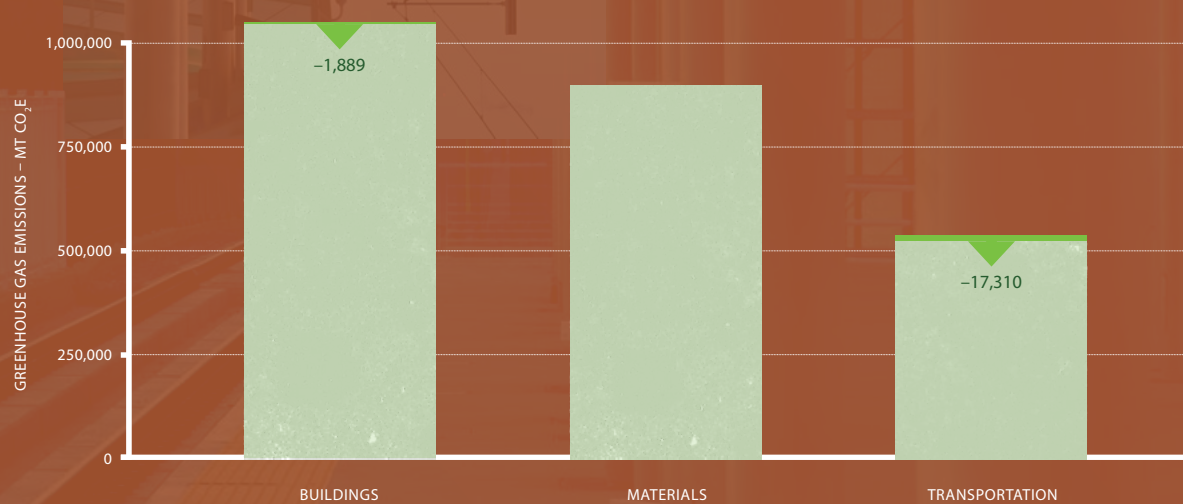
2025 BUSINESS AS USUAL (BAU)				
EMISSIONS BY SECTOR – MT CO ₂ E			CHANGE	
BUILDINGS	1,053,368	42%	–	121,719
MATERIALS	903,600	36%	+	120,209
TRANSPORTATION	539,165	22%	–	151,596
TOTAL GHG	2,496,133	100%	–	153,107

2025 AFTER TRANSPORTATION STRATEGIES ARE IMPLEMENTED				
EMISSIONS BY SECTOR – MT CO ₂ E			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.

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

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

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,

RIDE SHARING

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

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. ■

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

- Transfer sustainable transportation infrastructure and operational knowledge from the City to property owners and managers responsible for surface maintenance on private property.

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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 MtCO₂e Greenhouse Gas Emissions  ~10,000 MtCO₂e 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.



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

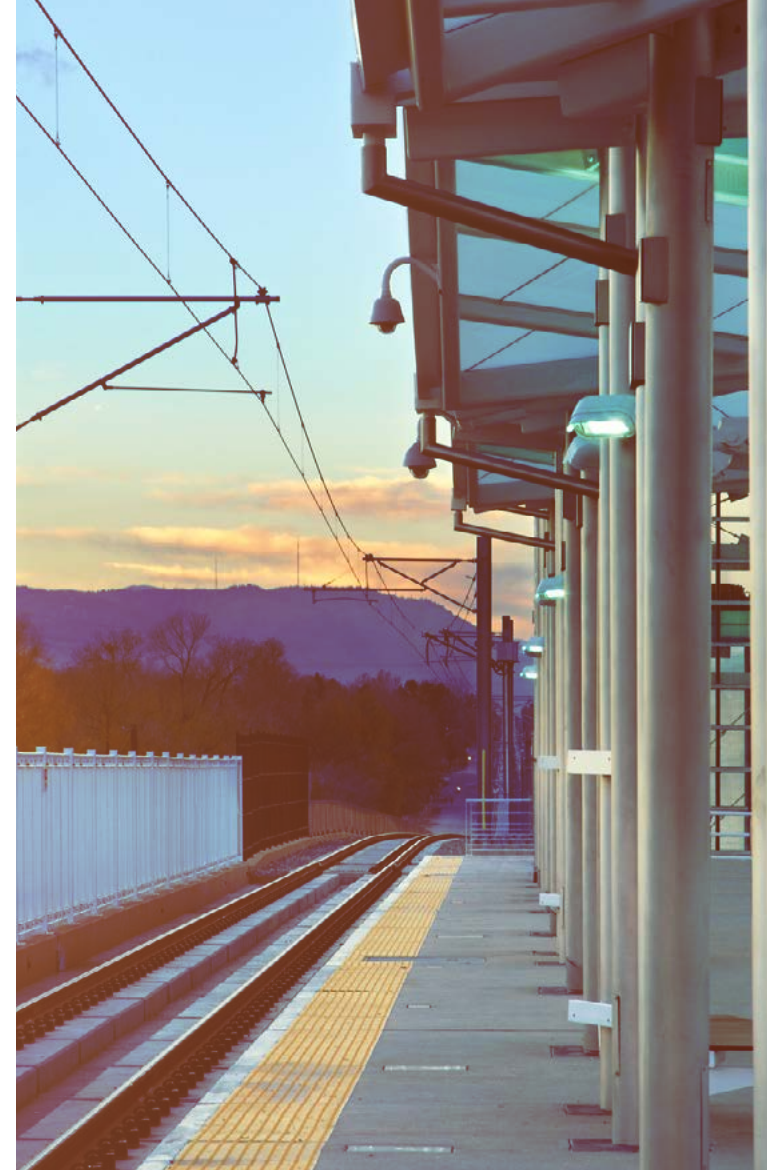
Utilize and promote the suite of transportation management tools available through Denver Regional Council of Governments' Way to Go program. Specifically:

- 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

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- 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

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- 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 MtCO₂e Greenhouse Gas Emissions
  ~10,000 MtCO₂e 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.



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.

CO₂ EQUIVALENT (MtCO₂e) 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 (CO₂e).

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) STEWARD-SHIP 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, evapotranspire, 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, visit 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, pyrolyzation, 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.

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 (MtCO₂e).

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

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 <i>(Baseline: 2008-2010 normalized data)</i> .	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 <i>(Baseline: 2007)</i> .	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 <i>(Baseline: 2007)</i> .	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. <i>(new construction and renovations receiving occupancy permits)</i>	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 (<i>baseline to be established after the completion of Implementation Strategy SE1-A</i>).	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, (<i>Baseline: 2010</i>).	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 <i>(to be established after the completion of Implementation Strategy ZW1-B).</i>	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 <i>(single-family residences and complexes with eight units or fewer).</i>	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 <i>(priority waste streams will be established through implementation Strategy ZW3-A).</i>	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 <i>(to be established after the completion of Implementation Strategy CC3-A)</i> .	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. <i>(Specific target to be established after the completion of Implementation Strategy NS1-C).</i>	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 (<i>Baseline: 2007</i>).	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 (<i>Baseline: 2007</i>).	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 (<i>Baseline: 2014</i>).	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)

MORE

LEARN MORE ABOUT LAKEWOOD'S SUSTAINABILITY EFFORTS

WWW.LAKEWOOD.ORG/SUSTAINABILITY





SUSTAINABILITY PLAN



November
2011

Summit County, Utah
Facilities & Operations Plan

Acknowledgements

Summit County wishes to thank the following community members, organizations, and staff for their contribution in developing this Sustainability Plan.

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Claudia McMullin

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Summit County Administration

Robert Jasper, Summit County Manager

Anita Lewis, Assistant County Manager

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Summit County Staff

Adryan Slaght, Planning

Ashley Koehler, Sustainability

Cliff Blonquist, Solid Waste

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Michael Crystal, Facilities

Richard Butz, Building

Ron Boyer, Information Technology

Ronie Sue Wilde, Human Resources

Sterling Banks, Utah State University Extension

Ashley Koehler, Summit County Sustainability Coordinator

P.O. Box 128 | 60 North Main Street Coalville, UT 84017

akoehler@summitcounty.org | (435) 336-3128

www.summitcounty.org/sustainability

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November 2011

Employees of Summit County:

The County Council, serving as representatives from this community, appreciates your attention and care in carrying out the public's needs. County Employees are the ambassadors for the County and have worked diligently in the past and continue to do so to carry out the policies and practices that our residents request and need. These policies are the ones that protect our public safety, provide for transportation, and maintain clean air and water.

Additionally, your interest and involvement in the community beyond how you earn a living, is shown in your support for the County Fair, Summit County Beef, participation in late night public meetings, and enthusiasm for recreational opportunities in our remarkable surroundings. These are the actions that help make Summit County what it is. Interestingly so, what we have discovered is that all of these actions translate into a sustainable community that considers the needs of the present economy, community and the environment while planning for future generations. Summit County employees have always placed a high priority on sustainability efforts long before it was even labeled "sustainability."

As we make our way out of the current economic recession it is the hope to rebound in a sustainable manner that encourages a variety of jobs, unique community attractions, and uses our natural resources wisely. You, as a County employee, can help do this and create a culture of sustainability.

Our County's leadership is built on a long tradition of excellence in planning, agriculture, tourism, and a heritage of stewardship of our natural environment. The bold decisions made years ago have given our County a head start over other regions across the country. It is in this context that we must look to the bold actions needed in coming decades.

We need your help and we look forward to your participation in the goals listed in this plan to see what we can accomplish together.

Christopher F. Robinson
Summit County Council, Chair

Robert Jasper
Summit County Manager

Resolution No. 2011-22

A RESOLUTION CONFIRMING SUMMIT COUNTY'S COMMITMENT TO SUSTAINABILITY

WHEREAS, scientific consensus has developed that carbon dioxide (CO₂) and other greenhouse gases released into the atmosphere have a profound effect on the Earth's climate; and

WHEREAS, pollutants such as greenhouse gases released into the atmosphere have negative long-term effects on local and regional human and natural systems, including, but not limited to, economic vitality, environmental integrity, and human health; and

WHEREAS, local government actions taken to reduce human-caused greenhouse gas emissions and increase energy efficiency provide multiple local benefits by decreasing air pollution, creating jobs, reducing energy expenditures, and saving money for the local government, its businesses, and its residents; and

WHEREAS, Summit County has a vested interest in protecting and enhancing the environment, the economy, and quality of life through reducing energy consumption and helping the community become more sustainable in use of resources; and

WHEREAS, Summit County has joined ICLEI-Local Governments for Sustainability, which is a nonprofit membership association of local governments committed to sustainability, energy conservation, and climate protection; and

WHEREAS, ICLEI has identified a set of Milestones for Sustainability and Greenhouse Gas Reduction, specifically:

- Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions within County operations;
- Establish a greenhouse gas emissions reduction target;
- Develop a sustainability plan with both existing and future actions which, when implemented, will allow the local government to meet the sustainability goals and greenhouse gas reduction target
- Implement the policies and actions in the plan
- Monitor and report progress; and

WHEREAS, Summit County has completed a greenhouse gas emission inventory, reduction goal, and Sustainability plan to meet a reduction goal and become more sustainable.

NOW THEREFORE, BE IT RESOLVED, that Summit County pledges to take a leadership role in promoting public awareness, education, and outreach regarding sustainability, the causes and impacts of climate change, actions that mitigate and prepare for the negative effects of climate change, and strengthen the local economy and quality of life; and

BE IT FURTHER RESOLVED, that Summit County adopts the Greenhouse Gas Inventory, Sustainability Plan, and reduction goal and will undertake the remaining Milestones for Sustainability and Greenhouse Gas Reduction, to meet current needs without compromising the ability of future generations to meet their needs, and

BE IT FINALLY RESOLVED, ICLEI membership will entitle Summit County to membership benefits and assistance as it progresses through these Milestones.

PASSED AND ADOPTED this 30 day of November, 2011.

Christopher F. Robinson

Christopher F. Robinson
Summit County Council, Chair

Kent Jones

Kent Jones
County Clerk



Attachment(s): Summit County Sustainability Plan (November 2011)

What is Sustainability?

Sustainability is about the long-term well-being of the planet and people, and their functions. A sustainable Summit County is not just about today, but about tomorrow as well. In May of 2010 the Summit County Council discussed sustainability and what it means to the County. As a result, they adapted the Brundtland definition of sustainability:

“As a sustainable community, Summit County considers the needs of the present without compromising the ability of future generations to meet their own needs, by integrating and balancing environmental, economic, and social values.”

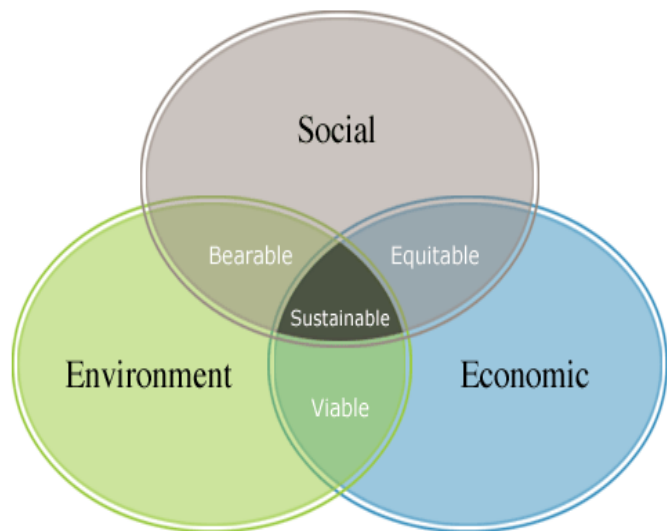
-Summit County Council May 2010

From major capital projects, to how we engage the community, to the way we operate and manage our facilities, Summit County is working to integrate sustainability into how we do business. This document is a formal directive to incorporate sustainability into all County operations as a way of doing business. This means buying smart, upgrading to cleaner fleets, enacting policies that support sustainable best practices, implementing a sustainable economic strategy, and protecting the environment.

If Summit County expects its citizens to lower their energy consumption, it must "walk-the-talk" in its own operations. In order to track progress, an energy and carbon emission baseline for our County operations and facilities has been established with a reduction goal and completed an inventory for the entire community.

It is the intent that these efforts will translate into community well-being, a sustainable environment, a prosperous economy, and smart growth choices.

Sustainability is not an end goal, but a journey that Summit County can take to improve our environmental, social, and economic conditions. In plain language, it is about building a great county for everyone, forever.



Park City
signs U.S.
Mayors
Climate
Protection
Agreement
2005

Utah
signs
Western
Climate
Initiative
2007

County
Sustainability
Coordinator
position
created
2010

County
Council adopts
Strategic Plan;
Sustainability
Ranked #2
2011, Feb

**Sustainability
Plan
2011, Nov**

State of Utah Goal:
2005 levels
Western Climate
Initiative Goal: 15%
below 2005 levels
2020

1974
County adopts
Energy
Conservation
Resolution

2006
County
Employee
Recycling
Committee
formed

2009
Save Our
Snow
Initiative

2010
Summit
County joins
ICLEI

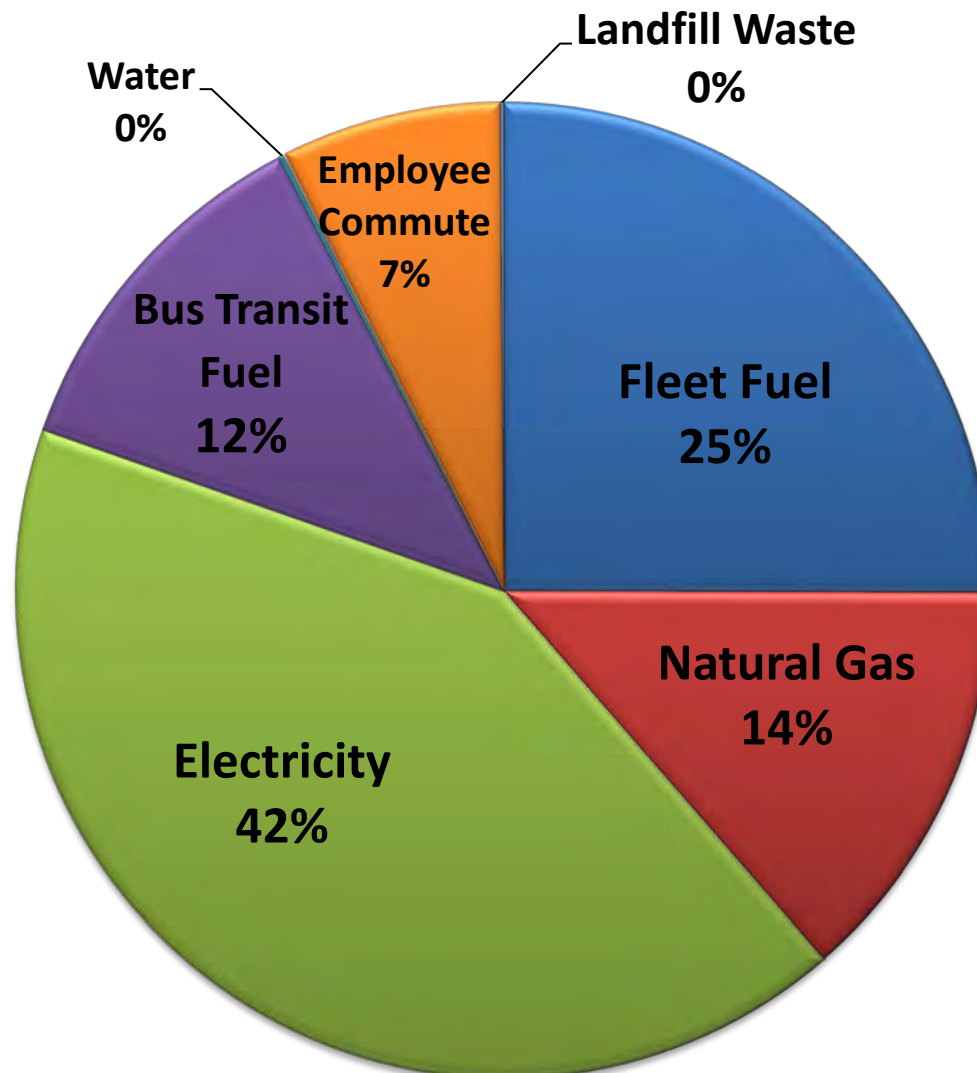
2011, Jan
Summit
County
becomes Blue
SkySM member

2011, Oct
Community
Carbon
Footprint

2013
Summit County
Goal: 13% below
Business-As-Usual

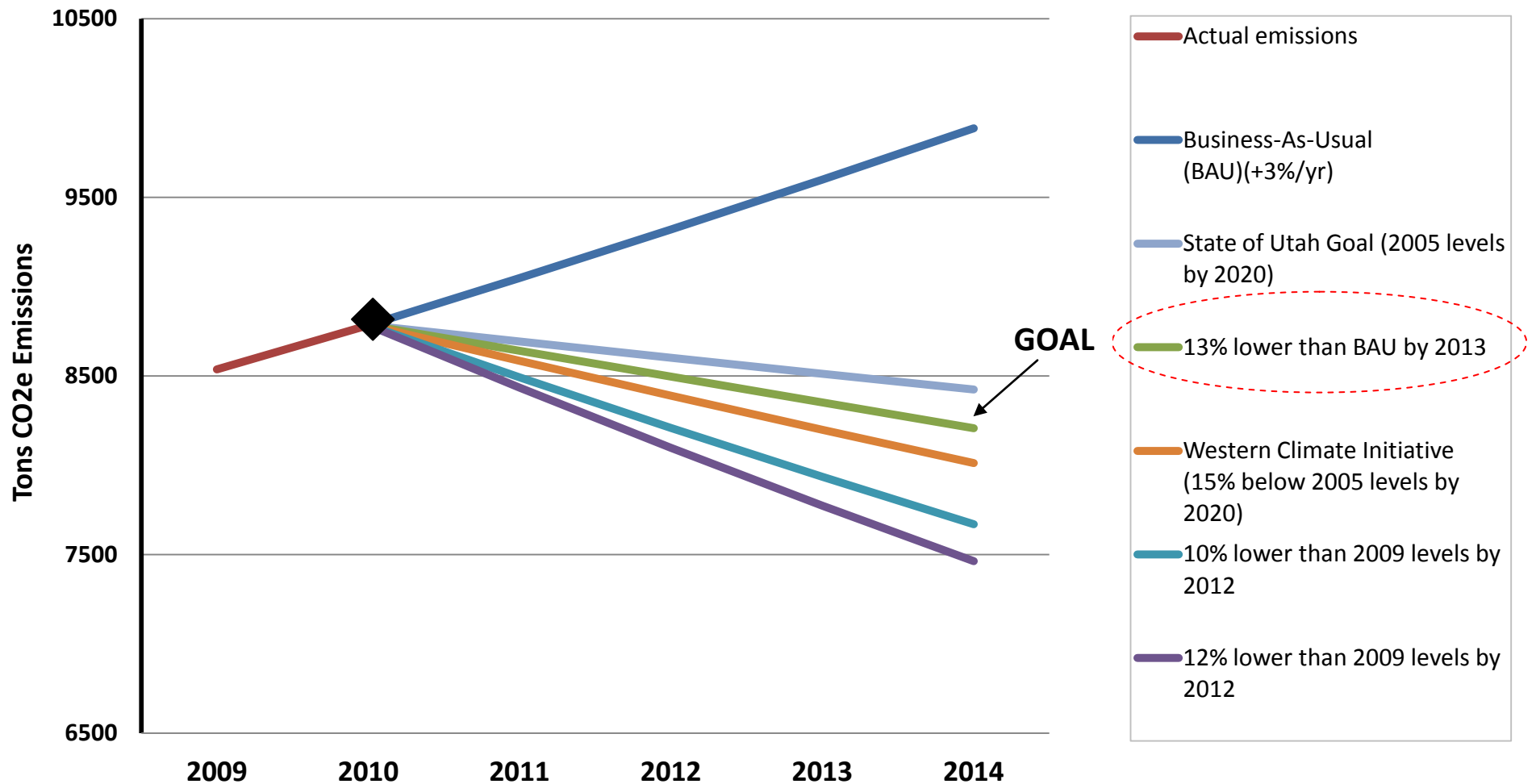
TIMELINE & GOALS

Summit County Facility & Operations Carbon Footprint (2010)



8,785 tons of
Carbon Dioxide
equivalent
emissions (CO₂e)

Carbon Emission Equivalent Reduction Forecast



Administration

GOAL 1 **Establish accountability for County sustainability efforts and energy conservation measures.**

ACTION Annually inventory County Facility and Operations utility data from electricity, natural gas, fleet, transit, employee commute fuel, water, and landfill emissions for a carbon emission baseline.

TIMELINE March 2012 (2011 Baseline)

Agencies/departments involved – Sustainability, Local utilities, Public Works, Facilities

ACTION Set a County Facility and Operations Carbon Footprint reduction goal to be adopted by Resolution.

TIMELINE November 2011

ACTION Review Sustainability Plan's goals and actions twice per year with Council.

TIMELINE March & August of each year

ACTION Distribute energy, fuel, and water usage data quarterly to each Department and Office. Review fuel data monthly at Department Head/Elected Official Meetings.

TIMELINE January 2012 and each quarter (fuel- monthly)

GOAL 2 **Develop funding stream for projects to meet reduction goal.**

ACTION Maintain funding in the budget for sustainability and require a sustainability/conservation goal statement in budget requests from all departments and offices.

TIMELINE September of each year

ACTION Seek grant opportunities from State and Federal government agencies, local utilities, and non-profit organizations for energy and fuel efficiency upgrades, alternative fuels, and renewable energy projects for the County.

TIMELINE Ongoing

Departments involved – Facilities, Sustainability, Administration, Public Works, & Community Development

ACTION Follow State and Federal legislation through National League of Cities (NLC), National Association of Counties (NACo), American Planning Association (APA), ICLEI, International City/County Management Association (ICMA), U.S. Department of Energy, U.S. Environmental Protection Agency (EPA) and other leading communities for innovations in funding programs.

TIMELINE Ongoing

ACTION Participate in the Blue SkySM program to show public support of renewable energy and increase eligibility for additional Blue SkySM Funding Awards.

TIMELINE January 2011 and ongoing

Land Use Planning/Building

GOAL 3 **Incorporate sustainability measures in the Land Management Codes and General Plans.**

ACTION Review current codes for areas of improvement and prioritize with Planning Commissions and Planning Staff. Examples include, but are not limited to, water conservation, renewable energy, density, wildlife, lighting, and walkability.

TIMELINE In process and ongoing

Departments involved- Community Development, Engineering, & Sustainability

ACTION Support state legislation for the adoption of higher energy conservation building codes in the residential sector, specifically the adoption of the 2009 IECC code.

TIMELINE In process

Departments/agencies involved- Planning, Building, Sustainability, County Council, Utah Clean Energy, Park City Homebuilders Association, and partnerships with cities and counties in Utah.

ACTION Research and consider disincentives or prohibitions on heated driveways and large open gas flames. Encourage the generation of these from renewable energy.

TIMELINE Initiate January 2012

ACTION Remove barriers to permitting and fees for alternative energy systems.

TIMELINE Initiate April 2012

Departments/agencies involved- Planning, Building, Sustainability, Utah Clean Energy through the Wasatch SunShot grant proposal.

ACTION Maintain Building Staff's certification to review and inspect solar and wind energy systems through ongoing training.

TIMELINE Ongoing

GOAL 4 **Develop community programs for residents and businesses to retro-fit homes and buildings for greater energy efficiency and conservation.**

ACTION Consider models used by other communities such as Aspen/Pitkin County, CO, Teton County, WY, as well as Property Assessed Clean Energy (PACE) Financing.

TIMELINE March 2011 and ongoing

ACTION Follow national legislation through ICLEI, NLC, NACo, and ICMA and other leading communities for innovative program funding.

TIMELINE May 2011 and ongoing

Department/agencies involved- Community Development, Sustainability, & Utah Clean Energy

ACTION Initiate a weatherization program focused on senior citizen owned and occupied households and low income households.

TIMELINE Initiate February 2012

Department/agencies involved- Assistant County Manager (Economic Development), Sustainability, USDA Rural Development Program, Rocky Mountain Power, & Questar Gas

GOAL 5 **Initiate a program to encourage the community to generate an additional 100 kW of energy from solar thermal or solar photovoltaic by 2014.**

ACTION Inventory and track renewable energy systems installed in Summit County that are on and off grid. Map locations with the kW generation capacity.

TIMELINE Initiate December 2011

Departments involved- Community Development, Sustainability, and Information Technology (IT-GIS)

ACTION Research funding mechanisms and grant opportunities for project promotion, incentives, and rebates for participants.

TIMELINE Initiate February 2012

Departments/Agencies involved- Sustainability, Community Development, Utah Clean Energy, & Rocky Mountain Power

ACTION Create a County program that partners with local utilities and/or businesses to support the installation of renewable energy systems.

TIMELINE Initiate February 2012

Departments/agencies involved- Community Development, Sustainability, Utah Clean Energy, Rocky Mountain Power, and local businesses.

GOAL 6 **Maintain and preserve natural resources significant to Summit County's identity and quality of life.**

ACTION Complete inventory of all protected open space in Summit County, including private conservation easements and open space as part of subdivision plats.

TIMELINE Ongoing

Departments involved- Community Development, Sustainability, and Information Technology (IT-GIS)

ACTION Develop preservation and long-term management plans for County owned open spaces, using best practices and models from other communities.

TIMELINE December 2011

Departments/committees involved- Basin Open Space Advisory Committee (BOSAC), Eastern Summit County Agriculture and Open Space Protection Advisory Board (ESAP), Planning, Sustainability, Facilities, & Public Works

ACTION Include open space maintenance funding in annual budget.

TIMELINE Simultaneous with FY 2012 budget and ongoing

Departments/offices involved- Administration, Public Works, Facilities, Sustainability, Auditor

ACTION Determine financing available and establish funding source for purchase of open space and agricultural land preservation.

TIMELINE Simultaneous to adoption of FY 2014 budget

Departments/offices involved- Administration, USU Extension, BOSAC, ESAP, Sustainability, and Planning.

Facilities/Operations

GOAL 7 **Increase energy and water efficiency standards for all new construction and major remodels for County facilities.**

ACTION Adopt a policy that requires all major remodels and new County facilities to be built to LEED™ standards or a related program with emphasis on energy efficiency and energy conservation standards.

TIMELINE Initiate March 2013

ACTION Implement xeriscape or water conservation landscapes at all County facilities.

TIMELINE As funding is available – FY 2013

ACTION Retro-fit and require all outdoor lighting to be night sky friendly and energy efficient, specifically for County pathways, parking lots, and roads. Work in conjunction with **GOAL 3** to adopt County-wide ordinance.

TIMELINE As funding is available – FY 2013

Departments involved- Planning, Facilities, and Public Works

GOAL 8 **Reduce energy and water consumption in existing County facilities.**

ACTION Perform window audit, pursuant to Staff report dated June 9, 2010, to identify leaking windows. Photograph windows before and after with thermal camera.

TIMELINE July 2011 and ongoing

ACTION Perform lighting audit. Remove unnecessary bulbs and fluorescent tubes from fixtures.

TIMELINE July 2011 and ongoing

ACTION Identify alternative solutions to reduce the number of high energy use personal electronics such as personal refrigerators, microwaves, and space heaters.

TIMELINE Initiate February 2012

ACTION Install programmable thermostats, low flow toilets, and faucet aerators.

TIMELINE As funding is available – FY 2014

ACTION Seek and establish funds for major retro-fits to meet Energy Star® performance standards and recognition.

TIMELINE Energy Star® Benchmark- March 2012; retro-fits as funding is available – FY 2014

GOAL 9 **Incorporate best practices for procurement.**

ACTION Promote an office supply re-use storage room. Encourage departments and offices to check supply room before ordering new. Document supplies re-used to quantify dollar savings.

TIMELINE Initiate October 2012

ACTION As allowed by law, give preference to local suppliers and/or contractors in requests for proposals and bids. Promote procurement of goods containing post-consumer or recycled content.

TIMELINE Initiate November 2012

Departments/offices involved- Auditor, Assistant County Manager, & Administration

ACTION Establish central purchasing to achieve economies of scale, merging orders for reduced pricing and cost saving delivery.

TIMELINE Initiate January 2013

ACTION Discontinue the purchase of disposable water bottles with taxpayer funds in an effort to save money and reduce waste.

TIMELINE Initiate January 2013

GOAL 10 **Engage employees in methods of conservation for energy, fuel, supplies, and water, as wells as participation in recycling.**

ACTION Meet with individual departments and offices to brainstorm ideas for further energy, material, and water conservation methods, and set reduction goals.

TIMELINE September 2011

ACTION Encourage telecommuting and flexible schedule options for applicable County departments/offices and employee positions.

TIMELINE December 2011

ACTION Create a mobile workspace at the Richins Building, open to all employees, in an effort to reduce employee commuting during the workday.

TIMELINE Initiate June 2012

Departments/agencies involved- Facilities and IT

ACTION Assemble County Sustainability team to educate, promote accomplishments, and issue challenges to the County and to employees through newsletters, branding, and local media.

TIMELINE February 2012 assemble team

ACTION Develop program for employee or departmental recognition/reward for energy conservation and sustainable practices.

TIMELINE Initiate June 2012 and ongoing

Departments/agencies involved- Administration, Human Resources, and all Departments and Offices

ACTION Include evaluation of conservation efforts in performance reviews at the department head level. Consider in employee evaluations.

TIMELINE Initiate September 2012

ACTION Explore program to establish carpool list for ride-share to meetings and commuting to/from work with online sign up.

TIMELINE Initiate January 2013

Departments/agencies involved- IT, Human Resources, & Utah Transit Authority (UTA)

GOAL 11 Integrate automated energy and paper saving technologies.

ACTION Install software to automatically shut off user's monitors and computers when not in use (after-hours). Teach employees how to set printing preferences to double-side and print draft quality.

TIMELINE December 2011 and Budget cycle for FY 2012

ACTION Promote new system for automating Building, Planning, and Engineering electronic processing of applications, permits, and licenses to implement paperless government. Work in conjunction with **GOAL 10** to reward ideas for paperless government.

TIMELINE Initiate January 2012

Departments/offices involved- Community Development, Engineering, Clerk, IT

ACTION Implement on-line meeting software and/or use of webcasts for meetings, interviews, and training requirements.

TIMELINE Initiate April 2012

Departments/offices involved- IT, Human Resources

ACTION Continue paperless check-in at polling locations and expand paperless options in other election and Clerk's Office functions where applicable.

TIMELINE November 2010 and ongoing

Departments/offices involved- Clerk, IT

ACTION Expand options for and promote online viewing of recorded documents in an effort to save vehicle trips, paper, and printing and copying equipment.

TIMELINE Ongoing

Departments/offices involved- Recorder, IT

Waste Management

GOAL 12 **Extend the life of the County landfills.**

ACTION Report waste diversion rate from the landfills annually to Manager and Council.

TIMELINE February of each year

Agencies/departments/offices involved – Waste Management and Sustainability

ACTION Require annual monitoring and auditing of the new residential waste and recycling collection contract to ensure efficiency and maximize diversion from the landfill.

TIMELINE December 2011 and ongoing

ACTION Reduce trash bin size provided in County sponsored residential trash collection program in an effort to encourage greater recycling.

TIMELINE Initiate July 2012

ACTION Revise current County sponsored curbside recycling service locations to expand into high density residential areas and replace low density areas with recycling drop-off sites.

TIMELINE Initiate July 2012

ACTION Inventory and identify the management of the existing public recycling facilities in the Oakley, Kamas, Francis, Weber Canyon Road, and Timberline areas. If needed, support the enhancement of the facilities.

TIMELINE Initiate March 2012

ACTION Facilitate the creation of public recycling drop-off sites to serve the Henefer, Wanship, Woodland, and Jeremy Ranch/Pinebrook areas.

TIMELINE Initiate August 2012

ACTION Pursue partnership with owner of Richardson Flats for a public green waste composting facility.

TIMELINE Initiate May 2012

ACTION Research options for local glass reuse.

TIMELINE Initiate September 2012

ACTION Continue research and partnership with the Snyderville Basin Water Reclamation District on sustainable bio-solid disposal options.

TIMELINE Initiate June 2013

GOAL 13 **Offer more recycling opportunities at all county facilities for employees and the public.**

ACTION Require a recycling plan for all major events that require a Special Event Permit through the Planning Department.

TIMELINE December 2011

Departments involved- Planning

ACTION Educate and encourage employees to recycle. Ensure adequate signs, accessibility, and convenience.

TIMELINE Initiate June 2012

Departments involved- Facilities and Sustainability

ACTION Continue to support the efforts of Recycle Utah to educate students and the broader community about recycling in Summit County.

TIMELINE Ongoing with annual updates to Solid Waste Manager based on County supported funds

Departments involved- Solid Waste & Sustainability

Transportation

GOAL 14 Implement County fleet management initiatives to increase fuel efficiency, reduce emissions, and save money.

ACTION Track monthly fuel use by department/office and report monthly to Department Head/Elected Official Meetings. Combine effort with **Goal 1** and actions.

TIMELINE Initiate January 2012

ACTION Increase fuel efficiency by checking tire pressure at County fueling facility, removing unnecessary equipment and weight from vehicles, and extending reasonable time between oil changes.

TIMELINE Initiate April 2012

Departments/offices involved- Public Works and all offices/department with fleet vehicles

ACTION Install air compressor for tire filling at County fuel pumps.

TIMELINE Evaluation due by 2013 FYbudget cycle

Departments involved- Facilities

ACTION Promote efficient driving practices through employee education and accountability through the Employee Driving Policy and fuel tracking software.

TIMELINE Initiate January 2012 and ongoing

Agencies/departments/offices involved- Human Resources, Public Works, Sustainability

ACTION Assemble fleet committee to evaluate fleet purchases and audit existing fleet for excess. Ensure vehicle size (truck, SUV, 4x4) fits purpose and anticipated use.

TIMELINE Initiate February 2012 with evaluation due by FY 2013 budget cycle

ACTION Direct Fleet Committee to research and implement a long-term fleet program to transition fleet to lower carbon emissions and higher fuel efficiency using alternative fuels and technologies (hybrids, natural gas, and electric).

TIMELINE Initiate April 2012 (research) with implementation ready for FY 2013 budget cycle.

GOAL 15 Eliminate vehicle idling in fleet vehicles.

ACTION Research technology solution to avoid the need to idle by law enforcement and other public safety fleet vehicles in order to charge equipment. Work in conjunction with **GOAL 10**.

TIMELINE Research due by July 2012; funding request by FY 2013 budget

Departments/offices involved - Sheriff, Public Works, IT

GOAL 16 Practice conservation in County Road construction & maintenance.

ACTION Continue making brine solution in-house and retrofitting County trucks with salt-brine spray systems.

ACTION Evaluate the need for supplemental facilities to reduce employee trips during the work day, including a salt storage facility in Summit Park.

ACTION Continue the practice of asphalt recycling in an effort to eliminate the need to haul old asphalt off-site and to minimize importing new materials.

GOAL 17 Promote more sustainable County/Park City transit initiatives and increase ridership.

ACTION Implement route changes as recommended in the Regional Short Range Transit Plan (5/23/11) to increase ridership.

TIMELINE January 2013 - 2014

ACTION Continue to track technology advancements in alternative fuels and vehicle technology for buses in an effort to lower emissions.

TIMELINE To be determined by Park City and County Public Works and included in capital improvement planning and budget cycles.

ACTION Extend transit service to Kamas and Heber in addition to the UTA bus service to Salt Lake City area when support infrastructure is completed.

ACTION Design and build the Kimball Junction Transit Center supporting green building and walkability elements. Work in conjunction with [Goal 7](#).

TIMELINE Include in capital improvements plan – target May 2014

GOAL 18 Enhance walkability and non-motorized transportation links in Eastern Summit County.

ACTION Map and prioritize corridors for a trails master plan in Eastern Summit County to establish regional connectivity with a strategy for funding installation.

TIMELINE July 2011 and ongoing

Departments/Agencies involved- Planning, Engineering, North Summit Recreation District

ACTION Identify key corridors with high rates of cycling/motorist conflicts. Prioritize these corridors and match with methods to reduce cycling/motorist conflict through driver and cycling education, signage, wider shoulders and designated bike lanes. Implement in tandem with road repairs and as funding allows.

TIMELINE Initiate September 2012

Departments/Agencies involved- Engineering, Sustainability, Mountain Trails Foundation, and North Summit Recreation District

Community Engagement and Economic Vitality

GOAL 19 **Engage the community in sustainability initiatives through example, education, and incentives.**

ACTION Partner with local municipalities, other regional counties and cities, non-profits, and Universities on sustainability projects.

TIMELINE March 2011 and ongoing

ACTION List County sustainability projects and community resources on website.

TIMELINE Initiate January 2012

ACTION Be a leader in the community for waste reduction and diversion at all County sponsored events, including the County Fair.

TIMELINE Initiate August 2012

Departments involved - Facilities, Fair Board, and Sustainability

ACTION Encourage volunteerism within County employees and the community through road clean-ups, community beautification, and humanitarian projects.

TIMELINE Initiate September 2012

Departments involved - Human Resources, Assistant Manager, Sustainability, Facilities, and Public Works

ACTION Compile list of potential volunteer projects for community participation, including beautification, humanitarian projects, and noxious weed control.

TIMELINE Initiate October 2012

Departments/agencies involved - Sustainability, Assistant Manager, Facilities, Public Works, Snyderville Basin Special Recreation District and Water Reclamation District, and Cooperative Weed Management Area (CWMA)

ACTION Support and expand programs to assist the local agricultural economy, including the Summit County Beef program and Farmers' Markets.

TIMELINE Ongoing

Departments involved - Assistant Manager, USU Extension Agent, and Sustainability

ACTION Foster community and local food efforts by working with local non-profits and schools to maintain and create additional community gardens.

TIMELINE December 2010 and ongoing

Departments involved - Health Dept, Sustainability, School Districts, and Summit Community Gardens

GOAL 20 Establish community-wide carbon emissions reduction goal and Action Plan.

ACTION Promote Community-wide Greenhouse-Gas Emission Inventory and Roadmap for reduction.

TIMELINE December 2011

ACTION Expand partnership and involvement with the existing program for community engagement, such as “Living room” meetings using the “Low Carbon Diet” workbooks with Park City Municipal Sustainability staff.

TIMELINE Initiate January 2012

ACTION Adopt an Idle-Free ordinance, following the year review of the Idle-Free Resolution and educational campaign.

TIMELINE Initiate April 2012

ACTION Continue participation with the Save Our Snow community Action Plan to reduce community carbon emissions in the Park City/Summit County area.

TIMELINE Ongoing

Additional Items for Consideration:

Economy

- Address the beetle kill and fuel mitigation in the Uinta Mountains through programs and partnerships with local saw mills, U.S. Forest Service, Natural Resource Conservation Service, and UT Department of Natural Resources- Division of Forestry Fire and State Lands. (Fuels for Schools program, Environmental Quality Incentives Program (EQIP), Forest Stewardship Plans, etc).
- Promotion of Farmers Market/Agri-tourism/Historical tourism in Eastern Summit County.
- Online Inventory of local Summit County businesses (Partner with Chamber of Commerce).
- Lease County owned property for grazing/farming where applicable to further habitat management.
- Research a program to lease public facilities with commercial kitchens to local small businesses for local food processing.
- Support and recognize a rating system to be applied to businesses incorporating sustainable practices.

Public Health

- Support healthy lifestyles of County employees in an effort to reduce health insurance premiums and claims and improve employee productivity.
- Promote access to local healthy food/produce in the community and schools.

Legislation

- Consider a ban on disposable plastic bags & Styrofoam take-out containers
- Ban cardboard from the landfill

HELPING SMALL CITIES HAVE A GLOBAL IMPACT

 THE CITY OF YPSILANTI
CLIMATE ACTION PLAN

JULY 2012



ACKNOWLEDGMENTS

► THE CITY OF YPSILANTI

Teresa Gillotti :: City Planner

Stan Kirton :: Director of Public Services

[PLANNING COMMISSION]

Commissioner Mark Bullard

Commissioner Gary Clark

Commissioner Phil Hollifield

Commissioner Roderick Johnson

Commissioner Daniel Lautenbach

Commissioner Brett Lenart

Commissioner Richard Murphy

Commissioner Kelly Weger

Commissioner Cheryl Zuellig

[CITY COUNCIL]

Mayor Paul Schreiber

Mayor Pro-Tem Lois Richardson

Council Representative Ricky Jefferson

Council Representative Michael Bodary

Council Representative Daniel Vogt

Council Representative Peter Murdock

Council Representative Brian Robb

► COMMUNITY ORGANIZATIONS

Eastern Michigan University

Growing Hope

EMU PLACE

Transition Ypsi

► MICHIGAN SUBURBS ALLIANCE

Valerie Bieberich :: Community Outreach

Stephanie Chueh :: Intern

Victoria Gasidlo :: Intern

Scott Kalafatis :: Intern

Sarah Hoerl :: Project Assistant

Richard Murphy :: Transportation Director

Andrew Reaume :: Graphic Designer

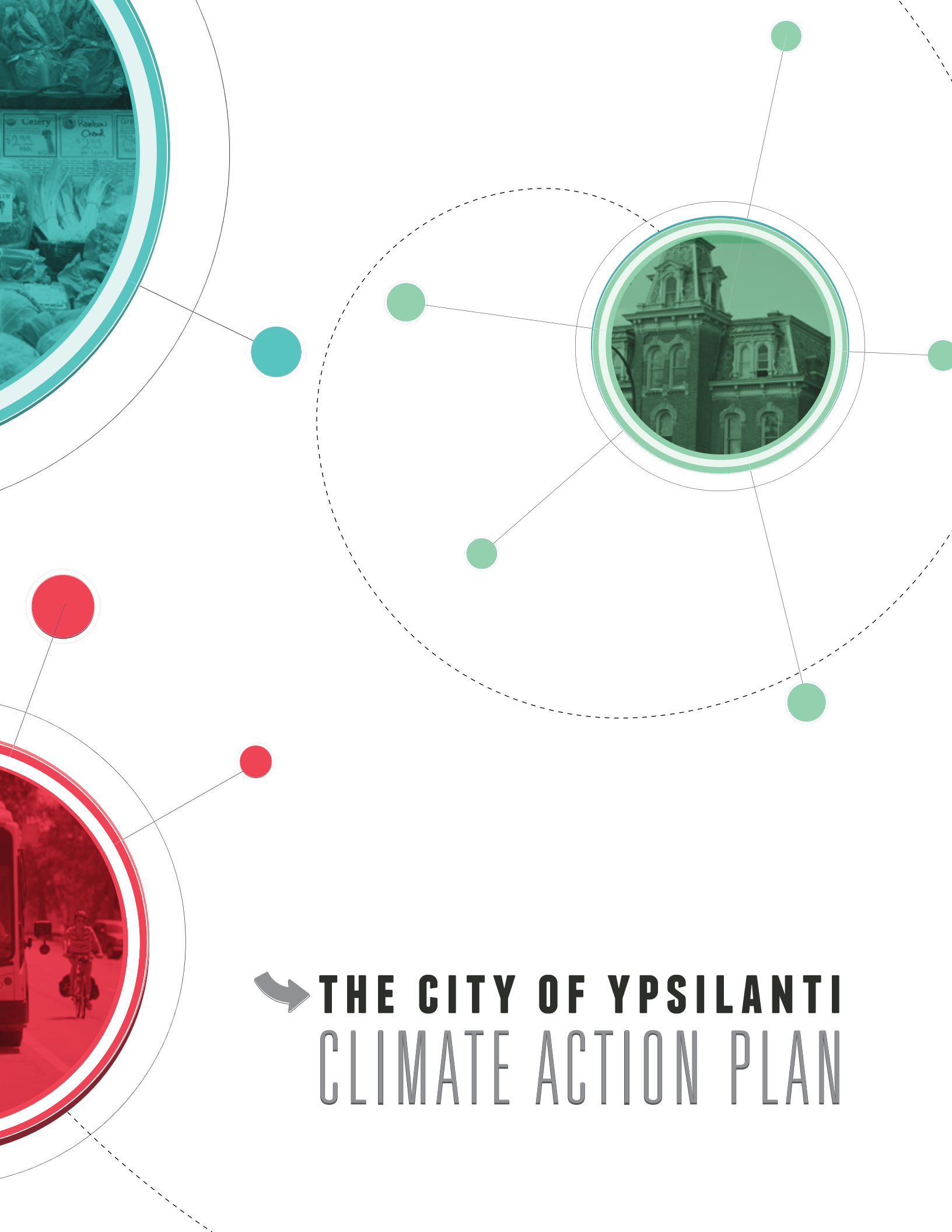
Melanie Piana :: Deputy Director

► WARM TRAINING CENTER

Amanda Cross :: Intern

Joel Howrani Heeres :: Sustainable Communities Coordinator





THE CITY OF YPSILANTI CLIMATE ACTION PLAN

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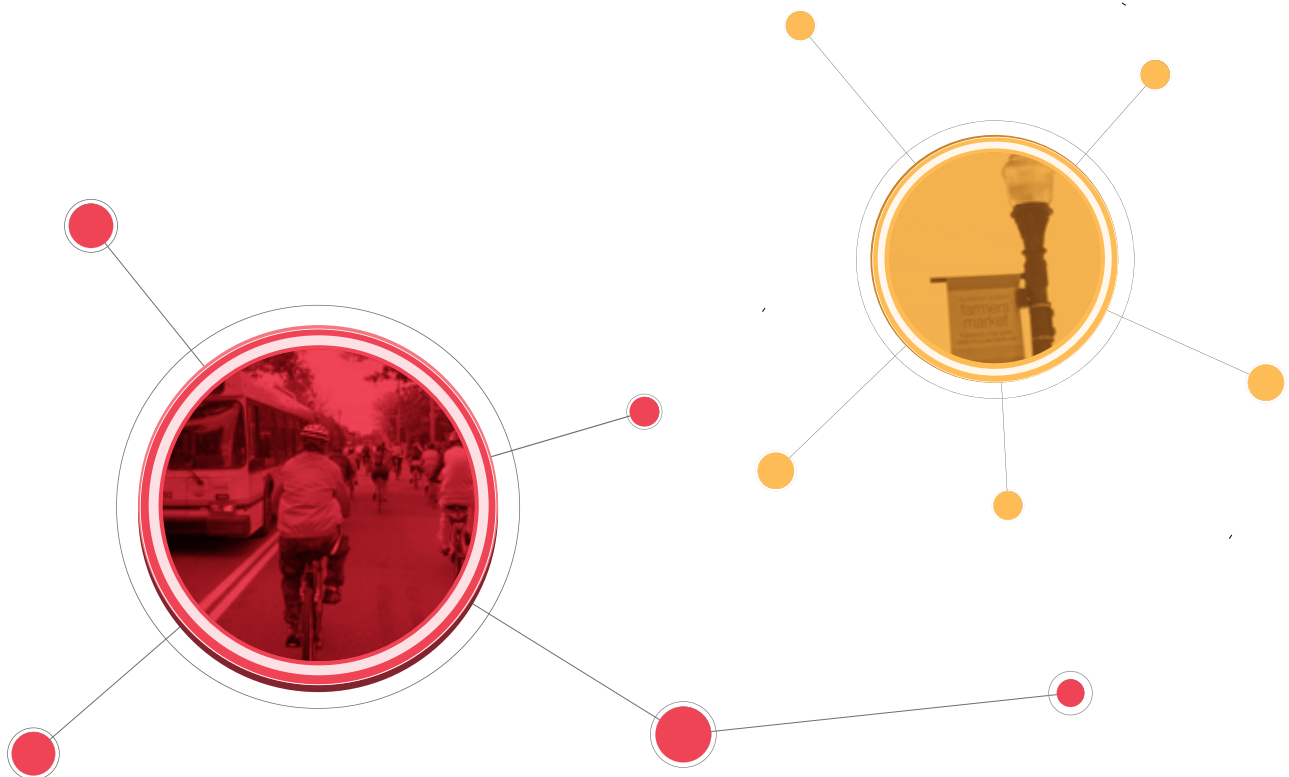
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WHAT THIS PLAN CONTAINS

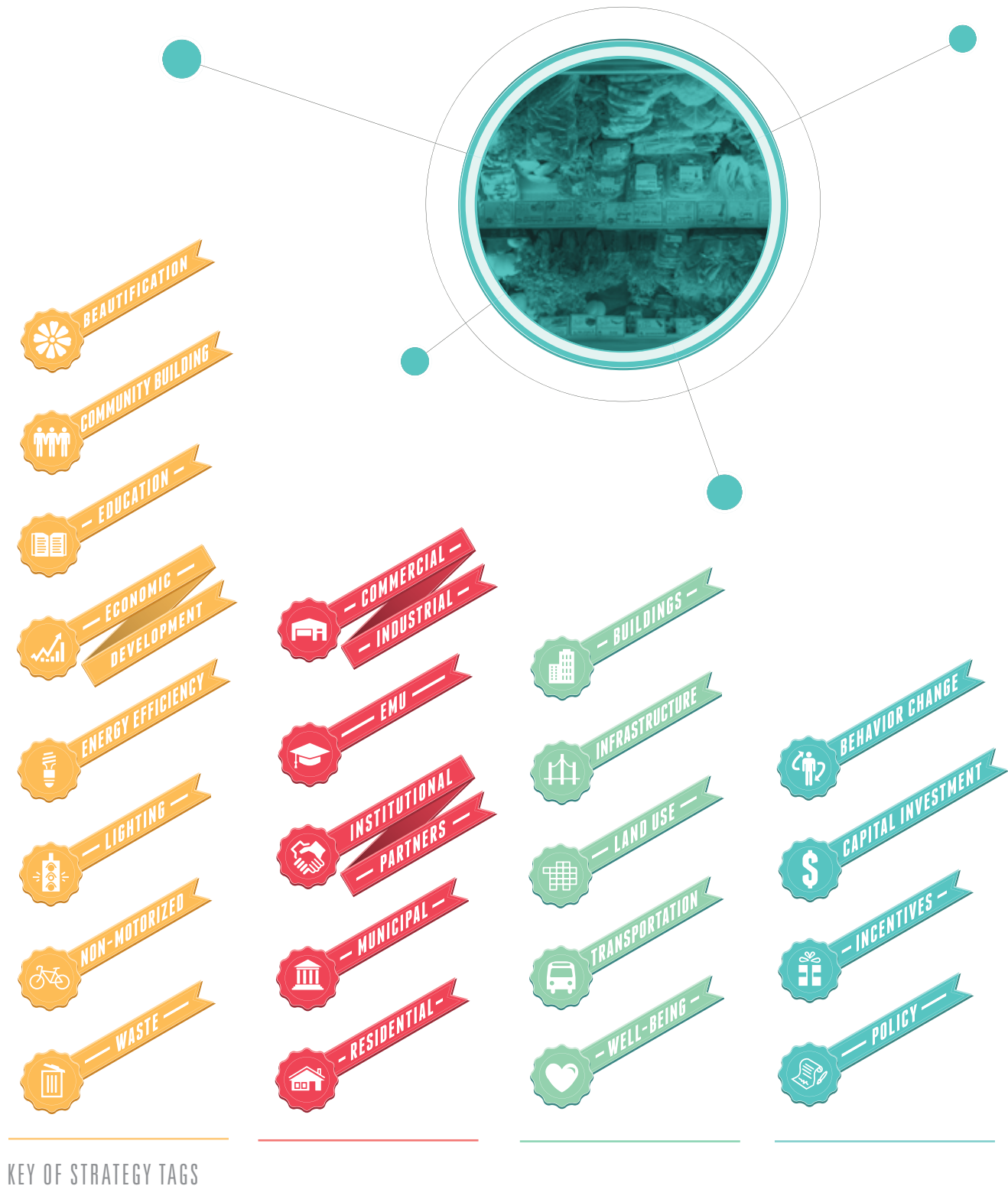
This report outlines a plan to guide Ypsilanti into a more sustainable future by coordinating municipal and community efforts to reduce greenhouse gas emissions and address climate change. The plan begins with an outline of the methodology used to create this plan and reviews community conditions, both from an emissions and qualitative standpoint. Next, the report delves into the strategies themselves and depicts the recommended tactics the city can use to reduce its greenhouse gas emissions. The strategies have been sorted into climate action areas: buildings, infrastructure, land use and transportation, and culture change. Additionally, the strategies have been given “tags” that indicate the nature of each idea, ranging from “municipal” to “behavior change.” These tags allow the user to further sort strategies by interest and acknowledge the interdisciplinary nature of each idea.

After presenting and explaining the proposed strategies, the report addresses implementation. Taking into account existing city and community efforts, the report proposes a course of action to achieve the stated goals. This plan recommends where the city can act by making direct investments, taking steps through its staff and administration, creating new policies to drive change, and coordinating with the region as a whole. The plan also recognizes that some efforts may need to be led by the community, whether through specific individuals, groups or institutions, or by the creation of an official taskforce or coalition.

Finally, more detailed information on GHG emissions and community-driven strategy ideas can be found in the two appendices. Appendix A contains the full technical assessment of municipal and community greenhouse gas emissions. Appendix B is a list of all strategy ideas collected during best practices research, exploration of related efforts and community outreach. This library of approaches has been included to encourage consideration and implementation by the community or future municipal efforts.



KEY OF STRATEGY TAGS



KEY OF STRATEGY TAGS



A CLIMATE ACTION PLAN FOR YPSILANTI

Metropolitan Detroit, as Michigan's largest metro area, is both the state's greatest challenge to sustainability and holds the most promise for the future. The region holds an abundance of human capital, energy and other resources for development but is also rooted in a history of sprawl, inadequate transportation options and aging infrastructure. To move toward a better, more sustainable future, we must draw on both a desire to change as well as local resources in order to confront these substantial barriers to reform. The City of Duluth lays out the environmental challenge to city development in its own climate plan: "International scientific and political communities recognize that elevated temperatures, loss of habitat and species, and economic hardships due to damage from severe weather patterns and changes in natural resources are just some of the substantial changes we may experience in the coming years if action is not taken to reverse current [emissions] trends."¹

As a built-out and de-industrializing community, Ypsilanti struggles to meet the challenge of reducing greenhouse gas emissions. While the city's historic core predates the automotive era, the land use and transportation decisions of the last half century have been planned around the automobile. This left the city with significant greenhouse gas "legacy costs."

In 2011, the City of Ypsilanti joined the Millennial Mayors Congress, a collaborative body of veteran and emerging civic leaders who focus on developing replicable models for local action that will produce a more prosperous, environmentally sustainable and equitable Detroit region. Each of the 22 participating communities is represented by a city official and a Millennial, or 18-35 year-old, resident. In December 2009, the Congress adopted the Energy Savings Protocol, setting a goal of reducing government uses of energy from non-renewable sources to 25% below 2005 levels by 2015. Now they are working together to implement localized approaches to this regional goal.

The Cities of Southgate, Hazel Park and Ypsilanti seek to go beyond this 2015 energy goal, however, and have stepped up to lead the region in local sustainability efforts. Together, the communities and their partners seek to assess strategies for community engagement, devise plans for reductions in municipal GHG emissions, and develop and test strategies targeting community-wide emissions due to limited transportation options, inefficient buildings, and dependence on fossil fuels. All three cities seek to develop and test components of a climate action plan that will result in a measurable reduction of Green House Gas (GHG) emissions from both city government and community activities.

1 | Skoog, Carin. "Greenhouse Gas Inventory & Forecast Report: With Recommendations for the Development of Duluth's Local Action Plan." City of Duluth. October 2001. Web, 12 June 2012. <http://www.natcapsolutions.org/ClimateManual/Cities/Chapter3/Duluth_baseline_14vii06.pdf>



WHAT IS CLIMATE ACTION PLANNING?

Climate change is by definition global and cannot be addressed by one community acting alone. Many mitigation efforts, however, can only be implemented at the local level, and community-scale strategies must be developed.

The local communities where we live and work present many opportunities to reduce greenhouse gas emissions, simultaneously addressing climate change and providing direct local benefits. While small cities may not be able to match national examples like Chicago for big flashy efforts, they have the ability to tailor efforts to local concerns and be just as impactful.

From an individual home to the citywide street network, local action can help slow climate change while also saving money, improving quality of life, and supporting new business and employment opportunities.

WHY YPSILANTI? WHY NOW?

Ypsilanti has already established itself as a leader in energy conservation and related issues, with the community taking a lead on sustainability. The Ypsilanti Climate Action Plan is a way to aggregate many of these efforts, support them through the City in the form of a formalized process, and collectively move forward toward City and community goals related to climate change.

Municipal efforts in the past few years have included a number of significant energy-related projects, and have been effective in an opportunistic, incremental approach: incorporating energy efficiency measures into already-planned projects, or leveraging outside funding opportunities to undertake projects that reduce greenhouse gas emissions and bring other benefits.

Examples of these projects include:

- ▶ Recent renovations to the city's Senior Center and Parkridge Community Center included energy-saving measures like insulation, more efficient windows and boiler upgrades, in addition to improvements for structural maintenance and better ADA access.
- ▶ City Hall features a 2.5 kW photovoltaic array installed in 2010 with the help of the Solar Ypsi initiative. During this project, the Historic District Commission also developed explicit guidelines for appropriate installation of solar panels on historic properties, streamlining future installations.
- ▶ A 2011 streetscaping project on West Cross used LED fixtures in the new streetlights, a choice expected to save the city over \$3,500 a year in energy and maintenance costs.
- ▶ Currently, the city is establishing a municipal tree nursery to provide for shade tree planting along public streets and in parks at a fraction of the cost of purchasing mature trees. This work is funded by a Great Lakes Restoration Initiative grant and includes a workforce training component.
- ▶ Ypsilanti has leveraged Congestion Mitigation and Air Quality grants for several recent projects, ranging from the construction of a segment of the "Border to Border" bike/walk trail to the replacement of the city's aging street sweeper with a lower emissions model.

Looking more broadly, Ypsilanti is home to a number of citizen groups and non-profits interested in climate-related issues. Whether around bicycling, gardening, farmers markets, renewable energy or general sustainability, the community's tradition of vibrant civic engagement provides both momentum and opportunity for new, coordinated efforts.

Finally, Eastern Michigan University, which occupies a quarter of the city's total land area and accounts for roughly 40% of the city's total daytime population,² has incorporated energy efficiency measures into its recent capital projects: the renovation and expansion of the Mark Jefferson Science Complex alone included energy-related improvements that will save an estimated \$400,000 in annual operating costs and eliminate more than 3,000 metric tons of carbon dioxide equivalent (mtCO₂e) in annual greenhouse gas emissions. The University has also taken steps to support transit commutes and encourage staff to live locally.

Through the sum of these efforts, Ypsilanti is already actively, though not always explicitly, pursuing climate change mitigation. The community lacks specific priorities. While the opportunistic approach has worked well in a number of cases, a strategic look at various options will help the city more strategically select projects—an important consideration in a time of extremely limited funds and staff time.



² | Based on commute data and estimates from EMU staff, Ypsilanti's daytime population is around 25,000. With around 5,000 students commuting into town for school and 5,000 students already residing in the city, EMU represents roughly 40% of the daytime population.

➔ A REGIONAL PARTNERSHIP FOR LOCAL AND GLOBAL IMPACT

This project is a collaborative effort made possible by a grant awarded to the City of Ypsilanti by the Michigan Department of Environmental Quality in August 2010. In partnership with the Michigan Suburbs Alliance, the Cities of Ypsilanti, Hazel Park and Southgate each received \$50,000 to develop a model process for small-city climate action planning. From 2010 to 2012, with leadership from the Michigan Suburbs Alliance, Ypsilanti has developed a basis for climate action planning that takes into account the city's limited resources and builds upon the tight-knit nature of the local community to effect change.

The participating cities set three goals for the local climate action planning process. First, test and model greenhouse gas emissions reduction strategies for small cities in metro Detroit. Second, engage a broad and diverse citizenry in reducing our collective carbon footprint. And third, develop a local climate action plan that addresses issues like transportation, buildings, renewable energy and government operations. This process will develop a model process and plan for other small Michigan cities to follow, a library of best-practice strategies to reduce greenhouse gas emissions and a city-specific climate action plan for each community to be adopted by city council.

A successful city climate action plan must be defined and supported by local residents and businesses. Citizens must feel empowered and included in the city's planning activities. Local development of the Ypsilanti Climate Action Plan was rooted in broad civic engagement and supported by planning professionals at the city, the Michigan Suburbs Alliance and WARM Training Center. Ypsilanti convened a dedicated group of local stakeholders throughout the process who participated in community forums to identify how the city can reduce the impact of climate change in their community. In large part, this report is their work.



OUR METHODOLOGY

► GREENHOUSE GAS DATA COLLECTION

Developing realistic, implementable strategies to mitigate the impacts of climate change requires a proven methodology to analyze Ypsilanti's greenhouse gas emissions. An inventory of GHG emissions establishes a baseline for both the government and community sectors, which is then used to develop strategies for targeted sectors and measure future emissions reductions resulting from the implementation of those strategies.

The tools and resources developed by ICLEI Local Governments for Sustainability guided our determination of sources and provided quantification methodologies. Since 1990, ICLEI has been assisting cities in their efforts to limit their environmental impacts by providing analytical tools and methods to help local governments and communities measure and reduce their greenhouse gas emissions.³ Preparation of this plan also drew on the experience of the Southeast Michigan Regional Energy Office, an intergovernmental organization that works with municipalities and other civic partners to support efficiency work, renewables and other energy-related projects in southeast Michigan. Ypsilanti is a member city of the Regional Energy Office.

The following concepts are used throughout this plan, and are explained here to orient non-experts to these technical issues and to ensure that those with background knowledge share an understanding with this plan. More technical detail can also be found in Appendix A.

- Greenhouse gas (GHG) emissions: The vast majority of scientists agree: an unprecedented increase in greenhouse gases, driven by human activity, is causing our climate to change. Greenhouse gases like carbon dioxide, methane, nitrous oxide and fluorinated gases are emitted in the course of daily activity, when we drive our cars, turn on lights and even when you exhale. GHG emissions can be either direct or indirect—a toaster indirectly emits, while the power plant that provides the electricity for that toaster directly emits. The EPA's website contains a wealth of information for those interested in learning more.⁴
- Metric tons of carbon dioxide equivalent (mtCO₂e): This unit is a generally accepted standard used to measure GHG emissions, combining all of the different greenhouse gases, weighted by their impact, into a single measure. This plan uses it throughout the discussion of various strategies to measure and compare their impact. One mtCO₂e is equivalent to the emissions produced by consuming 112 gallons of gasoline.
- Return on Investment (ROI): Return on investment defines the rate at which energy savings resulting from efficiency improvements will recoup the initial cost of the project. For example, a project that costs \$5,000 to implement and saves \$1,000 worth of energy annually has a 20% ROI, or a 5 year payback.

► ORGANIZATIONAL BOUNDARIES

In the absence of any US-based standard for assessing GHG emissions, the methods used for the evaluation of community emissions are outlined in the International Local Government Greenhouse Gas Emissions Analysis Protocol. The methods used for the evaluation of governmental emissions are outlined in the Local Government Operations Protocol (LGOP), which was developed through a partnership between the California Air Resources Board, California Climate Action Registry, and ICLEI.⁵

► COMMUNITY

ICLEI's International Local Government GHG Emissions Analysis Protocol indicates that any community-scale emissions inventory must include all emissions associated with any activity occurring within the geopolitical boundaries pertaining to the jurisdiction of the local government. The rationale for this edict is that local governments have a greater degree of influence over activities occurring within their jurisdictions, as opposed to activities occurring outside of their jurisdiction.⁶ The actual emission sources, as in the case of electrical power plants, may occur outside of the geopolitical boundaries but be driven by activities within the community.

³ | Local Government Operations Protocol. "The Climate Registry. ARB, CCAR, ICLEI, The Climate Registry, May 2010. Web. 23 May 2012. <<http://www.theclimateregistry.org/downloads/2010/05/2010-05-06-LGO-1.1.pdf>>.

⁴ | Start at: <http://www.epa.gov/climatechange/science/causes.html> ⁵ | Ibid.

⁶ | International Local Government Greenhouse Gas (GHG) Emissions Analysis Protocol, ICLEI, p. 11, <http://www.iclei.org/index.php?id=ghgprotocol>

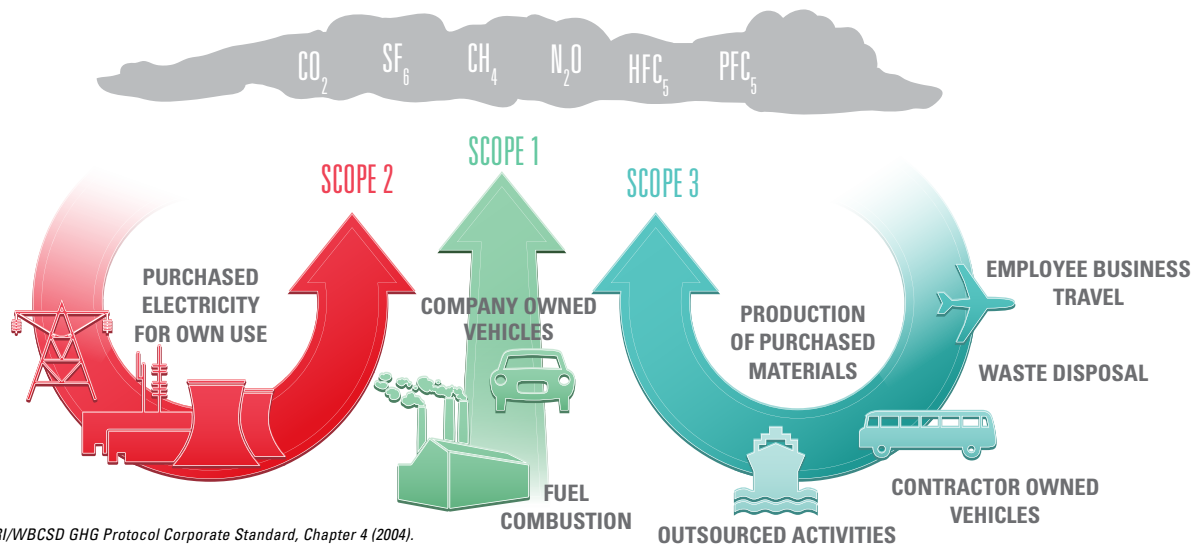
► GOVERNMENT

The Local Government Operations Protocol indicates that the preferred method quantifies GHG emissions only from sources over which a local government has operational control. A local government has operational control if it has the full authority to introduce and implement operating policies. According to this Protocol, “one or more of the following conditions establishes operational control:

- Wholly owning an operation, facility, or source;
- or
- Having the full authority to introduce and implement operational and health, safety and environmental policies (including both GHG- and non-GHG- related policies).⁷

Under this approach, the local government is responsible for all emissions that are emitted in any facility where the government has operational control. However, it is important to note that though a municipality may have full operational control over a facility, control of capital investments or other major changes may be shared. Under LGOP, however, this does not change the responsible party.⁸

► IDENTIFYING GHG OPERATIONAL BOUNDARIES



Source: WRI/WBCSD GHG Protocol Corporate Standard, Chapter 4 (2004).

► DEFINING SCOPE

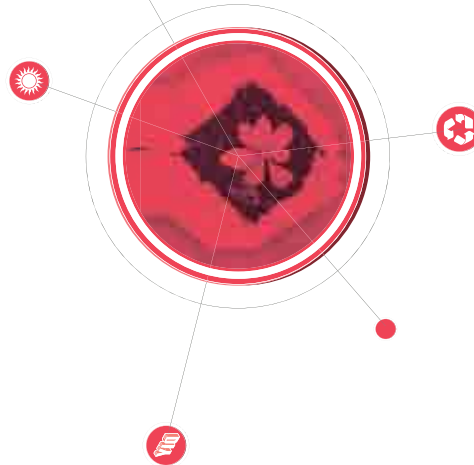
Greenhouse gases are emitted in the course of daily activity. To account for both direct and indirect emissions, improve transparency, and provide information for different types of climate policies and goals, this report follows the World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) GHG Protocol Corporate Standard in categorizing direct and indirect emissions into “scopes” as follows:

- SCOPE 1:** All direct GHG emissions, with the exception of direct CO₂ emissions from biogenic sources, such as decaying food waste.
- SCOPE 2:** Indirect GHG emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.
- SCOPE 3:** All other indirect emissions not covered in Scope 2, such as emissions resulting from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity (e.g., employee commuting and business travel), outsourced activities, waste disposal, etc.⁹

7 | “Local Government Operations Protocol.” *The Climate Registry*. ARB, CCAR, ICLEI, The Climate Registry, May 2010. Web. 23 May 2012. <<http://www.theclimateresistry.org/downloads/2010/05/2010-05-06-LGO-1.1.pdf>>.

8 | Ibid. 9 | “The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.” Revised ed. World Business Council for Sustainable Development and World Resources Institute, n.d. 25-32. Web. 23 May 2012. <<http://www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf>>.

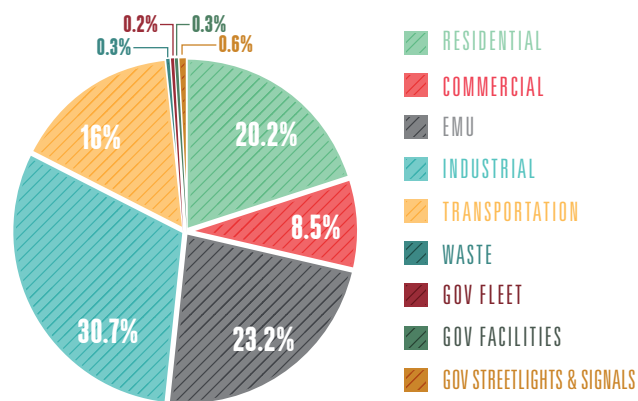
YPSILANTI'S BASELINE EMISSIONS & EXISTING CONDITIONS



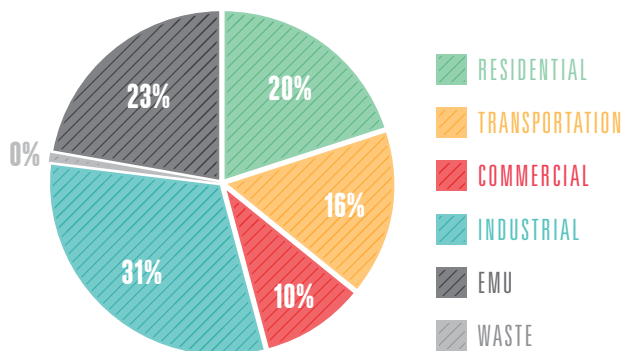
► GREENHOUSE GAS DATA COLLECTION

Over 15 months, the City of Ypsilanti and its consultants, Michigan Suburbs Alliance and WARM Training Center, collected available energy usage data with concentrated collection efforts across four main sectors: Buildings (commercial, industrial, residential and government), Culture Change (events, celebration and education), Infrastructure (water, waste and energy generation), and Land Use and Transportation (development patterns, travel options). Data was collected primarily from city departments (energy bills, fleet fuel usage, gas bills, etc), DTE Energy, Southeast Michigan Council of Governments and the U.S. Census. Combined, these four sectors provide an accurate summary of Ypsilanti's total community and municipal emission usage profile and existing conditions. These GHG emission baselines, analyzed by sector, provide a path to align community emission reductions goals with realistic strategies and resident desire to positively impact existing conditions, thereby reducing the city's impact on climate change.

TOTAL GHG EMISSIONS, COMMUNITY + GOVERNMENT
[TONS CO₂e]



COMMUNITY GHG EMISSIONS, 2008
[TONS CO₂e]



► COMMUNITY & GOVERNMENT EMISSIONS

The Ypsilanti community contributed 302,710 metric tons of GHG emissions (CO₂e) into the atmosphere in 2005/2008, equivalent to 15.0 metric tons per capita for the city.¹⁰ On average, national emissions per capita in 2000 were 24.5 metric tons CO₂ equivalent (CO₂e) for comparison.¹¹

The Ypsilanti city government contributed 3,387 metric tons of emissions, about 1.1% of the total emissions. Municipal emissions are typically a small percentage of the overall community emissions profile. Local government has a number of levers from which to change not only its own behavior, but also that of its citizens. Local governments have control over the processes, technologies, and procedures that result in municipal emissions. A dedicated focus on these emissions can be a productive source for emissions reductions.

¹⁰ | Transportation and waste data are from 2005. All other sectors are from 2008.

¹¹ | Baumert, Kevin A., Timothy Herzog, and Jonathan Pershing. Navigating the Numbers: Greenhouse Gas Data and International Climate Policy. N.p.: World Resources Institute, 2005. 22. Web. 23 May 2012. <http://pdf.wri.org/navigating_numbers_chapter4.pdf>.

► COMMUNITY SECTOR EMISSION USAGE

The commercial sector in Ypsilanti was the greatest contributor to GHG emissions, with 9.5% of the total emissions plus 23% additional commercial from Eastern Michigan University (EMU). Industrial followed close behind at 31%. Residential was third, with 20% of the total emissions. Transportation emitted 16% of total emissions. Emissions from community waste, a Scope 3 source, made up 0.3% of the overall emissions profile.

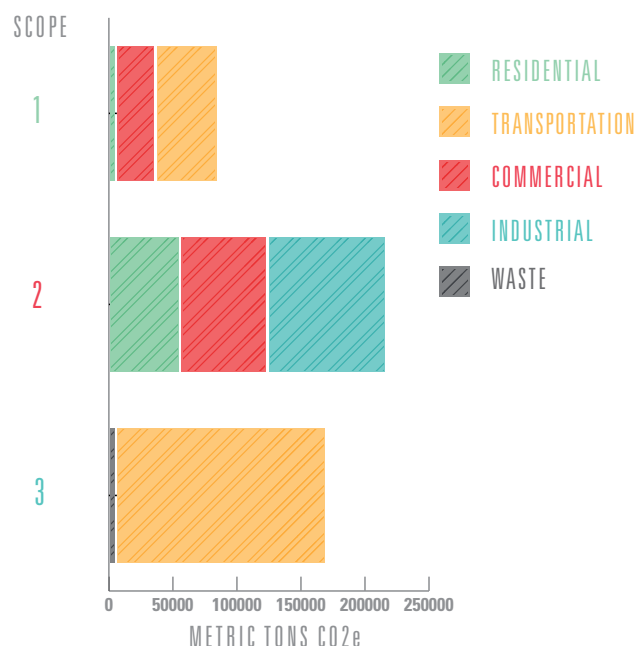
The large contributions of the industrial and commercial sectors are attributed to two factors. First, Eastern Michigan University, a significant part of the Ypsilanti community, was a large commercial emitter, producing 70,228 metric tons of CO₂ equivalent emissions in 2008. EMU's emissions were considered additive to the existing community emissions. Unclear data scope is another methodological issue that could have led to the large contribution of industrial and commercial to overall community emissions. See the Electricity/Natural Gas methodology section in Appendix A for an in-depth explanation.

► EMISSIONS BY SCOPE AND SECTOR

Examining emissions by scope is an important component of any GHG assessment, as scopes help prioritize investments to reduce impacts. Scope 1 and 2 emissions are the most directly impacted by local action and thus most inventories only include scope 1 and 2 emissions in their totals. Scope 3 emissions are those emissions either partly or wholly outside of the geographic bounds of the city.

For Ypsilanti, Scope 2 emissions are more than double Scope 1 emissions. Scope 3 emissions are attributed to sources outside of the city and, in Ypsilanti's case, include emissions from the miles travelled for all trips beginning or ending with the city (including those miles travelled outside of the city) and the fugitive emissions (largely methane) from garbage produced by city residents and businesses and sent to the Woodland Meadows landfill, operated by Waste Management.

2008 COMMUNITY GHG EMISSIONS BY SECTOR BY SCOPE



➔ OVERALL YPSILANTI EMISSIONS REDUCTION GOALS

From the baseline greenhouse gas emissions level of 302,710 metric tons CO₂-equivalent, the target reduction amount selected was 50% by 2050, or approximately 12.5% (37,838 mtCO₂e) per decade. This percentage is based on a review of climate planning efforts around the country and a consideration of feasibility: many of these used targets of 80%-100% emissions reductions by 2050, but based on the more limited powers of a smaller city on issues like regional land use or travel patterns, this number was considered unrealistic for Ypsilanti's plan.

In addition, the City of Ypsilanti should formally commit to the Millennial Mayors Congress 2009 Energy Savings Protocol by passing a resolution of support through the local City Council. This would add an additional energy savings goal of reducing municipal energy use from non-renewable sources to 25% below 2005 levels within 5 years time.¹²

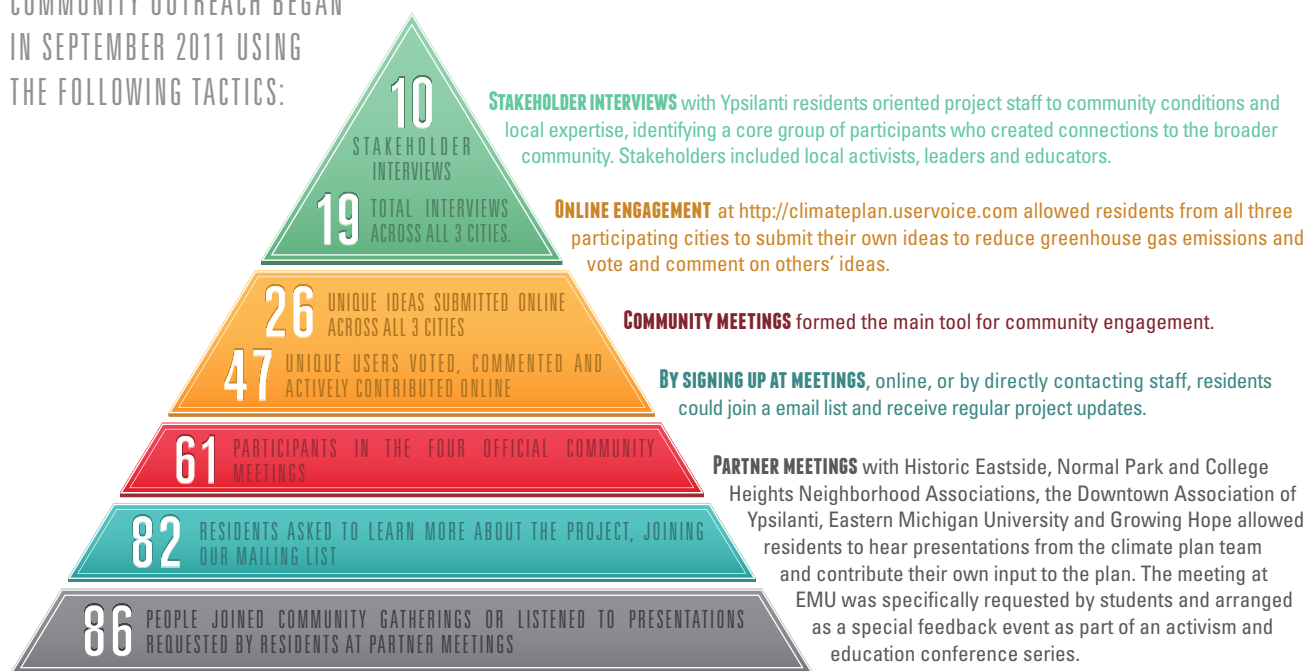
For more data and analysis about the city of Ypsilanti's GHG emission usage by community, sector and source, reference City of Ypsilanti's Greenhouse Gas Assessment, Appendix A.

¹² | The Millennial Mayors Congress Energy Savings Protocol, adopted in 2009, calls upon member cities to reduce energy use to 25% below 2005 levels by 2015. However, since City of Ypsilanti would be adopting the protocol later than the Congress as a whole, it would make sense to extend the target year.

PUBLIC ENGAGEMENT

The City of Ypsilanti chose to create this local climate action plan through a community-driven process. By engaging residents from the very beginning of the process, the plan has generated a greater variety of ideas, and the community as a whole will be more likely to support its implementation. This ensures that the final plan will more fully represent community desires, taking into account local challenges and resources. Ypsilanti already has a base of climate activists; however, these stakeholders act independently of one another with varied purpose. The primary planning process goal was to connect these parties with less-engaged citizens around the creation and later implementation of a climate action plan.

COMMUNITY OUTREACH BEGAN
IN SEPTEMBER 2011 USING
THE FOLLOWING TACTICS:



Through these opportunities for public engagement, residents were able to set local goals, inform plan writers about community conditions and resources, brainstorm ideas to reduce greenhouse gas emissions, assess proposed strategies, suggest how to best implement the plan, and give general feedback and comments on drafts of the Ypsilanti climate action plan. Residents also sought to move implementation of the lower-priority strategies—those that will not be included in this plan but that could be important for community goals—into the sphere of community work.

The City of Ypsilanti has few resources to implement this climate plan. Many of these strategies for greenhouse gas reductions will need to be driven by the community. This means the City must provide avenues for both formal and spontaneous citizen engagement in plan implementation. A final community meeting in September will kick off this process by informing a broad swath of citizens about the plan and providing them with resources to get involved.



➤ **RECOMMENDED** EMISSIONS-REDUCTION STRATEGIES

More than one hundred strategies were collected and considered for this plan, based both on community suggestions and on best practices research. The research considered related efforts in other communities, both locally and across the nation, as well as compilations of climate change mitigation tactics from ICLEI and Transition Network.

For the purpose of the plan document, attention has been focused on providing a greater level of detail on action steps and relevant resources for a smaller number of “first steps” strategies. These strategies were selected based on a combination of effectiveness (clear and significant links to greenhouse gas reduction), community support and perceived feasibility. The selection process also emphasized strategies that offer clear financial returns or other substantial benefits in addition to the greenhouse gas mitigation.

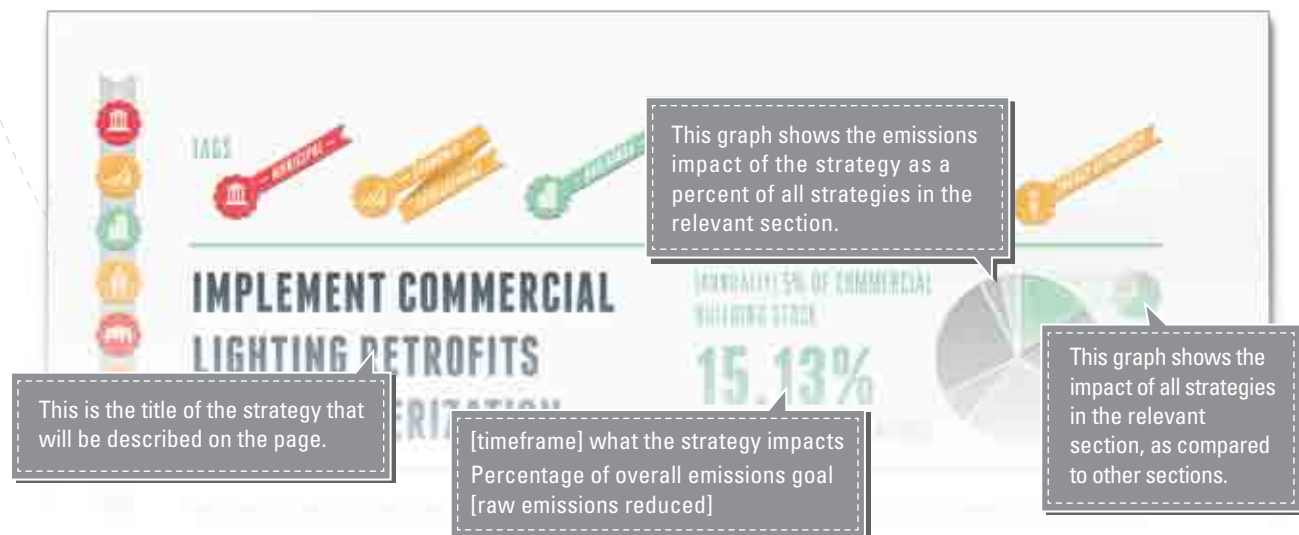
The full list of potential strategies identified during the process is included in Appendix B for reference. Some of these additional strategies may be appropriate “next steps” for future consideration; others are likely to be unworkable, due to cost, legal barriers, or other challenges.

THE SELECTED STRATEGIES HAVE BEEN GENERALLY DIVIDED INTO FOUR CATEGORIES, WITH THE ACKNOWLEDGEMENT THAT THESE OVERLAP AND ARE INTERCONNECTED:

- ▶ **BUILDINGS**
- ▶ **LAND USE & TRANSPORTATION**
- ▶ **INFRASTRUCTURE**
- ▶ **CULTURE CHANGE**

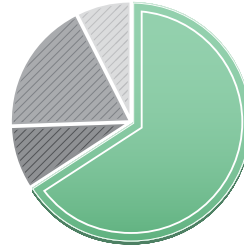
Within each strategy, examples are provided of successful implementation in other communities--locally, where possible, estimates of implementation costs on a relevant per-unit basis, estimates of potential greenhouse gas mitigation impacts, discussion of ancillary benefits, identification of potential partners or stakeholders for implementation, and additional considerations that may help appropriately target adoption. Except where otherwise noted, both implementation costs and GHG and cost savings were estimated using the ICLEI Climate and Air Pollution Planning Assistant version 1.5 (CAPPA), which contains standards derived from the experience of local governments across the country.

HOW TO READ A STRATEGY:





Buildings are where many of us live, work, play and emit greenhouse gases. Ypsilanti's historic buildings are an asset that should be preserved and upgraded for greater energy efficiency.



67.83%

OF 2020 TARGET
[BUILDING STRATEGY REDUCTIONS]

RECOMMENDED EMISSIONS-REDUCTION STRATEGIES

BUILDINGS

Heating and lighting buildings consumes a substantial amount of energy, producing 27% of emissions from municipal operations and the great majority of emissions at the community scale. As of 2010, city assessing records showed 6,683,191 square feet of commercial and industrial property on 446 parcels, and 6,495,995 square feet of residential property on 4,119 parcels.¹³

Improvements to buildings are made by individual building owners, but the City of Ypsilanti has a number of tools to support these improvements and can also use the improvements it makes to its own buildings to model opportunities for other property owners. Many energy efficiency improvements in buildings have high returns on investment, paying back capital costs in as little as 1 year, or within 5 to 10 years, making them attractive to property owners. National experience also suggests that highly energy-efficient buildings can bring higher rents or sale prices, providing another incentive for owners to make improvements.

Because each building is unique—especially when working with historic properties—it is difficult to identify “one size fits all” solutions. Any energy efficiency work on a building should start with an energy audit to identify the best opportunities to reduce energy usage and save money. DTE Energy offers walkthrough audit service for commercial properties as well as subsidized energy audits for homes; the Southeast Michigan Regional Energy Office and other nonprofits also offer home energy audits for a fee.

Due to the outsized role of energy use by buildings, 70% of the overall emissions reduction goal is targeted at building-related strategies: a 26,487 mtCO₂e reduction by 2020. Additional community goals set around buildings include:

- ▶ Property owners improve energy efficiency in all types of buildings, with special attention paid to historic structures.
- ▶ Owners and residents of rental housing units, a substantial portion of the city’s building stock, share in the benefits of energy savings.

Although Eastern’s campus does account for a substantial share of emissions within the city, the University has already undertaken improvements at a number of campus facilities, yielding 6,475 mtCO₂e in emissions reductions, and nearly \$800,000 in annual cost savings. Because Eastern is still in the midst of a multi-year program to identify and implement energy efficiency measures in their buildings, specific recommendations are not presented in this plan.

¹³ | These numbers may not include some un-assessed, tax-exempt properties.

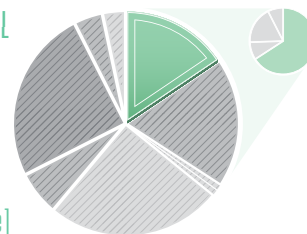


IMPLEMENT COMMERCIAL LIGHTING RETROFITS AND WEATHERIZATION

[ANNUALLY] 5% OF COMMERCIAL BUILDING STOCK

15.13%

OF 2020 TARGET [4809.6 mtCO₂e]



Ypsilanti's historic building stock is certainly an asset to the community. However, this historic nature also indicates that many of the buildings in town have outdated lighting technology. For commercial and institutional applications, lighting retrofits are one of the quickest, surest paybacks, usually in the range of 1 to 7 years. Commercial and industrial spaces should explore other energy efficiency measures, such as HVAC upgrades and insulation, in concert with lighting upgrades. The City of Ypsilanti has already upgraded many of their older fluorescent lights to more efficient fixtures.

► EXAMPLES:

Numerous Southeast Michigan Regional Energy Office members have performed lighting upgrades in their municipal buildings. A video case study can be found on the Energy Office's website.¹⁴ Ypsilanti has already upgraded some older fluorescent light ballasts in City Hall.

► IMPLEMENTATION COSTS:

Lighting retrofits are often in the range of \$60 per 1,000 square feet of building, depending on the technology used.

► EXPECTED GHG SAVINGS:

Lighting retrofits can bring energy savings of 15% or more: 1.5 mtCO₂e annually per 1,000 square feet of construction, based on ICLEI "typical experience" measures. Applied across approximately 100,000 square feet of municipal buildings, this would total 150 mtCO₂e. If 5% of the city's commercial and industrial properties undertake lighting upgrades annually, reductions of 4,000 mtCO₂e could be achieved by 2020.

Applying other weatherization measures for commercial and industrial sectors at the same installation level, focusing specifically on HVAC and air-sealing, can achieve an additional 1,067 mtCO₂e in emissions reductions by 2020.

► CONSIDERATIONS:

There are a number of options for lighting retrofits, ranging from T8 or T5 fluorescents to LED or other forms of solid state lighting technologies. An energy audit focused on lighting is recommended for any building that seeks to upgrade its lighting technology.

► ADDITIONAL BENEFITS:

Occupants can expect energy cost savings of approximately \$200 per 1,000 square feet, resulting in lower operating costs over the lifetime of the building. Lighting retrofits also reduce fluorescent flicker, improving employee comfort and building appearance. By better shielding a building from the elements, weatherization upgrades make a building more comfortable and save money.

► PARTNERS & STAKEHOLDERS:

DTE offers free walk-through inspections to advise commercial building owners on opportunities and available incentives. City of Ypsilanti, as a member of the Regional Energy Office, can also utilize those technical assistance resources to implement lighting retrofits in its buildings. The Regional Energy Office additionally expects to have access to PACE funding soon, and can use this financing to support commercial efficiency upgrades.

➔ RECOMMENDED APPROACH:

Upgrade lighting in city buildings as soon as possible. Advertise the availability of low and no cost energy audit services to help building owners prioritize the energy work they would like to do in their buildings. Partner with relevant organizations to help market available services.

¹⁴ | A video case study can be found at the following link: <http://www.youtube.com/watch?v=Rc7Fwz4rwek>

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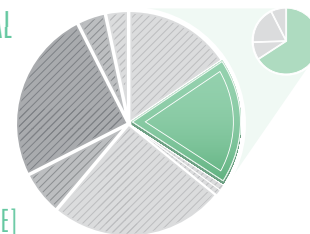


INSTALL AND PROMOTE BUILDING LIGHTING SENSORS

[ANNUALLY] 5% OF COMMERCIAL BUILDING STOCK

18.16%

OF 2020 TARGET [4809.6 MTCO₂E]



Installing occupancy sensors on interior lighting can be a simple and cost-effective way to reduce electricity consumption—typical experience suggests a 35% reduction in electricity usage is possible in commercial buildings, with payback of installation costs in less than a year. In other locations, light-level sensors that can dim or brighten lighting based on natural light levels can save energy while maintaining constant light levels. However, these light sensors require dimmer-friendly fixtures and may not be as reliable as occupancy sensors.

► IMPLEMENTATION COSTS:

Hardware and installation costs average around \$50 per room, or \$50-\$100 per 1,000 square feet.

► CONSIDERATIONS:

The total impact of this strategy is lessened significantly when lighting fixture upgrades are also undertaken. Additionally, the use patterns of many of the city's spaces specifically—whether they are occupied continuously or very rarely—may reduce effectiveness. However, the overall cost/benefit consideration remains high.

► EXPECTED GHG SAVINGS:

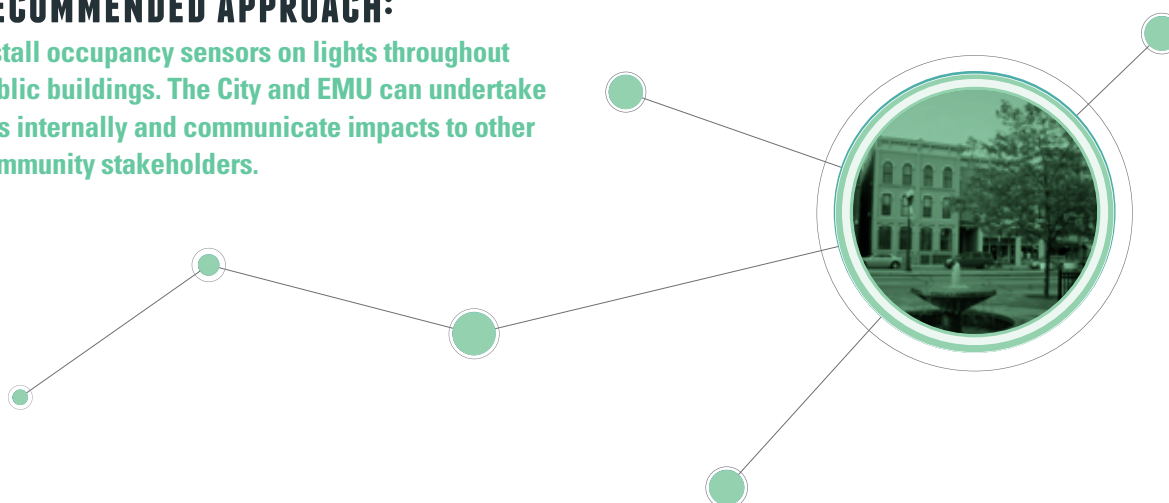
Each 1,000 square feet installed with occupancy sensors can prevent 1.8 mtCO₂e annually, with up to \$250 in accompanying annual electricity savings. Applied across all city buildings, this could reduce 180 mtCO₂e annually.

► PARTNERS & STAKEHOLDERS:

Beyond public and institutional buildings, improvements must be made by individual building owners. The Ypsilanti Downtown Development Authority, Downtown Association of Ypsilanti and Ypsilanti Area Chamber of Commerce can help get information to building owners.

➔ RECOMMENDED APPROACH:

Install occupancy sensors on lights throughout public buildings. The City and EMU can undertake this internally and communicate impacts to other community stakeholders.



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THE CITY OF YPSILANTI

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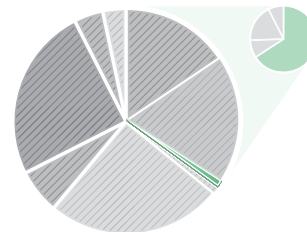
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PURSUE SOLAR THERMAL AND PHOTOVOLTAIC OPPORTUNITIES

[ANNUALLY] 20 KW INSTALLED

0.66%

OF 2020 TARGET [176 mtCO₂e]

In general, building-scale alternative energy generation should only be pursued after all reasonable energy efficiency measures have been completed: energy efficiency is typically much more cost-effective than energy generation. However, Ypsilanti stakeholders have demonstrated a strong interest in alternative energy generation, and various combinations of federal tax incentives, DTE incentives and grant funding may make solar installations cost competitive. Solar energy generation may include solar photovoltaic (PV), which generates electricity, solar thermal, which heats water, or hybrid, “water-cooled” systems—photovoltaic panels that generate hot water as a byproduct.

► EXAMPLES:

The Solar Ypsi initiative has initiated or supported several solar photovoltaic installations around Ypsilanti, and is unique in the region for its online interface that shows live and cumulative energy generation.

► IMPLEMENTATION COSTS:

A University of Michigan team working with the Corner Brewery estimated a commercial-building-scaled 20 kW photovoltaic/thermal hybrid system as costing approximately \$200,000 to install.¹⁵

► CONSIDERATIONS:

Current federal incentives expire in 2016, while DTE's SolarCurrents program is fully subscribed as of this plan's adoption. Maintaining clear, current information on opportunities for interested businesses and homeowners will be the most significant challenge in supporting adoption. A solar thermal or hybrid system will have the most impact for a building that uses a lot of hot water.

► EXPECTED GHG SAVINGS:

Expected GHG savings: Each 1 kW of solar PV/thermal hybrid installed can be expected to offset 2,150 kWh of electricity and 223 cubic feet of natural gas usage annually, preventing 1.1 mtCO₂e of emissions.

► PARTNERS & STAKEHOLDERS:

Solar Ypsi is a strong unifying brand for the community. The site and the people behind it can serve as a clearinghouse for information and funding opportunities, with the support of relevant non-profits like Clean Energy Coalition and Regional Energy Office.

► ADDITIONAL BENEFITS:

Without any financial incentives, a solar system will likely take decades to recoup savings that equal the initial cost. Combinations of currently available incentives, however, can yield payback periods of less than 10 years. Additionally, solar installations have a higher profile than many other strategies: this visibility provides opportunities for education and for promotion of the community's achievements, and support a sense of pride shared by many Ypsilanti residents.

➔ RECOMMENDED APPROACH:

Monitor financing opportunities for solar installation and publicize via Solar Ypsi. The City should monitor grant opportunities for solar hybrid systems on high water-usage public buildings, such as the Rutherford Pool and Fire Department, and remain alert for low-cost ways to support private installations; a PACE program would be one such option. A target of 20 kW of new installed capacity within the city annually would build on recent momentum.

¹⁵ | Bennett, Jazmine, Jarrett Diamond, Gary Fischer, and Kerby Smithson. "The Green Brewery Project." Apr. (2010). Web. 25 May 2012. <<http://hdl.handle.net/2027.42/83664>>.



The Ypsilanti Food Cooperative installed a 12 panel, 2.38 KW solar array in 2009, in collaboration with SolarYpsi.



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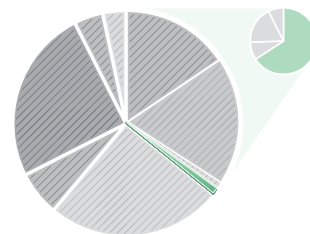


INCORPORATE GREEN BUILDING STANDARDS INTO INCENTIVE PROGRAMS

[ANNUALLY] 10,000 SQUARE FEET OF DEVELOPMENT

1.03%

OF 2020 TARGET [272 mtCO₂e]



Ypsilanti has made significant use of various redevelopment incentive programs and tax abatements over the past decade, including brownfield, obsolete property, industrial facilities, and facade grant programs. The City's adopted economic development incentive policy states a preference for projects that are "green," but does not provide any specific measure for green development. Providing clear guidance, via reference to industry-accepted standards or certifications, will make this criterion more meaningful and provide clearer guidance to developers and city staff. While Leadership in Energy and Environmental Design (LEED) certification is the most well-known program, it has been criticized for the costs required to achieve certification; alternative systems such as Green Building Initiative's Green Globes certification may be more appropriate to minimize the cost and effort needed to demonstrate compliance.

► EXAMPLES:

East Lansing adopted an ordinance in early 2009 requiring any construction project that receives municipal incentives to achieve LEED certification. The requirement is triggered based on the value of incentives as a percent of project cost.

► IMPLEMENTATION COSTS:

A Green Globes self-assessment costs about \$500, if the city is willing to allow review internally rather than requiring third-party review. A report with third-party verification costs about \$3000.

► EXPECTED GHG SAVINGS:

Certification can yield energy savings of 25% or more: 3.4 metric tons CO₂ annually per 1,000 square feet of construction, based on ICLEI "typical experience" measures.¹⁶ Based on recent history, with an average 10,000 square feet of development projects receiving public subsidies annually, such a policy could save a total of 272 mtCO₂e by 2020.

► ADDITIONAL BENEFITS:

Occupants can expect energy cost savings of up to \$500 per 1,000 square feet, and certified green buildings can also bring higher rents through cachet factors, translating to higher income for property owners and higher property values for the community.

► PARTNERS & STAKEHOLDERS:

Developers of recent projects in the city can be asked for feedback on the selected evaluation tool, as many are "repeat users" of incentive programs. Ann Arbor SPARK can help communicate the policy's benefits to prospective developers and businesses.

► CONSIDERATIONS:

The Green Globes certification process appears to be reasonably scaled for typical projects in the city, especially when tied to municipal subsidies—recent projects given Obsolete Property Rehabilitation Act abatements, for example, received \$50,000 or more per year in effective subsidy. An alternative approach based on building code-style language and review rather than a certification review would require publicly subsidized projects to use a standard such as ASHRAE 189.1 "High-Performance Buildings."¹⁷

16 | Using CAPPA 1.5 calculator, "Require Green Building for New Construction."

17 | This particular standard, however, does not cover "low-rise residential," which would exclude many recent projects that have received tax abatements.



➔ RECOMMENDED APPROACH:

Adopt a Green Globes certification requirement for any development project receiving at least \$10,000 in municipal incentives or tax abatements in a single year. While a trigger based on percent of project cost could also be used, the \$10,000 condition is already used in other city incentive policies and would provide consistency. This strategy could also be built into a graduated approach to incentives or abatements that adjusts the package according to the amount of community benefits in the proposed development.



TAGS

BUILDINGS

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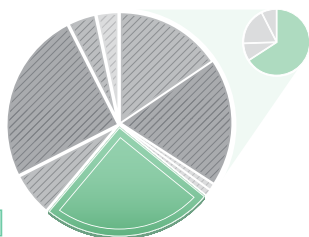


CREATE ENERGY-EFFICIENT RENTAL HOUSING CERTIFICATION

[ONGOING] ALL RENTAL
HOUSING STOCK

24.32%

OF 2020 TARGET [6442.8 mtCO₂e]



Energy Efficient
Rentals



A large share of Ypsilanti's housing—nearly 2/3 of all dwelling units—is rental-occupied, ranging from single-family homes to large apartment complexes. Rental housing is traditionally difficult to target with energy efficiency programs, because the capital cost of any upgrade is typically borne by the landlord, while the month-to-month costs, and therefore the benefits of any upgrade, are typically the tenants' responsibility. Ypsilanti already has a strong rental housing inspection and certification program that could be leveraged to address this problem through a combination of improved information and regulatory requirements. Chapter 58, Article IV of the City's Code of Ordinances addresses "Landlord and Tenant Relations" and could be extended for this purpose.

Energy efficiency rental housing ordinances could take a number of forms, and many of these options can be combined or implemented in phases over time. Local landlords must be involved in the process to ensure any new requirements are feasible. Many of the community's best and most attentive landlords may welcome new ways to differentiate themselves within a crowded market.

➡ OPTION 1: REQUIRE ENERGY COST DISCLOSURE BY LANDLORDS

The most basic approach to rental greening is to require that landlords provide tenants with information on utility costs prior to signing a lease. This gives tenants a better understanding of the total cost of a unit and allows them to shop around. It also avoids "punishing" landlords who invest in energy efficiency measures and attempt to recoup those costs through higher rents.

Examples: City of Ann Arbor City Code Sec. 8:524, "Information regarding utility charges" requires provision by landlords of estimated utility costs prior to signing a lease.

Implementation costs: Costs are minimal for both the city (developing and passing an ordinance) and for landlords (providing utility cost information).

Considerations: landlords who comply with this requirement can apply "peer enforcement" by encouraging prospective tenants to ask other landlords for the information.

➤ OPTION 2: PROVIDE FORMAL RECOGNITION FOR ENERGY EFFICIENT RENTAL UNITS

Verifying and certifying rental units that meet certain energy standards requires more effort, but would produce a more user-friendly way for tenants to “shop” for efficient units.

Examples: The “Energy Star Homes” program certifies new-construction homes nationally; while not directly applicable for Ypsilanti’s rental stock, it can be used to benchmark a certification program.

Implementation costs: Costs would remain minimal for landlords under this option; the City would require more effort to craft and administer the program, though it could still be managed within the existing rental housing inspection program.

Considerations: Staff have already discussed this option with City of Ann Arbor staff and have identified a shared interest: developing such a program in partnership would reduce the burden on city staff. While Eastern Michigan University does not currently offer a database of off-campus housing options, such a tool could help students find high-quality housing as well as offer a way to *communicate the energy efficiency certification*.

➤ OPTION 3: REQUIRE ACHIEVEMENT OF CERTAIN ENERGY STANDARDS

A more aggressive—and effective—approach would require that rental housing units meet certain efficiency standards. These standards would likely need to be phased upwards over time or tied to certain “triggering” events.

Examples: City of Ann Arbor City Code Sec 8:528, “Basic winterization in rental housing” provides minimum air sealing and insulation standards for rental units.

Implementation costs: Costs are minimal for the city, though developing such an ordinance would be more complex than the mandated disclosure option, and compliance costs would be higher for landlords--around \$3,000 per unit for weatherization.

Considerations: Current “weak market” conditions and Ypsilanti’s small geographic size mean this option may not be appropriate at present, due to concerns about placing additional burdens on landlords in the city that are not felt in the adjacent townships.

➤ FOR ALL OPTIONS:

► EXPECTED GHG SAVINGS:

Modeling this option as an educational program targeting Ypsilanti’s 5,300 rental housing units, 10% energy savings can be achieved, saving 1.20 mtCO₂ per rental household, or 6,443 mtCO₂ in total. This total, however, will not likely be achieved for several years due to the generally indirect, market-driven nature of the first two approaches.

► ADDITIONAL BENEFITS:

Median rental household earnings in Ypsilanti are around \$21,000 annually. This income group spends about 11% of its annual income on home energy costs. Providing tenants with the opportunity to reduce their home energy costs frees up income for other needs.

► PARTNERS & STAKEHOLDERS:

Local landlords, DTE and Ypsilanti Community Utilities Authority (YCUA), and the EMU Office of Campus Life can help design requirements that are appropriate for local conditions and easy to comply with. Ypsilanti Township could also be a partner in development and adoption of standards, as they look for ways to encourage and support “high road” rental properties in their community.

➤ RECOMMENDED APPROACH:

Develop a utility costs disclosure ordinance for rental housing units. Disclosure should include actual billings from utility providers, plus a calculation of each unit’s share, in the case of multi-unit properties with prorated utilities, and should be provided even when utility costs are included in rent charges. Depending on resources, a disclosure ordinance could be a first step, followed by a formal recognition or certification program for energy efficient units, or the two could happen at the same time. City of Ann Arbor, Ypsilanti Township, and Eastern Michigan University should all be approached to partner on any effort to establish uniform standards that are easy for landlords and tenants to understand.



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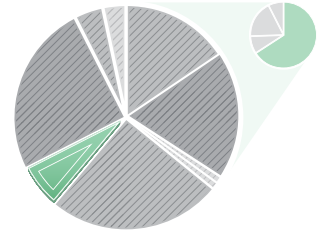


PROMOTE RESIDENTIAL WEATHERIZATION PROGRAMS

[BY 2020] 900 HOMES

6.12%

OF 2020 TARGET [1620 mtCO₂e]



Residential weatherization projects make homes more energy-efficient through methods such as insulation and caulking. Residents also become more aware of their energy use, spend less in energy costs and find that their homes become more comfortable. The City of Ypsilanti is already a participant in two programs that assist residents in weatherizing their homes: BetterBuildings for Michigan and, through Washtenaw County, the federally-funded Weatherization Assistance Program (WAP).

► EXAMPLES:

BetterBuildings for Michigan, a state-run program funded with federal dollars and administered by the Southeast Michigan Regional Energy Office, will “sweep” the City of Ypsilanti in June-December 2012. They expect to achieve 15% energy reductions in approximately 500 homes in Ypsilanti.

► IMPLEMENTATION COSTS:

A basic weatherization package that includes an energy audit, customer education, and installation of more efficient compact appliances like compact fluorescent lights and water saving showerheads costs between \$1,000 and \$1,300.

► EXPECTED GHG SAVINGS:

A basic weatherization package reduces a typical household’s emissions by about 1.1 mtCO₂e per year. If BetterBuildings hits its targets, including basic weatherization and additional measures, they will reduce annual emissions in Ypsilanti by 720 mtCO₂e by the end of 2012. Targeting an additional 50 homes per year through various programs will yield a total of 1620 mtCO₂e by 2020.

► ADDITIONAL BENEFITS:

The average household can expect to save between \$300 and \$450 per year after a basic weatherization project. Residents will also be more comfortable in their homes, as they are better insulated from the elements, and may see property values increase.

► PARTNERS & STAKEHOLDERS:

Homeowners and landlords should be made aware of existing opportunities and the benefits that come along with weatherization. Federal, state and county governments as well as utility providers such as DTE should be tapped for funding and other support.

► CONSIDERATIONS:

Weatherization programs received a large influx of support from the American Recovery and Reinvestment Act. Many of the opportunities afforded by this expansion, however, are set to end at the end of 2012. The Weatherization Assistance Program may continue, but is targeted only towards low-income households. Federal and state budgets will largely determine future availability of funds for weatherization.

➔ RECOMMENDED APPROACH:

Promote available energy efficiency incentive programs to reach maximum adoption in the city. The city and community partners should aggressively promote available home (and business) energy efficiency programs in order to capture as much benefit as possible for city residents. Some of these programs, like BetterBuildings, can offer as much support as residents are able to take advantage of, but are time limited; others, like WAP, are more limited in the total funds available, and the city should be alert for opportunities to support expanded funding at the state and federal levels.



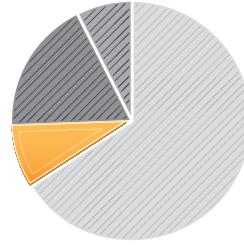
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BUILDINGS

2012 CAP REPORT



These new LED streetlights in Ypsilanti's downtown area demonstrate an infrastructure project that saves money for the city, beautifies the downtown area, and reduces GHG emissions.



8.77%

OF 2020 TARGET

[INFRASTRUCTURE STRATEGY REDUCTIONS]

RECOMMENDED EMISSIONS-REDUCTION STRATEGIES

INFRASTRUCTURE

The following strategies cover programs the city could initiate in order to reduce the amount of greenhouse gases emitted by municipal service provision—or by the behaviors it supports. Several of these deal with waste stream management, as an opportunity to affect the “upstream” impacts related to manufacturing the items that residents consume. It is important to note that Ypsilanti has been proactive with providing services such as curbside recycling and yard waste pick-up, but only 18.8% of the municipally collected waste stream (by weight) is in the form of recycling, compared to the national average of 34%; since this does not include larger housing complexes or business users, most of whom only have garbage dumpsters, not recycling, the overall recycling rate is likely even lower.

By implementing the following strategies, we seek to achieve 15% of our total greenhouse gas reduction target, or 5,676 mtCO₂e by 2020. The community has also stated qualitative goals for Ypsilanti including that the city maintains the high quality level of its city services, with special focus on waste management and energy efficiency.

TAGS

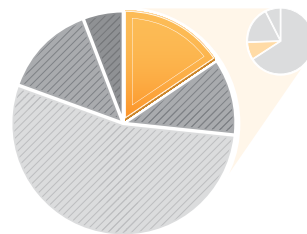


UPGRADE STREETLIGHTS TO LEDS

[BY 2020]

ALL STREET LIGHTS CITYWIDE

8.99%

OF 2020 TARGET [510.4 mtCO₂e]

LED-based street lighting options are becoming more prevalent, typically offering opportunities for fast return on investment through lower energy use and reduced maintenance costs relative to traditional mercury vapor and high pressure sodium lighting. With 54% of Ypsilanti's governmental sector emissions coming from street lighting and traffic signals, this is a high-priority target. Ypsilanti's street lighting has a high percent of total energy use partially because of reduced energy use by the city in other areas, but is also high on a per capita basis when compared to other cities. Ypsilanti has 1,770 streetlights that are owned and operated by DTE.

► EXAMPLES:

Ypsilanti's West Cross streetscaping project upgraded 28 streetlights to LEDs and will save \$3,500 annually at DTE's current rates.

► IMPLEMENTATION COSTS:

A typical streetlight upgrade costs \$600-\$700 per fixture, including hardware and installation. Replacing all DTE-maintained streetlights at this rate would cost a total of \$1.1 million, though economies of scale could be achieved for larger installations.

► EXPECTED GHG SAVINGS:

Each streetlight upgrade averages 0.25 mtCO₂e in annual savings, yielding about 500 mtCO₂e if all of the streetlights were converted to LED.

► ADDITIONAL BENEFITS:

DTE does not yet have standard rates for LED fixtures, so exact savings are hard to estimate, but cities in DTE's service area have experienced an average of \$90 annual savings per fixture. This means the payback period for the initial conversion costs is about 7 years. If Ypsilanti's entire inventory of street lighting were upgraded, the City could save \$160,000 annually. In addition to cost savings, many people prefer the whiter light of LED fixtures to traditional yellow high-pressure sodium lighting. The conversion could also reduce light pollution and glare.

► PARTNERS & STAKEHOLDERS:

Any conversion must be negotiated with DTE. By partnering with other institutional entities such as EMU or with other cities via the Regional Energy Office, joint purchasing could reduce hardware costs. The Michigan Public Service Commission and Department of Energy, Labor and Economic Growth have provided grants for streetlight conversions in recent years, which could reduce costs further. The DDA may also pay for streetlight upgrades in their designated downtown districts through TIF funds.

➔ RECOMMENDED APPROACH:

Upgrade as many street lights as possible with the city's revolving loan fund, working with the DDA, EMU and Regional Energy Office to achieve the best price through bulk upgrades and to identify any grants or other funding opportunities. This should be undertaken as soon as possible, so that savings from initial upgrades can pay for additional lights in future years. The DDA and Public Services Department should also review existing light levels during this process—in some locations, additional energy and cost savings may be achieved through removal of unneeded fixtures.

TAGS



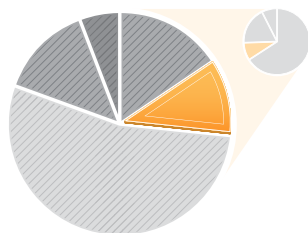
INCREASE STREET TREE CANOPY

[ANNUALLY]

112 STREET TREES PLANTED

6.31%

OF 2020 TARGET [358.4 mtCO₂e]



Canopy trees provide several climate-related benefits: absorbing carbon dioxide, shading buildings to reduce cooling costs and reducing the “heat island” effect of exposed street and parking lot asphalt. Canopy trees additionally provide aesthetic benefits, enhancing quality of life and property values. While many Ypsilanti neighborhoods have substantial canopy cover, the city’s February 2012 Urban Forestry Management Plan identified 3,000 additional planting sites within street rights-of-way and parks, not including opportunities on private properties.

► EXAMPLES:

The City of Ann Arbor has one of the largest urban forestry programs in the state, with over 47,000 trees. The city’s canopy saves businesses and homeowners an estimated \$2.25 million in energy costs annually.

► IMPLEMENTATION COSTS:

The Urban Forestry Management Plan prepared by Davey Resource Group recommends planting 974 trees over the next 8 years. At an average cost of \$110 per tree, this adds to approximately \$27,000 annually.

► PARTNERS & STAKEHOLDERS:

Individual residents can easily engage in tree planting, and community members have expressed interest in implementing this strategy.

► EXPECTED GHG SAVINGS:

Each canopy tree can offset about 0.4 mtCO₂e annually through a combination of carbon absorption and reduced cooling costs.

► ADDITIONAL BENEFITS:

The City of Ann Arbor’s urban forestry program is estimated to return \$2.68 for every \$1 invested, though most of these benefits accrue to private property owners through energy savings. Furthermore, street trees add an estimated 3% to residential property values.

► CONSIDERATIONS:

The DTE Energy Foundation offers annual matching grants for tree planting. The city’s recently-established tree nursery will provide low-cost trees, but they will not be ready to plant for a few years. City staff has proposed a streamlined process for allowing residents and business to plant trees in public rights-of-way.

➔ RECOMMENDED APPROACH:

Identify funding sources to implement recommended tree planting program, maintain existing trees and continue policy support. In addition to traditional public and grant funding sources, tree planting lends itself to crowdsourced approaches, including small donations or direct individual planting. The City should also ensure that its landscaping standards for development favor canopy tree planting, either on-site or in rights-of-way.



TAGS

INFRASTRUCTURE

2012 CAP REPORT

TAGS

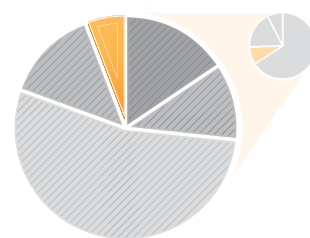


UPGRADE WASTEWATER PLANT CONTROLS & PROMOTE RESIDENTIAL WATER EFFICIENCY

[ONE-TIME]
CONTROL UPGRADES AT YCUA

3.20%

OF 2020 TARGET [181.5 mtCO₂e]



Wastewater treatment plants are energy-intensive: the Ypsilanti Community Utilities Authority spends over \$2 million annually in utility costs alone for its wastewater plant. Recent advances in plant control systems can allow for quick energy savings of 10-20% in the treatment process, just through upgrades of sensors and software. Water efficiency measures that reduce the total load and peak flow rates to the treatment plant can also save substantial amounts of energy.

► EXAMPLES:

The City of South Lyon performed sensor and control upgrades on its wastewater treatment plant in 2011, reducing annual energy usage by 10-15% and recouping upgrade costs in the first year. DTE and the Better Buildings for Michigan program provide residents with low-flow faucet aerators and showerheads as part of their home energy efficiency packages.

► IMPLEMENTATION COSTS:

The cost of wastewater treatment plant control upgrades depends on the specifics of the current system and opportunities identified. Home water efficiency measures—low-flow faucets, showerheads, and toilet replacements—cost about \$500 per bathroom.

► ADDITIONAL BENEFITS:

In addition to the system-wide cost savings provided by treatment plant improvements, with a potential payback of 6 months to 2 years, home water efficiency measures can save individuals money: a residential bathroom water efficiency package will save residents about half of a billing unit (measured in CCF—one hundred cubic feet of water) monthly, or about \$9 per billing cycle.

► EXPECTED GHG SAVINGS:

Control upgrades to the YCUA plant could save an estimated 550 mtCO₂e annually, system-wide. Residential water efficiency measures can save about 0.22 mtCO₂e per home, stemming from less water usage and resulting reductions in wastewater treatment and pumping.

► PARTNERS & STAKEHOLDERS:

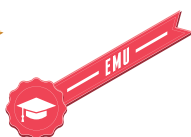
The City of Ypsilanti appoints two members of YCUA's board, and should work with the adjacent townships to move energy efficiency measures forward. Local knowledge is available to support this work: Ann Arbor and South Lyon were the first two wastewater plants in Michigan to perform control upgrades, and Ypsilanti-based Utilities Instrumentation Service, Inc. (UIS) designed and implemented the South Lyon project.

► CONSIDERATIONS:

Reducing water usage benefits YCUA in several ways: reducing overall and peak loading and preventing the need for future capacity expansions. In addition to the DTE and BBFM programs, YCUA could consider promoting individual home or business water efficiency measures through a PACE-style financing program: providing individual loans to be paid back through the property's future water bills.

➔ RECOMMENDED APPROACH:

YCUA should investigate wastewater treatment control upgrades immediately—Utilities Instrumentation Service, Inc., staff have expressed an interest in working with YCUA on this project. YCUA should additionally consider an internal financing system for individual home and business water efficiency improvements, and can likely leverage the experience of City of Ann Arbor or Regional Energy Office staff to design a PACE-like program.

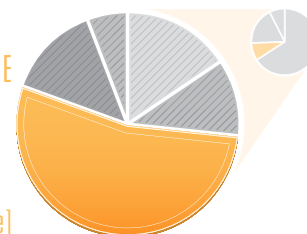


INCREASE RECYCLING RATES THROUGH COMPETITION

[BY 2020] RECYCLING RATE
INCREASED TO NATIONAL AVERAGE

30.85%

OF 2020 TARGET [7050.7 mtCO₂e]



Competition is a great motivator, and an inter-neighborhood recycling competition is a relatively low-cost way to increase visibility and encourage people to work together towards a shared goal: proving that where they live is the greenest and best. With a 2010 recycling rate of 18.8%, residents of Ypsilanti have a fair amount of room to improve their waste practices.

► EXAMPLES:

Alameda County in California has committed to reducing waste by 75%. In pursuit of this goal, they've established the website StopWaste.org and hold an annual "Ready Set Recycle" contest.¹⁸ They ask citizens to commit to keeping all recyclable and compostable items out of the trash, and randomly select garbage bins to measure the amount of these items in trash. Winners are eligible for cash and prizes. In the 2011 contest, 1537 residents made online pledges and 893 homes were selected for sorting.¹⁹

► IMPLEMENTATION COSTS:

The program in Alameda County cost \$856,712.²⁰ This was paid for out of facility fees and a grant from the recycling board to a nonprofit. Assuming the same cost per person, Ypsilanti could expect the program to cost \$44,000. However, this program was fairly expensive because Alameda County sent out trash bin sorters ahead of the regular trash collectors. If, instead, Ypsilanti simply weighed the amount recycled, costs could be kept to a minimum.

► ADDITIONAL BENEFITS:

A recycling competition would increase visibility for better waste management practices and can create better habits in participants, encouraging behavior change after the competition has ended. Reducing the amount of waste landfilled also can save the City money. The amount saved is variable, but as of May 2012, the City paid \$24.99 per ton of trash landfilled and received \$14 per ton of recyclables.

► EXPECTED GHG SAVINGS:

Each ton of waste diverted to recycling rather than to a landfill saves 2.87 metric tons CO₂e. If residents were challenged to increase their rate of recycling from the 2010 city average of 18.8% to the national recycling rate of 34.1% (and met that challenge), 610 tons of waste would be diverted from the landfill into recycling bins, saving 1750.94 mtCO₂e emissions.

► PARTNERS & STAKEHOLDERS:

As the provider of recycling services, the City of Ypsilanti should host and coordinate any waste-reduction competition. The Ann Arbor Materials Recovery Facility handles Ypsilanti's recycling and should also be included in any recycling efforts. The City should work with existing neighborhood associations to promote and coordinate the competition.

► CONSIDERATIONS:

Other Michigan cities and counties have paid for expanded recycling services through landfill or waste fees or have created intergovernmental agreements to expand purchasing power and lower prices. EMU already participates in an annual inter-university recycling competition—the community could use this as a model or compete against students to increase the rate of recycling. A system that measures waste and recycling amounts per pickup day could best allow for neighborhood competition, but because it would require a change in DPW methods, might be prohibitively expensive. A University of Michigan study found that four key themes to a successful recycling program were culture, convenience, communication of information and custodial support.²¹

18 | "Ready Set Recycle Contest," StopWaste.Org. Web. 30 May 2012. <<http://www.readysetrecyclecontest.org>>.

19 | Becerra, Jeff. "Winning the Recycling Game." Resource Recycling Aug. 2011: 31-33. Print.

20 | "Annual Budget Fiscal Year 2011-12." StopWaste.org. Alameda County Waste Management Authority, June 2011. Web. 1 June 2012. <<http://stopwaste.org/docs/fy11-12-budget.pdf>>.

21 | Fox, Elizabeth. "Recycling Best Practices Report." University of Michigan Plant Building and Grounds Services. Aug. 2011. Web. 30 May 2012. <<http://www.recycle.umich.edu/grounds/recycle/PDF/RecyclingBestPracticesReport.pdf>>.



➔ **RECOMMENDED APPROACH:**

Work with neighborhood associations and Eastern Michigan University to hold a recycling competition, based either on improvements over past performance or on town vs. gown recycling rates. The challenge for Ypsilanti residents should be to collaborate with or out-compete neighbors, but also on an individual level, to achieve the national average rate of recycling: 34.1%. The City should consider using a neighborhood competition as a pilot—perhaps working only with a few neighborhoods to begin with or seeking to later expand to include local businesses, as well.



PLACE ARTISTIC TRASH AND RECYCLING BINS THROUGHOUT COMMUNITY

► EXAMPLES:

Collegetown ART (Art, Recycling, and Trash cans) at Cornell University, as part of a student sustainability effort, held an art contest in the spring of 2010 to decorate bins on campus. Interested parties can sponsor a bin for between \$225 and \$900, and their company logo will appear on a decorated bin.²² Indiana University's "More Art, Less Trash" program hosted by the Student Sustainability Council offers small cash prizes each year for designs submitted to be displayed on ten recycle bins in high-use locations.²³

► IMPLEMENTATION COSTS:

Costs for implementation involve materials to create refuse and recycling bins. A 95-gallon waste bin typically costs between \$50 and \$75. The DDA budget currently allots \$20,000 annually for "pedestrian trash receptacle collection" in downtown areas. The city does not currently have public recycling bins, though it does provide recycling services to the downtown.

A report from 1993, shortly after University of Michigan (UM) instituted public recycling bins, states that the costs of recycling generally equal the savings from the reduced amount of trash it pays to be sent to the landfill.²⁴ UM has reported higher amounts of recycling on campus since it instituted public recycling bins.²⁵ The university receives payment for recyclables from its solid waste provider, which ultimately means that increased recycling reduces the cost to dispose of waste.

► EXPECTED GHG SAVINGS:

Every ton of waste diverted to recycling rather than a landfill saves 2.87 mtCO₂e. If public recycling in specially-indicated bins encouraged Ypsilanti residents to increase the community's rate of recycling to the national average of 34.1%, as discussed in the strategy "Increase recycling rate through competition," the community would reduce emissions by 1750.94 mtCO₂e.

Universities across the country have used decorated waste containers to encourage recycling efforts and proper waste disposal on their campuses while providing a creative outlet for local talent. These artistic receptacles beautify the city, pay for themselves with sponsorships, and teach citizens how to dispose their trash and recyclables.

► ADDITIONAL BENEFITS:

This strategy will expose residents and visitors to local artists and make the city's beautification and recycling efforts more visible. Displaying artwork created by local youth also provides an opportunity to teach children about environmental responsibility and recycling, especially if artistic bins are installed on school property. Installing bins that are available to the public at all hours of the day can support recycling city-wide.

► PARTNERS & STAKEHOLDERS:

Ypsilanti could partner with Eastern Michigan University and local schools to start a small-scale outdoor recycling program that features artistic bins and hold a contest to create the bin art. The DDA could also partner with local businesses to sponsor bins downtown.

► CONSIDERATIONS:

The City will need to ensure the recycling and trash receptacles are emptied regularly, approve the addition of a public recycling service, site these bins in high-traffic areas and limit the risk of cross contamination. The City of Ann Arbor's Commercial Recycling Expansion and Implementation Plan indicates that cross-contamination can be limited by ensuring that recycle bins are visibly distinct from garbage receptacles.²⁶ For example, if a recycling bin should only be used for aluminum cans, the bin should indicate this requirement in writing and with imagery. Recycle bins that are specifically intended for plastic bottles and aluminum cans could have cylindrical holes to deposit the intended materials, while bins for paper could have small, rectangular holes. Eye-catching designs can encourage citizens to use the proper receptacle. Depending on volume, sidewalk recycling could be emptied as part of the weekly pickup of curbside bins from individual businesses, or may need to be incorporated into the DDA's contract for emptying sidewalk trash cans.

➔ RECOMMENDED APPROACH:

Partner with EMU, local schools, and the DDA to create an artistic trash bin design contest, incorporating local sponsorships and educational efforts. Test the program first on EMU's campus while exploring options to expand downtown recycling, then move outwards into city itself. Additional savings could be generated by investing in an outdoor recycling service in the city's parks and downtown areas.

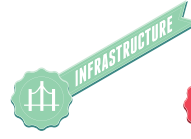
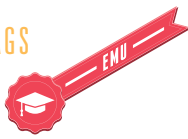
²² | Cornell University, "College Town Art," Web. 24 April 2012.
<<https://sites.google.com/site/collegetownart>>.

²³ | Indiana News Room, "'More Art, Less Trash' artistic outdoor recycling bins installed on campus," 9 April 2009. Web. 24 April 2012.
<<http://newsinfo.iu.edu/news/page/normal/10489.html>>.

²⁴ | EPA, "2009 Success Story: University of Michigan." Web. 24 April 2012.
<<http://www.epa.gov/wastes/partnerships/wastewise/challenge/gameday/09success-um.htm>>.

²⁵ | University of Michigan, "Recycling Timeline," 11 November 2010. Web. 24 April 2012.
<http://www.recycle.umich.edu/grounds/recycle/history_of_recycling.php>.

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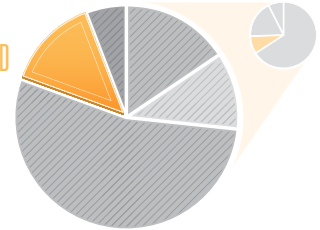


CREATE KITCHEN COMPOST DROP-OFF SYSTEM

[BY 2020]

5% OF FOOD WASTE COMPOSTED

7.93%

OF 2020 TARGET [450 mtCO₂e]

The US EPA estimates that food waste makes up 14 percent of the US municipal solid waste stream, making it the largest single component of landfilled material. Much of this waste could be composted rather than sent to a landfill.²⁶ Ypsilanti currently has a functional yard waste collection program and a free yard waste compost and wood chip pick-up site. Residents are interested in adding kitchen compost collection to these existing services. This requires more active management than composting yard waste alone in order to prevent contamination with non-compostable or vermin-attracting material. However, the added operations would result in a reduction of greenhouse gas emissions, preservation of landfill space, reduced need for fertilizers, a reduction in tipping fees by redirecting funds to sustainable waste management practices, and the production of a higher-value, more nutrient-rich compost. Additionally, newer self-contained biodigesters can maximize the amount of emissions avoided by capturing gases from compost materials for use as a heating fuel source for nearby buildings, and can also handle a wider variety of material, reducing the problems of contamination.

► EXAMPLES:

The US EPA provides guidance on how to incorporate “food residuals” into existing yard waste and composting operations:²⁷ this includes all pre- and post-consumer foods and food by-products, as well as organic items which may accompany food, such as manufactured organic materials and soiled paper products. The EPA guide details the rate of decomposition for various types of food waste, different methods to create the compost, and how to produce mixes suitable for redistribution or resale. Closer to home, the City of Ann Arbor collects uncooked vegetable waste as part of its curbside compost system.

► IMPLEMENTATION COSTS:

Cornell University’s 1999 report “Small to Medium Scale Composting of Food Wastes in New York City” evaluated the use of municipal composting systems. A city can purchase existing equipment for composting food waste. This could cost between \$30,000 and \$80,000, depending on the amount of waste the city expects to collect. Labor to maintain the system can cost between \$15 and \$20 an hour.²⁸ The City of Eugene, Oregon has implemented a system for commercial food waste collection that charges per bin for weekly pick-up, based on cubic yard capacity. Combined with compost sales, this fee is intended to cover the costs of running the service.

► EXPECTED GHG SAVINGS:

Each ton of food waste recycled rather than landfilled can reduce emissions by 1 to 3 mtCO₂e, primarily in methane, depending on what practices are used. Using the EPA’s estimated share of total waste, Ypsilanti’s municipal waste stream likely contains 745 tons of food waste annually. For every 1% of this amount diverted to compost, up to 22.3 mtCO₂e could be reduced.

► ADDITIONAL BENEFITS:

Finished compost can be added to lawns and gardens to replenish nutrients in the soil. Biodigesters can additionally help heat nearby buildings, reducing heating costs from purchase of natural gas. Each 1% of the food waste currently landfilled will reduce landfill tipping costs by approximately \$175.

26 | “Basic Information about Food Waste.” US EPA. Web. 10 May 2012. <<http://www.epa.gov/osw/conservation/materials/organics/food/fd-basic.htm>>.

28 | “Small to Medium Food Wastes in New York City,” Cornell University, August 1999. Web. 24 April 2012. <<http://compost.css.cornell.edu/NYCComposting.pdf>>.

27 | The U.S. Composting Council, “Best Management Practices (BMPs) for Incorporating Food Residuals into Existing Yard Waste Composting Operations,” 2009. Web. 24 April 2012. <http://www.epa.gov/reg3wcmd/pdf/FR2YVW_BMP.pdf>.

► PARTNERS & STAKEHOLDERS:

The larger the venue, the more food waste is produced—partnering with the Downtown Association of Ypsilanti, the school system, or the proposed Washtenaw County Kitchen Incubator could provide large single sources of compostables, reducing collection costs and the difficulty of monitoring for contamination. One of these organizations or the local nonprofit Growing Hope should undertake a food waste audit to identify opportunities for a pilot project.

► CONSIDERATIONS:

Focusing on large producers of material can minimize contamination challenges, as can using biodigesters rather than open air composting. As compared to a curbside system, a voluntary drop-off program would eliminate collection costs and provide better control of waste stream. Educational efforts around home composting may be more cost-effective than a citywide system for non-institutional waste.

➔ RECOMMENDED APPROACH:

Partner with Growing Hope and local businesses that are high generators of food waste to implement a pilot program for a municipal kitchen compost system using the drop-off site method.

Solid waste, alternative energy or similarly targeted grants should be explored to fund installation of a biodigester at any selected pilot site.



Composting turns kitchen and yard waste into nutrient-rich soil.



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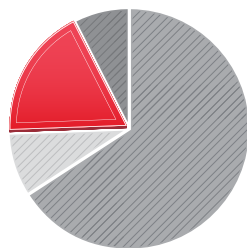
INFRASTRUCTURE

2012 CAP REPORT

35



Land use patterns are one of the largest factors in community greenhouse gas emissions. Many Ypsilanti residents already take advantage of the city's walkable streets and transit service.



18.97%

OF 2020 TARGET
[LAND USE & TRANSPORTATION
STRATEGY REDUCTIONS]

RECOMMENDED EMISSIONS-REDUCTION STRATEGIES

LAND USE & TRANSPORTATION

Land use patterns are a major determinant of development, travel choices and other behaviors that create greenhouse gas emissions. A community with smaller lot sizes and walkable commercial districts near residential areas will support walking, transit and cycling as alternatives to driving. In another example, a mixture of single- and multi-family housing types will reduce heating costs due to shared walls. Various sources have noted this impact: a recent EPA study showed that the choice to live in a transit-supportive location reduces household emissions more than undertaking home energy efficiency improvements and driving a fuel-efficient car.²⁹ The international Transition movement noted in its guide to climate planning that communities need to address land use first, “or else you may as well stop now.”³⁰

The City of Ypsilanti contains a downtown area and neighborhoods that feature walkable, compact and diverse land uses, and has taken conscious steps to encourage biking and walking and preserve transit service. The City has also sought to encourage infill development over the past decade, including downtown loft projects, rehabilitation of the former high school into senior housing, and construction of additional student housing. Parts of this section are therefore dedicated to measuring the expected impacts of existing policies and efforts. However, Ypsilanti still has improvements to make to its land use and transportation patterns. Some portions of the city are generally hostile to walking, such as the Washtenaw Avenue corridor, or lack neighborhood amenities, such as the Leforge Road area, and may require additional efforts to create the type of district that the community wants and that permit low-emissions travel behaviors.

Many more Ypsilanti residents and workers could take advantage of low-emissions travel modes. The Census’s Longitudinal Employer-Household Dynamics commuting dataset from 2010 shows that 52.7% of working Ypsilanti residents worked within 10 miles of home, including 29.6% working in Ann Arbor and 8.2% within Ypsilanti. Similarly, 50.7% of the 6,424 people employed within city limits live within 10 miles of their workplace. Many of these Ypsilanti residents and employees therefore have commute distances which make walking (1 mile), bicycling (5 miles), or transit (10 miles) reasonable options.

This plan seeks to accomplish 10% of its greenhouse gas reductions target through land use and transportation measures, reducing emissions by 3,784 mtCO₂e by 2020, with the following additional goals:

- ▶ Vacant and underused properties are redeveloped or reclaimed as green, productive spaces.
- ▶ Goods and services are available within neighborhoods, or within walking distance of residents.
- ▶ Streets are safe for all, providing for travel by any mode without fear of either crime or traffic crashes.
- ▶ Residents, commuters, and students choose to bike, walk or bus when possible.

²⁹ | US EPA, “Location Efficiency and Housing Type: Boiling it Down to BTUs,” March 2011. Web, 13 June 2012. <http://www.epa.gov/dced/pdf/location_efficiency_BTU.pdf>.

³⁰ | Daniel Lerch, *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Sebastopol, CA: Post Carbon Press, 2007.

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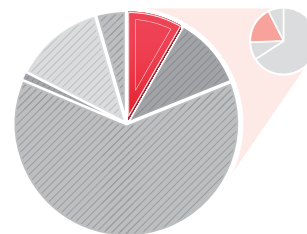


COMPLETE NETWORK OF BICYCLE FACILITIES

[ANNUALLY] 1 MILE BIKE LANE/
PATH CREATED

15.86%

OF 2020 TARGET [600 mtCO₂e]



Ypsilanti has shown a strong commitment to complete streets and non-motorized transportation, including bicycling, and has nearly 11.5 miles on on-road bike lanes and off-road paths. The 2006 WATS Non-Motorized Plan identifies 37.3 additional miles as “deficient” for bicycles (with each side of a two-way street counted independently). As the City is already actively pursuing this strategy, it is included primarily for the consideration of greenhouse gas impacts.

► EXPECTED GHG SAVINGS:

Each 1 mile of bike facilities per square mile of city area is estimated to increase cycling share by 1% of total travel.³¹ Applying this figure to non-freeway weekday passenger travel in Ypsilanti, each mile of bike lanes could convert 162,000 motor vehicle miles traveled (VMT) to cycling each year, leading to a reduction of 75 mtCO₂e. Assuming an additional mile of bike lanes is created in the city each year, through reconstruction or restriping projects, 600 mtCO₂e could be reduced annually by 2020.

► CONSIDERATIONS:

The Washtenaw County Road Commission will be an important partner in extending the bicycle network beyond Ypsilanti. WCRC has implemented 4-lane to 3-lane “road diets” recently and found them effective in improving both bicycle and automobile safety while maintaining road capacity. Including way-finding signs could help increase visibility of these projects and encourage more walking and biking, especially if these signs are visible from cars.

➔ RECOMMENDED APPROACH:

Continue development of bicycle and pedestrian network in coordination with Townships, WCRC, and Border to Border (B2B) trail development.

Considering existing, predominantly east/west commuting patterns, roads like Forest Avenue, East Cross and West Cross/Packard may hold the most benefit in terms of converting traffic from motor vehicle miles to bicycle miles.



³¹ | Dill, Jennifer and Theresa Carr. “Bicycle Commuting and Facilities in Major US Cities: If You Build Them, Commuters Will Use Them.” *Transportation Research Record: Journal of the Transportation Research Board*, No. 1828, TRB, 2003, pp 116-123

TAGS



BEHAVIOR CHANGE



TRANSPORTATION



INCENTIVES



WELL-BEING



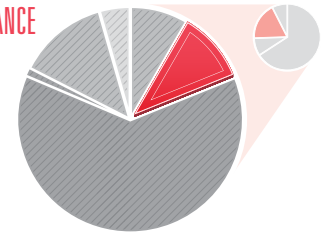
POLICY

PROVIDE PARKING ALTERNATIVES & CASH-OUT OPTIONS FOR EMPLOYEES

[ANNUALLY] 2.5% OF SHORT-DISTANCE
COMMUTERS CHANGING MODES

19.56%

OF 2020 TARGET [740 mtCO₂e]



Employers typically subsidize automobile use by providing parking spaces for employees but do not take on responsibility for any costs associated with commuting by other modes, such as transit or bicycle. The City of Ypsilanti, for example, provides downtown parking permits for City Hall employees, which typically costs \$200 per pass; many EMU departments similarly cover the costs of employee parking permits, while student commuters pay \$200 for fall/winter parking hangtags. A parking cash-out program can be a beneficial alternative method to traditional employee parking programs. The cash-out program makes the cost of parking transparent to the employee, and removes the incentive to drive by offering them the cash value of an unused parking permit, or by allowing them to transfer the value of the permit to another travel mode, such as a transit pass.

► EXAMPLES:

The go!pass system is used by over 500 employers in downtown Ann Arbor to offer employees a transit fare benefit as an option to driving and parking. EMU recently offered students discounted Ann Arbor Transportation Authority (AATA) monthly passes as an alternative to buying a parking permit. Both these programs have proven popular.

► EXPECTED GHG SAVINGS:

Assuming a modest 2.5% shift of the commuters living within 10 miles of their workplace from driving alone to other modes, 92.5 mtCO₂e would be avoided annually.

► IMPLEMENTATION COSTS:

Employers who currently pay for employee parking can offer cash-out options or alternative benefits at no additional cost. Employers who own parking spaces and view them as a no-cost benefit to employees might consider this an additional \$200 annual cost per employee, if the cash-out value were set equal to the paid downtown or campus parking options.

► ADDITIONAL BENEFITS:

Downtown employees (including those at City Hall) who choose a cash-out or alternative benefit clear public parking spaces for downtown business patrons. Similarly, EMU commuters who choose alternative benefits free up parking capacity without new construction costs. Choosing to bike or walk to work rather than driving also carries health and fitness benefits.

► PARTNERS & STAKEHOLDERS:

The DDA, City Treasurer and EMU each issue employee parking permits for various lots; they and downtown commercial landlords would be the key actors in an alternative benefits system.

► CONSIDERATIONS:

The 2008 survey of downtown Ypsilanti employees found that offering transit benefits would be the single most appealing option to change commute behavior. In order to address other potential concerns about not driving to work, offering alternative commuter benefits works best in coordination with strategies like car-sharing systems and improved visibility of other travel modes.

➔ RECOMMENDED APPROACH:

Provide a discounted AATA pass via the City Treasurer and DDA as an alternative to downtown parking permits. AATA may be able to offer additional discounts for permits purchased by downtown employees, as counter-peak commuters. City Hall can lead by example by implementing a parking cash-out or alternative benefit option for employees currently eligible for parking permits. Other major parking providers such as Washtenaw County and the Key Bank Building may also be approached as potential participants. EMU should continue to promote their transit pass and shuttle options.



TAGS

LAND USE & TRANSPORTATION

2012 CAP REPORT

TAGS



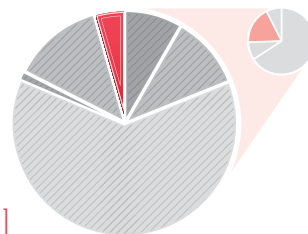
PURSUE IMPLEMENTATION OF TRANSIT MASTER PLAN

[BY 2020]

25% RIDERSHIP INCREASE

8.02%

OF 2020 TARGET [303.45 mtCO₂e]



Ypsilanti has shown strong support for transit: AATA figures show boardings in the City of Ypsilanti growing by 20% from 2005 to 2010, despite a decrease in service during that time, and voters overwhelmingly approved funding to support the system in 2010. The recently completed Washtenaw County-wide Transit Master Plan would continue to offer new options for Ypsilanti residents, commuters and students, including additional routes, improved frequency and hours of operation, and new services such as express commuter lines.

► EXAMPLES:

As an early implementation step in the Transit Master Plan, AATA implemented service increases on the Washtenaw Avenue route in early 2012 that yielded a 20% increase in ridership on that line within a few months. Expansion of AATA's Night Ride service to the Ypsilanti area also produced a significant increase in use of that service, though these numbers are not broken down by how many started or ended in the city itself. These immediate jumps in transit use following service increase show strong pent-up demand.

► IMPLEMENTATION COSTS:

AATA is still working with stakeholders around the county to finalize an implementation program and identify costs for the Transit Master Plan. In addition to rider fares and state and federal funding, implementation will likely require a county-wide or regional funding stream to be approved by voters.

► EXPECTED GHG SAVINGS:

Implementation of the Transit Master Plan should support continued ridership growth. Based on recent experience, a further 25% increase in ridership by 2020 appears possible: an additional 160,000 annual boardings within the city, or about 530 daily riders. Added to recent ridership gains, this would yield 303 mtCO₂e in reduced emissions.

► ADDITIONAL BENEFITS:

Continued increases in transit service will help mitigate congestion on major roads and in downtown and campus parking lots. High-quality transit service is also increasingly being cited as a factor in attracting new residents and businesses.

► PARTNERS & STAKEHOLDERS:

A new regional transit agency is being created under Public Act 196 to implement the plan. The City of Ypsilanti will have a seat on the board of this new agency and will need to work with neighboring communities to champion appropriate system improvements by this agency.

► CONSIDERATIONS:

Commuter rail service has been under discussion for many years and is currently a top transit priority for city officials and residents, but creation of this service remains very uncertain. One way to advance rail could be to simulate this service through new express, commuter-oriented bus service, in order to demonstrate demand.

➔ RECOMMENDED APPROACH:

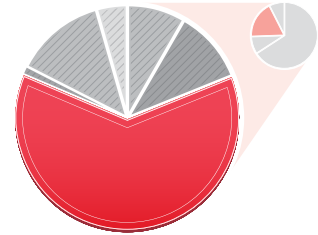
Champion creation of the 196 board, establishment of regional funding, and implementation of the Master Plan. Services that support commuting into Ann Arbor, for residents, and into Ypsilanti, for students, should be priorities for implementation.

TAGS



PROVIDE MORE VISIBILITY FOR ALTERNATIVE TRANSIT, INCLUDING BIKING & WALKING PATHS AND BUS ROUTES

[ONGOING] TRANSPORTATION
OPTIONS PROMOTED CITY-WIDE
116.29%
OF 2020 TARGET [4400 mtCO₂e]



While local governments cannot necessarily change the structure of regional transit systems, municipalities can facilitate the use and adoption of transit and non-motorized modes, including biking and walking. This includes a broad category of activities: cities can market available options, publish bicycle maps, improve signs for bike routes, or provide workshops or other informational material. The use of a survey to understand residents' transportation needs can help create more effective, targeted marketing and programs.

► EXAMPLES:

Portland, Oregon's Smart Trips program has reduced single-occupant car trips by 8-13% in the areas of the city that have been targeted.³² Transportation Riders United (TRU) has offered "Transit 101" workshops in Detroit and its suburbs in past years to teach people how to use the transit system, successfully converting "never riders" to "occasional riders."

► IMPLEMENTATION COSTS:

Costs for implementing biking/walking or ridership promotion programs typically cost around \$30 per household targeted. Some measures, such as bike/walk maps, are significantly cheaper; others, such as reduced-rate transit passes, are significantly more expensive.

► ADDITIONAL BENEFITS:

People who switch from car use to other travel modes can save substantially on travel costs. Reducing the number of vehicles on the road results in less congestion and a reduced need for parking. Additionally, increased walking and biking improves health and fitness.

► EXPECTED GHG SAVINGS:

Average GHG savings are about 0.8 metric tons mtCO₂e per household, or 4,400 mtCO₂e city-wide.

► PARTNERS & STAKEHOLDERS:

The Ann Arbor Transportation Authority is the key partner to promote transit and is currently rolling out increased transit service within the city and countywide. City of Ann Arbor and Washtenaw County can both assist in establishing and publishing bike routes and maps. Community groups such as Bike Ypsi and the Washtenaw Biking and Walking Coalition could help spread the word about any new initiatives among social networks.

► CONSIDERATIONS:

People look for predictability and convenience in their travel modes. To encourage a switch, additional benefits must be highlighted because it can be hard for other travel modes to compete with automobiles on only convenience measures.

RECOMMENDED APPROACH:

Engage community partners in an effort to understand residents' travel needs and develop a marketing plan to meet those needs. Provide bicycle maps, designated routes, and other wayfinding mechanisms to make the transition to bike commuting easy and convenient. Special attention should be paid to the connections between EMU's campus and Ypsilanti's downtown and Depot Town areas, encouraging students to explore the surrounding city. The existing Non-Motorized Advisory Committee should lead this effort within the city.

32 | "Smart Trips." Portland Bureau of Transportation. Web. 25 April 2012.
<<http://www.portlandonline.com/TRANSPORTATION/index.cfm?c=ediab>>.

TAGS



CREATE AND PROMOTE BIKE-SHARING AND CAR-SHARING PROGRAMS

Vehicle-sharing programs allow users to rent bikes or cars by the hour, increasing transportation access and making it easier to get where they need to go. Creating a bike-sharing or car-sharing program in Ypsilanti would supplement existing bus service, allow more residents to go without cars, and encourage travelers to take advantage of existing non-motorized transportation networks while spending time in Ypsilanti.

► EXAMPLES:

M-Bike.org suggests that our region should use Nice Ride Minnesota—the twin cities' bike share program—as a model. Users can pick up a bike from one of 75 kiosks over a 7.75 square mile service area. Rental rates are charged by the hour, and users must pay to subscribe for the day, month or year. The program is managed by a nonprofit. Nice Ride MN was founded through a partnership between local government, foundations, and local businesses.

Zipcar operates 20 shared cars on the University of Michigan campus and 10 more in downtown Ann Arbor. Zipcar estimates each shared car takes 15-20 cars off the road. Hertz started an hourly car rental service at Eastern Michigan University during the Fall 2011 semester, with two cars available on campus.

► IMPLEMENTATION COSTS:

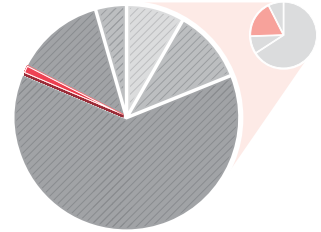
University bike rental programs are typically funded by grants and rental fees. Initial costs include bike and rack purchase, storage, maintenance and management hiring. A bike share program that covers EMU's campus, Ypsilanti's historic downtown and Depot Town could be implemented with initial costs of \$492,000 and an annual operating cost of \$229,000.³³ Annual operating costs could be recouped through fees for subscription or bike use.

Zipcar typically requires a "sponsor" to guarantee a minimum monthly revenue for each car; in Ann Arbor, the DDA and University of Michigan play this role. The Hertz On-Demand service does not have this requirement, but provides vehicles based only on rental revenue estimates. This makes implementation effectively free to the city or university, but also limits the local ability to steer development of the system.

[ANNUALLY] 2100 DRIVERS USE
BIKESHARING NETWORK

2.18%

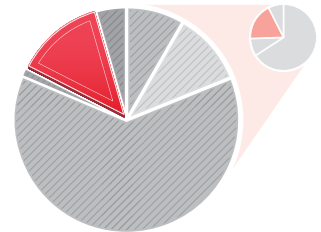
OF 2020 TARGET [82.4 mtCO₂e]



[ANNUALLY] 250 DRIVERS JOIN
CARSHARING NETWORK

24.05%

OF 2020 TARGET [910 mtCO₂e]



► EXPECTED GHG SAVINGS:

Bike Detroit notes that a 4 mile trip by bicycle will keep 15 pounds of pollutants out of the air. Using the same ridership projections as Nice Ride which estimates 5% of resident use, 3% local employee use, and 7% student use, bike sharing could alleviate 23,007 vehicle miles travelled annually in Ypsilanti. That equates to 10.3 mtCO₂e in savings annually.

National experience shows a typical car-sharing user reduces vehicle miles traveled (VMT) by 44%, due to adoption of more effective travel habits, and estimates a market potential of up to 10% of residents aged 21 and up, with a particular growth potential for university campuses. Based on SEMCOG estimates for trips starting or ending in the city, each 1% of residents over 21 who become car-sharing users (130 members) would reduce driving by 138,000 miles annually, preventing 66 mtCO₂e in emissions. Considering the large campus and near-campus populations and growing downtown resident base, a modest 2.5% adoption (325 active users) should be possible by 2020, yielding 165 mtCO₂e in emissions reductions and 345,500 fewer miles driven.³⁴

► ADDITIONAL BENEFITS:

Encouraging bike use improves resident quality of life due to increased exercise. Both bike-sharing and car-sharing decrease the amount of cars on the road, limiting the amount of traffic congestion and traffic delays—saving time and gas. Fewer cars commuting to campus also reduces the need for parking spaces.

³³ | This calculation uses Nice Ride's cost per bike and formulas for projected number of subscribers, and assumes that 1 bike will cover 15 subscribers.

³⁴ | In spring of 2012 (before students left campus for the summer), reservations for Hertz cars on EMU's campus ranged from roughly 150-200 per month. This does not account for unique uses, so 325 is a reasonable but reachable goal.

► PARTNERS & STAKEHOLDERS:

More and more students across the country are urging their universities to provide bike rentals on campus to encourage safer, faster, cheaper, more environmentally friendly means of traveling to class and around the city. Eastern Michigan University would be a great place to implement these practices. Oakland University already runs a free bike share program—EMU could meet with staff there. Ypsilanti Cycle and BikesEMU should also be approached as partners.

► CONSIDERATIONS:

The City of Ann Arbor may soon be adopting a bike sharing program. Once this effort gets underway (if Ypsilanti's does not begin before FY2013, which is when Ann Arbor's is slated to begin), Ypsilanti can learn from this neighboring city.

➔ RECOMMENDED APPROACH:

Partner with Eastern Michigan University to create a bike-sharing program and to expand the car-sharing network both on-campus and downtown. The programs can originate at the university, targeting students as the primary users with the source of information available online and at new student orientation. University faculty and employees, and downtown employees, should be targeted with information on bike- and car-sharing options as a support for car-free commutes; landlords and neighborhood associations can provide residents with information on car-sharing as a cost-saving alternative to a second household car.



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PRIORITIZE INFILL DEVELOPMENT OPPORTUNITIES IN MASTER PLAN UPDATE

► RE-EVALUATE PARKING STANDARDS:

The City's zoning ordinance requires large amounts of parking for new and expanded developments; not only does this reinforce high-emissions automobile travel habits, but it also poses a financial challenge for many of the small developers working in the city. Significantly reducing the parking requirements could both support other transportation modes as well as ease costs on businesses and developers.

► CONSIDER THE ROLE OF "NEIGHBORHOOD" COMMERCIAL USES:

While the City's B1 zoning district is named "neighborhood commercial", its primary application is on Washtenaw Avenue, which has a decidedly non-neighborhood feel. This district should be evaluated and potentially updated for use in supporting single-parcel "corner store" uses in actual neighborhoods, such as the convenience store at the corner of East Forest and Prospect or even a more full-service grocery store.

► TACKLE TRANSIT ORIENTED DEVELOPMENT:

The City has worked with neighboring communities to identify potential improvements along Washtenaw Avenue that would support additional development, an improved environment for walking and biking, and increased transit service between Ypsilanti and Ann Arbor. This effort should be supported by specific zoning ordinance updates to enable the desired development of Washtenaw as both a transit corridor and an amenity for surrounding residential neighborhoods. Similarly, while the City has aggressively pursued the reinstatement of Amtrak and commuter rail service in Depot Town, it should conduct specific planning to encourage new private development in the area that can take advantage of future rail service.

Infill development prioritizes development on vacant or underused land in existing cities and urban areas over construction in outlying areas. In addition to supporting lower GHG behaviors, as mentioned in the introduction to this section, infill development makes financial sense to communities, increasing tax yield over a given area: the State of Michigan's 2009 Climate Action Plan identifies land use planning measures as the single most cost-effective means to reduce greenhouse gas emissions. While development policies can be responsible for the greatest degree of change in a community's energy consumption, this change tends to happen slowly and incrementally.

Additionally, most of the energy savings yielded by infill development are not due to behavior changes of people already in town. The majority of energy savings result from households that choose to locate in the city and have access to transit and non-motorized travel options, rather than locating in auto-dependent outlying areas. The reductions therefore can't be counted against the city's baseline emissions—they may actually result in an increase in emissions produced by city residents, but a net decrease at the regional scale.

While the City of Ypsilanti is no stranger to encouraging infill, it could capitalize on additional opportunities. These suggestions should be fully developed during the upcoming revision of the city's Master Plan.

► UNDERTAKE SITE-SPECIFIC REDEVELOPMENT PLANNING:

Ypsilanti can provide the best environment for infill development by identifying individual priority sites and specifically planning for development of those sites. Priority sites for development can include both city-owned properties and vacant private properties with willing owners. An appropriate redevelopment process will ensure that sites have a vision shared and supported by the public, appropriate zoning is in place, available incentives are specifically identified, and the sites are being actively marketed. Ypsilanti has done some of these things, such as establishing districts for obsolete property and industrial facility incentives, and should continue these efforts. The city can look to the redevelopment ready sites best practices outlined by MEDC's "Redevelopment Ready Communities" program for additional guidance.



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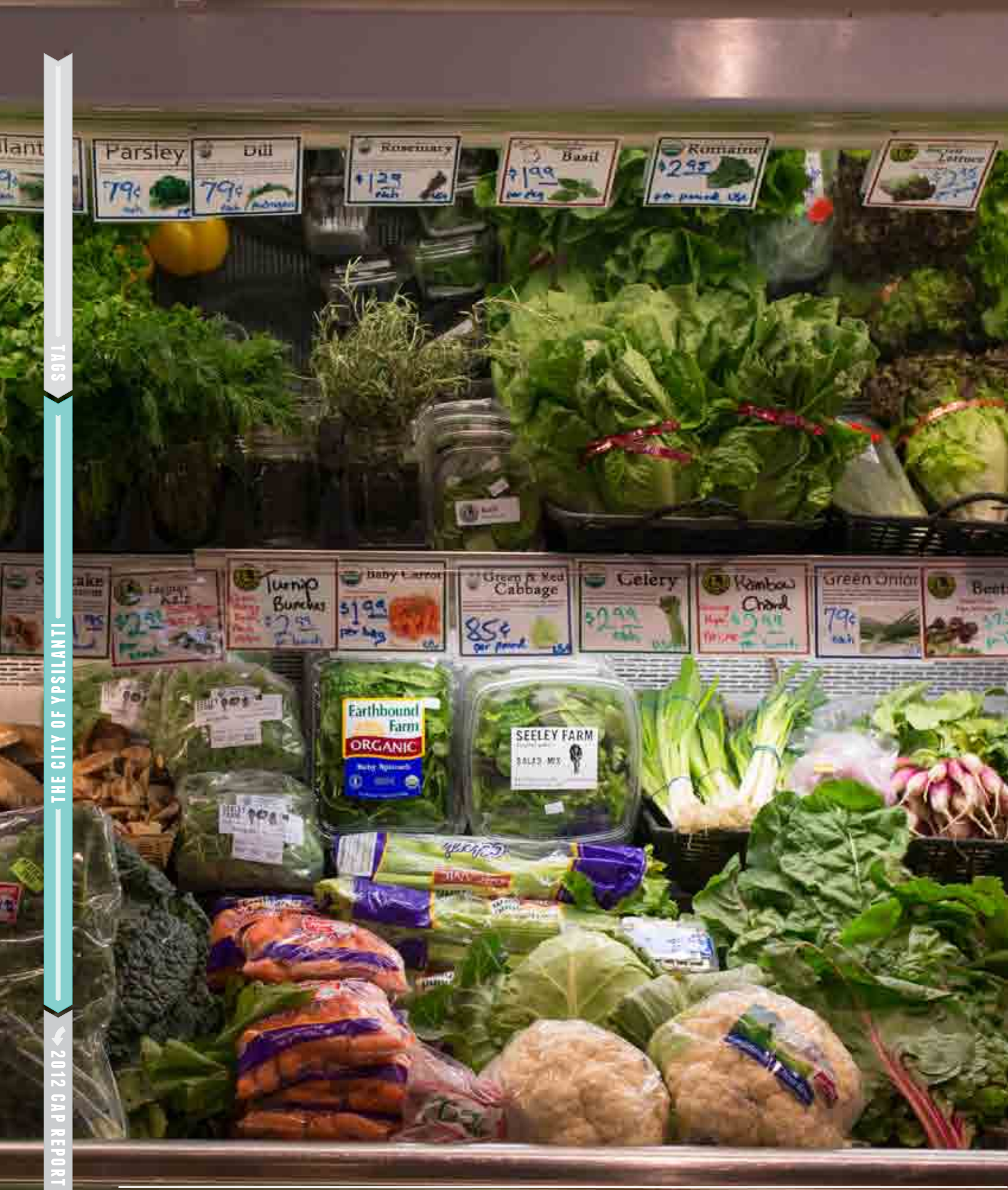


► FILL THE “MISSING MIDDLE” SEGMENT OF THE HOUSING STOCK:

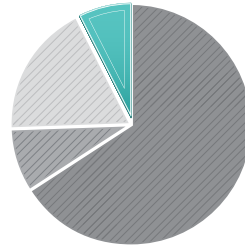
While some neighborhoods, such as the Historic South Side, appear to have a stable mix of single-family houses and 2- to 3-unit apartment houses, the city’s zoning predominantly supports either strict single-family housing or large apartment complexes. Revisiting the topic of small “accessory dwelling units,” encouraging rehabilitation of historic carriage barns and other tools can bring more people to Ypsilanti neighborhoods, supporting property values and taking advantage of the walkable, transit-served downtowns, without the impact of the larger apartment building. This is particularly an opportunity within the historic core, where large homes now typically house much smaller families than they once did.

► PLAN FOR COMMERCIAL USES IN HURON RIVER DRIVE AREA:

More than 2,500 people live in the apartment complexes around Leforge Road and Huron River Drive, but the area virtually lacks neighborhood amenities for these residents and encourages driving. Planning for additional uses in this area that serve these residents could reduce automobile necessity, strengthen these residents’ connection to the Ypsilanti community and also capture business from on-campus residents and campus commuters. Uses such as coffee shops and small-format grocery stores have been identified as desires during past planning work, though land availability will be a challenge for any substantial commercial use.



Culture change describes how Ypsilanti residents interact within their community, and how their decisions impact GHG emissions. This picture from the Ypsilanti Food Co-Op reminds us that even individual behaviors surrounding food can emit GHGs and impact Ypsilanti in myriad other ways.



3.05%

OF 2020 TARGET
[CULTURE CHANGE STRATEGY REDUCTIONS]

RECOMMENDED EMISSIONS-REDUCTION STRATEGIES

CULTURE CHANGE

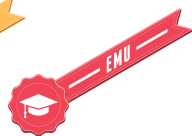
Individual behavior is one of the most important ways we impact greenhouse gas emissions, but it is also one of the most difficult to measure or change. While many Ypsilanti residents already recognize the importance of living in a way that's oriented around sustainability concerns and around reducing greenhouse gas emissions, they feel the majority of citizens have not heard of or do not fully understand these concepts. In order to relate to these issues and change behavior to incorporate the concepts into daily life, Ypsilanti residents need to understand sustainability and the actions they can take.

This section on culture change attempts to begin the difficult task of reorienting community thought and practice around climate change, the natural environment, and triple-bottom-line sustainability. We seek to achieve 5% of our total greenhouse gas reduction target through these strategies, or 1,891 mtCO₂e by 2020.

Based on community feedback, we have also set a number of qualitative goals for the future:

- ▶ Ypsilanti celebrates efforts to reduce greenhouse gas emissions and circulates information about sustainability and reducing greenhouse gases to residents. Community members understand the importance of climate action and the ways they can impact climate change, individually and collectively.
- ▶ In partnership with the community and municipal plans and priorities, local schools have refocused education towards sustainability.
- ▶ Ypsilanti works in collaboration with surrounding communities and the metro Detroit region to achieve broader changes.

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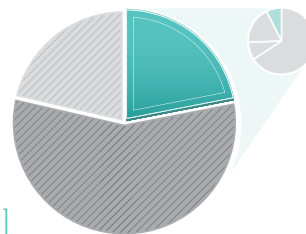
ENCOURAGE CONSERVATION THROUGH ENERGY COMPETITION

[ONGOING]

25% RIDERSHIP INCREASE

13.20%

OF 2020 TARGET [249.69 mtCO₂e]



Given that the City of Ypsilanti is home to Eastern Michigan University, leveraging college rivalry can be a powerful tool to leverage energy savings both within the university and the community. A non-university Ypsilanti competition could motivate the community to improve on past performance. The main key to a competition is extensive marketing and promotions, along with a web presence, key giveaways such as efficient light bulbs, and cultivating peer to peer networks.

► EXAMPLES:

The "Take Charge Challenge" in Kansas pitted 16 different towns (some with universities) against one another in a 9 month long challenge to save energy. Total savings were \$2,341,025 in energy costs and 22 million pounds of CO₂ emissions.³⁵

► IMPLEMENTATION COSTS:

Costs are around \$2 to \$5 per person contacted, which would equate to \$50 to \$100/ton of GHG reduction. Of course, this can vary greatly depending on the depth of contacts, availability of volunteer labor, and other factors.

► EXPECTED GHG SAVINGS:

Each person contacted can be expected to save about 55 kWh during the time of the competition, or about 1.75 lbs of CO₂e. There are many questions about the longevity of the behavior changes, but the changes done within the competition can be a gateway to further improvements.

► ADDITIONAL BENEFITS:

Energy savings for students and residents of Eastern Michigan University and Ypsilanti.

► PARTNERS & STAKEHOLDERS:

Eastern Michigan University would be a prime partner in this endeavor, as shown in the Kansas competition, university rivalries motivated more energy savings than towns without universities. Within the university and the city, networking with as many existing organizations as possible would help spread the words. The challenger cities would also be essential partners. Competition could also be coordinated through neighborhood associations or even commercial groups. Residents are able to rent Kill-A-Watt EZ electricity usage monitor from the Ypsilanti District Library, so tracking resources are readily available.

► CONSIDERATIONS:

One main consideration would be fostering change that "sticks" and articulating the energy conservation message while promoting the rivalry. Many people, students especially, may be motivated to "Beat State," but the challenge will be in relaying the actual reasoning behind the conservation competition. The strategy could be first tested by the university or by select neighborhoods and then expanded city-wide.



RECOMMENDED APPROACH:

Work with community stakeholders to initiate an energy competition. The University and City can partner together to challenge another city and university to an energy reduction competition.

³⁵ | "Take Charge Challenge with Efficiency Kansas," Take Charge Kansas, http://www.takechargekansas.org/Site_Data/Sub_Pages/Home.php, accessed May 15, 2012.



COMMUNITY SUSTAINABILITY LIBRARY

Ypsilanti stakeholders are knowledgeable about and interested in issues of climate change, energy use and environmental sustainability. Ypsilanti residents are willing to take on individual and community action to support local emissions reductions, but would benefit from a resource library: a shared space to hold collective knowledge on these topics and catalogue community resources.

► EXAMPLES:

The Green Garage in Detroit is home to the Urban Sustainability Library, which hosts, produces and disseminates information on how "people and organizations [can] make more sustainable choices."³⁶ Their physical and online library contains books and studies, but also displays current projects and facilitates community conversations.

► IMPLEMENTATION COSTS:

This library can be created with limited monetary expense, though it will require a large time investment from stakeholders. Costs may include staff and volunteer time as well as the physical or online space for the library.

► EXPECTED GHG SAVINGS:

Compilation of this resource library will not, in itself, result in GHG emissions reductions. It may inspire future reductions, but these are difficult to quantify.



*Energy Efficient
Rentals*

► ADDITIONAL BENEFITS:

As a community resource, the library can continue to collect best practices, new ideas and possible emissions reductions strategies after the climate plan has been adopted and the process is complete. It can serve as a new communal, coordinating space for sustainability in Ypsilanti and lead to individual and community actions to reduce emissions.

► PARTNERS & STAKEHOLDERS:

The Ypsilanti District Library and Eastern Michigan University can act as hosts, curators and resources for the strategy library. They should be accompanied by the many community groups who have a stake in either pulling from or putting resources into the library, including Transition Ypsilanti, local nonprofits and neighborhood associations.

► CONSIDERATIONS:

Simply compiling existing community resources will lead to a substantial base of knowledge for the library. The difficult part is curating the collection, ensuring it is kept up to date and usable by the average person. Outreach strategies must also be built into the creation of the library to publicize its existence and begin the dialogue that is at the heart of this community space.

➔ RECOMMENDED APPROACH:

Local experts and the EMU community can create an Ypsilanti sustainability library. The City will be able to pull from resources compiled in the process of creating this climate action plan as well as in a collaborative and ongoing research effort with EMU students. A plan for the continued existence of the library should be developed in partnership with community stakeholders.

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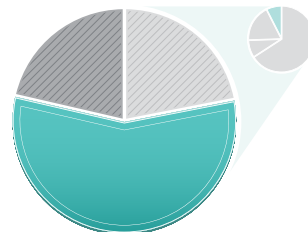


RESIDENTIAL ENERGY EDUCATION

[ANNUALLY]
100 HOUSEHOLDS

38.20%

OF 2020 TARGET [640 mtCO₂e]



Teaching residents to use low- and no-cost techniques for saving energy in their home is one of the most cost-effective ways to reduce energy use and resulting emissions on a community scale. This can be done through a workshop setting or a home visit. Workshops are the less expensive option, but corresponding savings are less as well.

➔ OPTION 1: IMPLEMENT A SERIES OF ENERGY SAVING WORKSHOPS IN DIFFERENT VENUES.

Use these workshops to communicate a basic level of understanding of home energy issues to residents, such as how to read your energy bill, sealing doors and windows and turning off appliances when not in use.

Examples: The City of Lathrup Village held a workshop to educate its residents on how to save money in their homes.³⁷ The Southeast Michigan Regional Energy Office put together a video case study that can be found at this link: <http://bit.ly/JLU8pc>. The City of Ypsilanti's Historic District Commission has in the past hosted workshops by State Historic Preservation Office (SHPO) staff and EMU Historic Preservation students on historic home maintenance—this topic could be expanded to include energy-specific historic home workshops.

Implementation costs: Workshops can be conducted by local non-profits for about \$500 each, either as stand-alone programs or as part of an existing, funded projects such as home weatherization programs or municipal energy efficiency upgrades.

Expected GHG savings: Based on the past experience of the Southeast Michigan Regional Energy Office, households can expect to save .8 mtCO₂e from implementing measures outlined in the workshop format. Assuming an average of 25 participants per workshop and 4 workshops per year, these workshops could reach 100 households, reducing carbon emissions by 80 mtCO₂e annually. By 2020, expected emissions savings add to a total 640 mtCO₂e.

➔ OPTION 2: IMPLEMENT A COMPREHENSIVE PROGRAM THAT ENCOURAGES ALL RESIDENTS OF THE CITY TO EITHER ATTEND A WORKSHOP OR HAVE A HOME VISIT, OR BOTH.

This would require both funding and an outside entity to administer the program.

Examples: The BetterBuildings for Michigan (BBFM) program is conducting consumer education, energy audits and direct installation of energy efficiency measures in Ypsilanti over the course of 2012.³⁸

Implementation costs: A residential energy audit and education program will cost approximately \$1000 per household to implement. This cost may be reduced or covered by programs such as BBFM or DTE incentives.

Expected GHG savings: Similar programs have achieved an approximate 1.2 mtCO₂e reduction per house in yearly GHG emissions.

37 | "EECBG Case Study #10: Resident Education." WARMTraining.org. N.p., n.d. Web. 21 May 2012. <http://www.warmtraining.org/gov/pdf/EECBG%20Case%20Study10_ResidentEducation.pdf>.

38 | BetterBuildings for Michigan. Southeast Michigan Regional Energy Office, n.d. Web. 22 May 2012. <<http://regionalenergyoffice.org/betterbuildings/>>.

➤ FOR ALL OPTIONS:

► CONSIDERATIONS:

The City of Ypsilanti should leverage the federal resources of the BetterBuildings for Michigan program during 2012 to get as much federal funding as possible to fund energy education and improvements for Ypsilanti housing stock. Any educational initiative should publicize the energy and money savings achieved by participants. Deliberately communicating benefits is key to the success of this strategy.

► ADDITIONAL BENEFITS:

WARM Training Center, BetterBuildings for Michigan, Clean Energy Coalition and DTE offer relevant programs. EMU's historic preservation program or Washtenaw Community College's building trades programs may also be able to offer workshops for residents.

➤ RECOMMENDED APPROACH:

Work with local universities and nonprofit organizations to expand educational workshops and resources. Past leveraging of EMU and SHPO offerings for historic property owners can be expanded to include a focus on energy efficiency in historic properties—a substantial share of Ypsilanti's building stock. BBFM outreach efforts during the course of 2012 should increase general awareness of energy-saving behaviors, and non-profit partners can build on this with future targeted educational efforts.



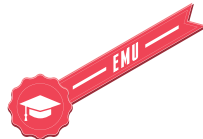
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CULTURE CHANGE

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TAGS

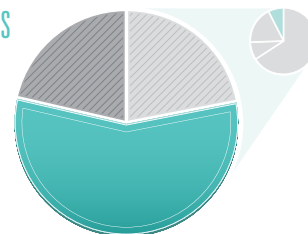


ENCOURAGE PUBLIC EMPLOYEES TO LIVE IN YPSILANTI

[ANNUALLY] 5 PUBLIC EMPLOYEES
MOVE INTO YPSILANTI

12.69%

OF 2020 TARGET [240 mtCO₂e]



Residents frequently express a preference for municipal and other public employees to live in the city where they work. While requiring residency as a condition of employment is not legal, public employers can provide incentives to promote residency. The Eastern Leaders Group (ELG) and EMU successfully launched a new incentive in 2012 for new staff and faculty to live within Ypsilanti: a forgivable loan towards a down payment or related housing expense. Similar programs in Detroit have proven very successful. All such programs have the twin goals of supporting the local housing market and encouraging commuters to invest—emotionally and monetarily—in the community. However, these programs also support reduced GHG emissions by offering the participants a better ability to use non-car travel options, both to commute to work and to meet other needs.

► EXAMPLES:

ELG and EMU expect the LiveYpsi program to have its first home closing in the summer of 2012. The program could be easily extended to other employers after the pilot phase at EMU.

► IMPLEMENTATION COSTS:

Detroit's Live Midtown and Live Downtown programs offer \$20,000 incentives; LiveYpsi provides a \$7,500 incentive, equivalent to a 5-10% down payment on most Ypsilanti home purchases.

► ADDITIONAL BENEFITS:

In addition to the intangible benefits usually cited for public sector employee residency—greater investment in the community—such a program can also have indirect fiscal benefits for the community. By incentivizing new buyers, this strategy can contribute to faster recovery of home prices. More importantly, if targeted at foreclosed homes, it can help mitigate the estimated 1-2% loss of property value caused to every property within a block radius of a foreclosure.³⁹

► EXPECTED GHG SAVINGS:

Each employee who moves from an average 25 mile one-way commute to an in-town commute will prevent approximately 6 mtCO₂e annually.

► PARTNERS & STAKEHOLDERS:

Expanding ELG's program would be the easiest way to implement this strategy. Washtenaw County and YPSD may be approached to offer residency benefits to their employees.

► CONSIDERATIONS:

Offering direct cash incentives to public employees is politically difficult, and substantial work needs to be done to define the fiscal benefits of the strategy for the city and set the right level of incentive. To reduce the cost of implementing such a program, it would be most easily introduced at the same time that employee concessions are being sought, as part of the overall package. Since the City and other local public employers make very few new hires, the incentive might be offered to all employees, rather than only to new hires.

RECOMMENDED APPROACH:

Consider a public employee residency incentive, in the form of a forgivable loan for down payment assistance for purchase of foreclosed homes. Defining the fiscal benefits of the program will be the key to successful implementation. ELG and EMU should continue to pursue additional funding sources for the LiveYpsi program, such as MSHDA, the Community Foundation and other foundations, and work to expand the program to municipal and other employees."

39 | Immergluck, Dan, and Geoff Smith. "There Goes the Neighborhood: The Effect of Single-Family Mortgage Foreclosures on Property Values." June (2005). Web. 21 May 2012. <http://ftp.nw.org/network/neighborworksprogs/foreclosureresolutions/reports/documents/TGTN_Report.pdf>.



PROMOTE CITY SUCCESSIONS TO LEAD BY EXAMPLE

The City of Ypsilanti has already taken on a number of energy-saving, “green” initiatives. By better publicizing and educating citizens around these efforts, they can impact the actions of their constituents. The government should create a coordinated strategy to educate residents about the steps that staff, officials and institutions take to create a more sustainable city. Leading by example requires not only better communication, but a visible presence in the community.

► EXAMPLES:

The City of Southgate created a video case study of the solar panels installed on its city buildings, featuring the mayor. This video ran on the local access channel, and the City is talking about using it, in conjunction with mayoral appearances, as an education and outreach tool.⁴⁰

► IMPLEMENTATION COSTS:

The City of Ypsilanti may need to devote staff time to personal outreach, written communications and social media updates. Costs other than time, though, can be minimal to none.

► EXPECTED GHG SAVINGS:

This strategy is geared towards the publication of GHG emissions reductions rather than achieving new reductions, though it may inspire citizen action.

► ADDITIONAL BENEFITS:

The City can lead a community-wide resurgence in the sustainability movement and contribute to education efforts.

► PARTNERS & STAKEHOLDERS:

City leaders, including appointed and elected officials and staff, must commit to in-person participation and more intentional, coordinated communications. They will need to work with local news agencies, both print and online, and community groups to reach citizens. Solar Ypsi is already reporting the city’s solar power generation—this can compose part of the city’s outreach and provides a model for further efforts.

► CONSIDERATIONS:

Communications and outreach around sustainability should be part of a greater institutional culture of openness in government operations. The city currently appears to lack an adopted or understood overall communications and outreach plan. Low cost methods of public outreach include social media, public events such as the Heritage Festival or the Mayor’s State of the City, or the incorporation of energy and sustainability into existing reporting such as the state-required dashboard.

➔ RECOMMENDED APPROACH:

Increase communications and citizen outreach around sustainability, publicizing efforts and providing information on how citizens can get involved or replicate green initiatives. These efforts should be part of a broader communications strategy by the city, rather than a standalone effort, in order to present energy and sustainability concerns alongside economic development, budgetary, and other information. This overall strategy should consider the role of the city’s recently updated webpage and Facebook presence alongside more “traditional” media and outreach work.

⁴⁰ | Watch the full video at this link: http://www.youtube.com/watch?v=7pAVV4LJYwo&list=PLE5A3534EF7B9E14C&index=7&feature=plpp_video



TAGS



INCLUDE STEWARDSHIP, ENGAGEMENT & SUSTAINABILITY EDUCATION IN LOCAL SCHOOLS

► EXAMPLES:

The EPA encourages K-12 educators to join the “SustainK12 listserve” which allows for collaboration on strategies that implement sustainable practices and lessons in their teaching plans. The EPA also links to various resources on environmental education curricula.⁴¹ The Sustainable School Project located in Vermont provides examples of lesson plans suitable for grades 3-8 on a number of subjects. They also provide the Sustainable Schools Project Starter Kit, which outlines three modules for teachers and students to complete in about two days.⁴² The Ecology Center in Ann Arbor provides workshops that are aligned with Michigan Grade Level Content Expectations. Their classroom programs and field trip options are fun for students and teach valuable lessons about the environment.⁴³

► IMPLEMENTATION COSTS:

Implementation costs are relatively low and should only require training educators on relevant subjects as well as the purchase of any materials that might be needed for class projects. With the number of project examples available, the schools can design a curriculum that fits their budgets while still making an impact on the student body.

► EXPECTED GHG SAVINGS:

Including sustainability education in school curriculum will not, in itself, result in GHG emissions reductions, but will support the implementation of other strategies the community undertakes. Educating schoolchildren sets the stage for a more sustainable future.

The residents of Ypsilanti have expressed a desire to teach students in grades K-12 about how each person can make sustainable choices each day to impact the future. The EPA agrees that the future of environmental education lies in teaching the concepts of sustainability and stewardship through youth programs and provides information on how schools can get more involved.

► ADDITIONAL BENEFITS:

Students learn about sustainable life choices early and have the chance to make a larger impact throughout their lifetimes. It is also likely that students will bring home what they learn, encouraging parents to change their own behaviors.

► PARTNERS & STAKEHOLDERS:

Ypsilanti Public Schools and any local charter or private schools should be the primary parties in this effort. Ypsilanti is lucky to have local sustainability resources such as Creative Change Educational Solutions, Growing Hope and Transition Ypsilanti, that the city can reach out to for support in encouraging the local schools to include sustainability efforts to the curriculum. The city would benefit from engaging these experts and local teachers from K-12 schools, especially Central Gardens Middle School, Washtenaw Community College and Eastern Michigan University when meeting with the school board to discuss implementation methods.

► CONSIDERATIONS:

The city may not have much control over the Ypsilanti public school system curriculum. The success of this strategy relies on a positive relationship between the city, the school board and other local educational institutions.

➡ RECOMMENDED APPROACH:

Utilize the community’s experts to gather support for adding sustainability education to the curriculum in local K-12 schools. There are many resources and ready-made lesson plans that can be added to existing school practices. The Eastern Michigan University community and local schoolteachers and parents would serve as valuable stakeholders to lead this strategy.

⁴¹ | “Teaching Stewardship and Sustainability.” US EPA, n.d. Web. 22 May 2012. <<http://www.epa.gov/region8/ee/teachingsustainability.html>>.

⁴² | Sustainable Schools Project. Shelburne Farms, n.d. Web. 22 May 2012. <<http://www.sustainableschoolsproject.org/>>.

⁴³ | Ecology Center. n.d. Web. 22 May 2012. <<http://www.ecocenter.org/>>.

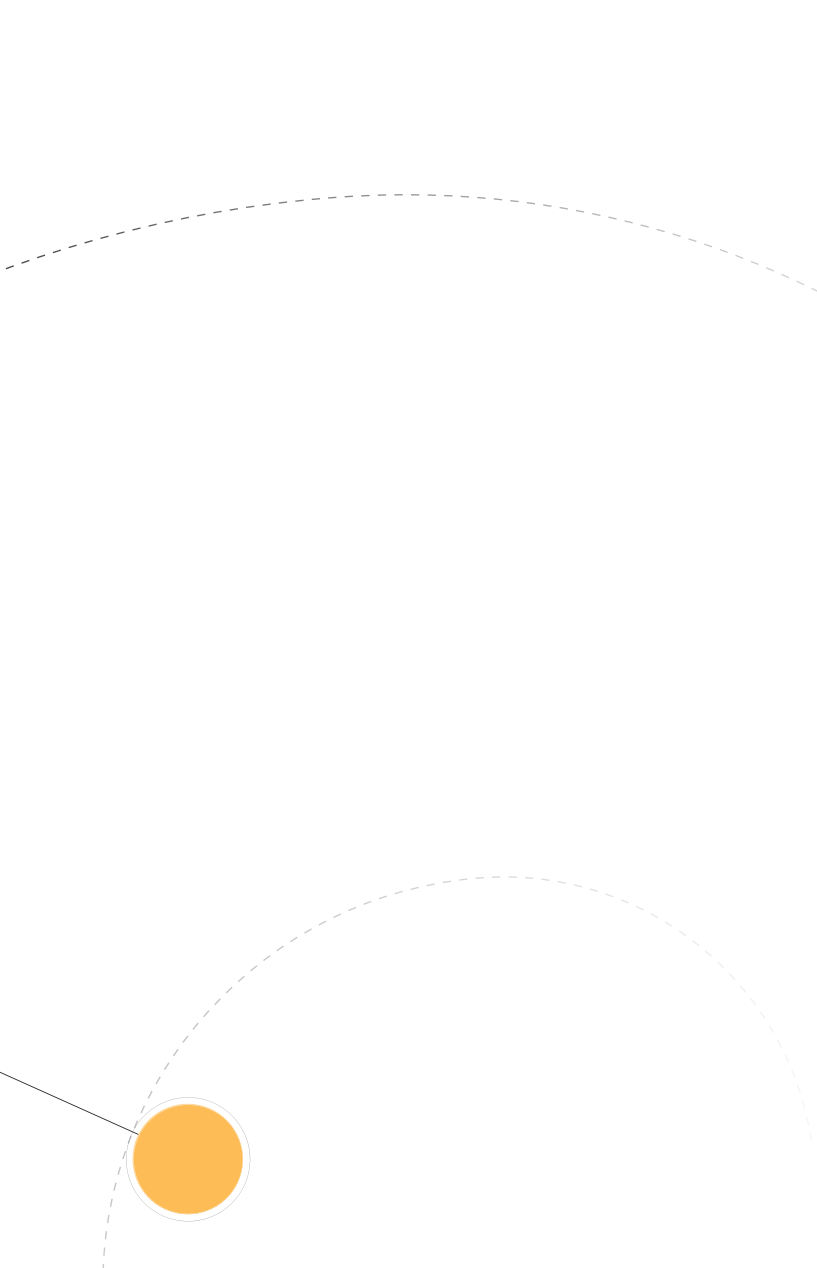
CULTURE CHANGE

2012 GAP REPORT





CLIMATE ACTION PLANNING IMPLEMENTATION



The strategies detailed in this plan are considered to be immediate or short-term strategies: actions that can be implemented with existing tools and partners over the next 3-5 years, and which will yield net cost savings or other benefits under current conditions. Strategies are summarized in this section based on the City's role in implementing them. Some require direct capital investments by the city; others are changes to policies or ordinances; still others must be taken up by community members and will involve little direct involvement by City Hall. The strategies included here are by no means the only ones possible, and other opportunities may arise that should also be pursued and celebrated.

Together, the recommended strategies should yield about 37,000 mtCO₂e of GHG reductions in 2020, or about 2 mtCO₂e per capita. This plan generally errs on the side of conservative estimates of emissions savings and provides a limited number of recommended strategies, acknowledging the constrained role of city government in achieving community-wide change. In order to meet emissions-reduction goals, residents, community groups and other business and nongovernmental stakeholders must take on responsibility for their own actions and for those of their neighbors. The City of Ypsilanti may convene stakeholders, model action and inspire change, but will not be the lead actor in many of the most impactful emissions-reduction strategies.

EVALUATING AND COMMUNICATING PROGRESS

Because the focus of the plan is on near-term opportunities, some evaluation can take place immediately or on an annual basis. The plan as a whole should be evaluated after about five years to select a new set of action steps. Opportunities for evaluating and reporting progress include:

► CONTINUOUSLY:

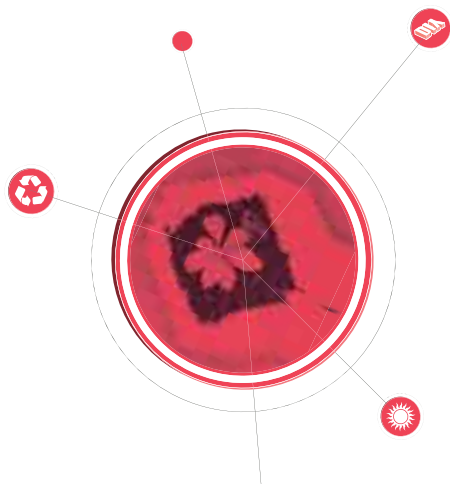
The city and its implementation partners have numerous channels available for communicating efforts as they happen. Social media such as the city's Facebook page and regular updates on a dedicated subpage of the City's homepage are especially suited for communicating implementation steps at launch, completion, and as they produce positive results. This almost-instant communication is especially important for action steps that require broad public awareness or participation in order to have significant impacts.

► ANNUALLY:

Existing communication tools can be used to report on progress from year-to-year, as well as to remind community members of ongoing efforts. The Mayor's State of the City address provides an opportunity to report city successes and recognize the efforts of community members. Information on programs or initiatives available to individual property owners could be provided within annual tax bills or water bills. Direct energy and cost savings by the city should be compiled from utility bills annually and reported on the local dashboard required by the State's Economic Vitality Incentive Program.

► LONG-TERM:

This entire plan should be evaluated in about 5 years to quantify community-wide trends in energy use and greenhouse gas emissions, and to comprehensively review successes and setbacks. By this point, most of the relatively easy, low-cost improvements to municipal operations and facilities management should be completed, and the city's actions are likely to be more indirect, with a greater focus on items like land use. As a result, maintaining a dedicated climate plan may be less important than incorporating any next steps into the city's master plan. Long-term evaluation of the climate plan should be coordinated with a 5-year update of that document.



FUNDING CHANGE: TOOLS AND OPPORTUNITIES

While many of the strategies recommended lead to significant cost savings for residents, businesses and City Hall, upfront implementation costs are still an issue in the city's current fiscal condition. Several options are possible to fund improvements.

► FEDERAL TAX INCENTIVES:

Private sector investments in energy efficiency measures may qualify for various federal tax incentive programs, reducing the effective cost. For example, the Business Energy Investment Tax Credit can be used to offset up to 30% of the capital costs of solar panels, wind turbines and similar measures installed by private businesses, and is expected to be available through 2016. The Historic Rehabilitation Tax Incentive can be used to offset up to 20% of the cost of appropriate renovation costs on buildings within the Ypsilanti Historic District. This incentive may cover lighting upgrades, weatherization, window and air-sealing work, and similar measures for commercial properties. DTE offers incentives for both commercial and residential properties, including rebates for energy efficiency measures and purchase of renewable energy credits (RECs) for solar photovoltaic installations. DTE funding may be used in tandem with tax incentives. All such incentive programs require documentation, and property owners are encouraged to research them carefully before undertaking projects.

► VOLUNTARY CONTRIBUTIONS:

Some projects may find community support through voluntary contributions. Ypsilanti has already had success with this approach around the Solar City Hall project, raising \$1,000 in grant matching funds through donations. A donation program is most appropriate for projects that have only indirect financial benefits but that are highly visible or provide benefits in the form of quality of life or pride of place. Efforts like planting street trees, raising matching funds for major bike/walk projects, alternative energy pilot projects or developing a community sustainability library are most likely to fall into this category. For a voluntary contribution program to work, it should have a clearly stated purpose for the funds. The city might consider asking a trusted third-party organization, such as the community foundation, to serve as fiduciary. Contributions could include structures such as monthly or annual "subscriptions" or a carbon offset based on the donor's driving patterns or utility bills.

► STATE AND FEDERAL GRANT FUNDING:

The largest energy-specific grant opportunities in recent years may or may not recur in the future: the Federal Energy Efficiency and Conservation Block Grants (EECBG), which were part of the federal stimulus program, and municipal grant programs by the Michigan Public Service Commission are not funded in 2012. Other recurring grant programs may be applicable to implementation of this plan, however. Michigan DEQ's Community Pollution Prevention grants, available annually, can often be used for capital projects related to air quality, which may include energy and GHG emissions reductions. Transportation funding such as Congestion Mitigation and Air Quality (CMAQ), Urban Safety, and Transportation Enhancement (TE) may support a variety of transit or non-motorized transportation efforts, and the city successfully leveraged these funds in the past.

► DDA TIF FUNDING:

In the past few years, the Ypsilanti DDA successfully used direct matching grants to help property owners make facade improvements and other capital investments. This program could be explicitly extended to cover energy efficiency or alternative energy projects; these projects are within the DDA's mission by helping reduce business operating costs. The DDA could also undertake public infrastructure improvements with its TIF funding, including streetlight upgrades, street tree planting, or shared geothermal well installation in coordination with future parking lot resurfacing work.

► PROPERTY ASSESSED CLEAN ENERGY (PACE):

A PACE program provides private property owners with affordable financing to make energy related improvements, with payments made over time in the form of an assessment on the property. Because the loan is attached to the property, it is considered lower risk than a loan to an individual, keeping defaults and financing costs low. Additionally, the cost savings from the energy efficiency improvements often cover the costs of the payments over time. A PACE program requires the backing of a municipal entity through issuance of bonds: the City of Ypsilanti is unlikely to undertake this, due to the community's small size and existing debt load, but the city can take advantage of a regionally pooled PACE program currently being created by the Regional Energy Office.

► REVOLVING LOAN FUND:

The City of Ypsilanti has set aside \$250,000 from past years' budget surpluses to be used as an internal revolving loan fund to make energy efficiency improvements to municipal buildings. This unusual and forward-thinking action provides the city with the resources to invest in its own energy and cost savings. The city should undertake full energy audits of its structures to identify the highest returns on investment of these modest funds, and leverage DTE rebates or bulk purchasing opportunities with EMU or other communities. In any case, though, the city should work to invest as quickly as possible: it is only once the fund is used that the savings from energy improvements can replenish the account. Similarly, returns to the fund should be spent as soon as the accumulated savings are enough to make further investments, in order to maximize financial benefits.



EFFORTS UNDERWAY

These are activities that are currently underway by the city or other actors in the community. These efforts may not need any active intervention at this point, except to be monitored and celebrated as significant achievements.

↪ CITY ACTIONS: CONTINUE PROGRESS, CELEBRATE SUCCESS!

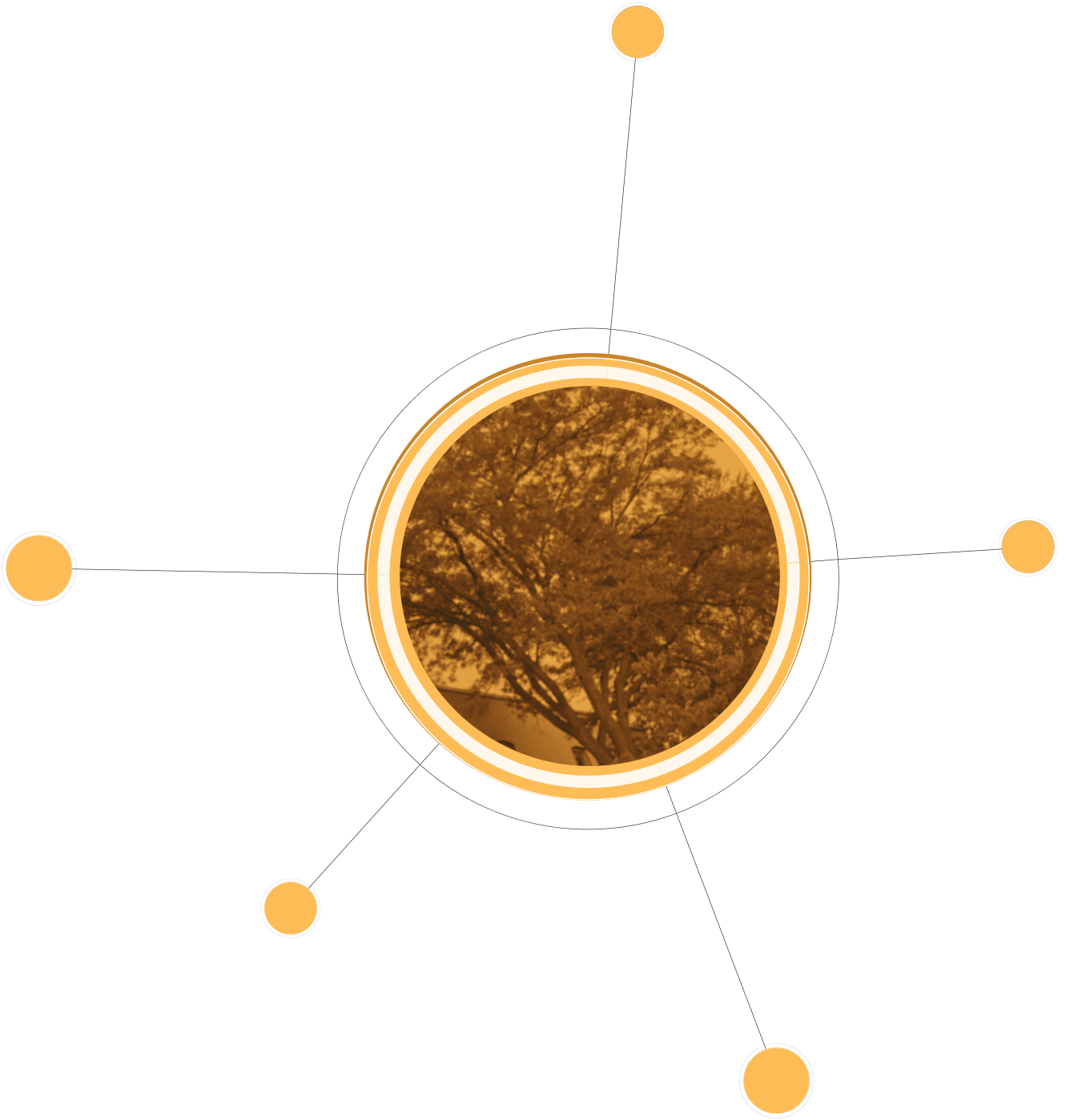
STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Continue development of bicycle and pedestrian network.	600 mtCO ₂ e	\$5,000-\$20,000 per mile on-road \$100,000 per mile off-road	Planning & Development Department, Non-Motorized Advisory Committee	Washtenaw Area Transportation Study (WATS), Washtenaw County Parks & Recreation Commission (WCPARC), EMU, adjacent townships, Washtenaw County Road Commission
Champion development of the County-wide Transit Master Plan	303 mtCO ₂ e	Funding via CMAQ (federal), WCPARC, MDOT Urban Safety funds To be determined by 196 board for regional funding	City Council, via 196 board representative	Ann Arbor Transit Authority (AATA), Washtenaw County, adjacent Townships
Prioritize infill development opportunities in Master Plan update.	Depends on specific measures adopted	Funding in place via Washtenaw County	Planning & Development Department, Planning Commission	Business and neighborhood associations, DDA, Ann Arbor SPARK, Washtenaw County, EMU
Increase communications and outreach around sustainability, publicizing efforts and providing information on how citizens can get involved.	Supports implementation of other efforts.	Costs: Staff time	City Manager and Department of Public Services	Elected officials, city staff, COPAC, local media

DIRECT INVESTMENTS

Some strategies require direct capital investment by the city or a close partner to upgrade buildings, infrastructure, or other assets so that they function more efficiently. These actions typically also result in direct financial savings for the city government in the form of reduced energy bills. As noted above, the city has previously established an internal revolving loan fund (RLF) to invest in energy efficiency improvements and recapture cost savings. Because these strategies provide extremely good returns on investment, the city should pursue them aggressively, in order to enjoy the cost savings as soon as possible: it would be reasonable to begin implementation of all of these strategies within the first year after adopting the plan.

➔ **CITY ACTIONS: PRIORITIZE PROJECTS, IDENTIFY FUNDING OPPORTUNITIES, PERFORM WORK, TRACK RESULTS.**

STRATEGY	POTENTIAL GREENHOUSE GAS EMISSIONS REDUCED	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Upgrade lighting fixtures in city buildings as soon as possible.	150 mtCO ₂ e	\$6,000 Expected ROI less than 1 year Funding via internal RLF	Department of Public Services	Southeast Michigan Regional Energy Office
Install occupancy sensors on lights throughout public buildings.	180 mtCO ₂ e	\$7,500 Expected ROI less than 1 year Funding via internal RLF	Department of Public Services	---
Upgrade street lights as quickly as possible, focusing on least efficient fixtures first.	0.25 mtCO ₂ e per fixture 510 mtCO ₂ e for all lights	\$400-600 per fixture Up to \$1.1 million for all Expected ROI 4-7 years. Funding via internal RLF and additional grants	Department of Public Services	Downtown Development Authority, Eastern Michigan University, Southeast Michigan Regional Energy Office
Investigate sensor and control improvements at YCUA wastewater treatment plant.	182 mtCO ₂ e	\$250,000 Expected ROI 0.5-2 years	YCUA	Adjacent Townships, UIS Corp., Regional Energy Office



PROGRAMMATIC EFFORTS

These strategies generally rely on some ongoing effort by the city or a close partner to support or encourage behavioral change in the community at large. These actions typically do not result in a direct energy cost savings to the city government, but may free up resources for other efforts or result in increased tax revenues by making the community more attractive and supporting property values.

↪ CITY ACTIONS: IDENTIFY NECESSARY PARTNERS, REFINE PROGRAM GOALS AND ACTIVITIES, LAUNCH.

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Educate on the availability of low and no cost business energy audit services through multiple partners.	4,000 mtCO2e	Free to city	Southeast Michigan Regional Energy Office	DTE Energy, DDA, Chamber of Commerce, Downtown Association of Ypsilanti (DAY)
Monitor financing opportunities for solar installation and publicize via Solar Ypsi.	176 mtCO2e	City: staff time	Solar Ypsi	Regional Energy Office, Clean Energy Coalition
Promote available energy efficiency incentive programs to reach maximum adoption in the city.	720 mtCO2e	Installation: \$10,000 per kW capacity Funding via available grants and credits Free to city	Planning & Development	Regional Energy Office, Washtenaw County, DTE
Increase recycling rates via promotion and competition.	1750.94 mtCO2e (2.87 mtCO2e per ton of recycling diversion)	City: Staff time	Department of Public Services	Eastern Michigan University, Ann Arbor Materials Recovery Facility, neighborhood associations

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Provide attractive sidewalk recycling bins for downtown, campus.	(supports goal of increased recycling rates)	\$50-75 per bin Funding from local sponsorships	DDA	DDA, Eastern Michigan University, downtown business owners
Engage community partners in an effort to understand residents' travel needs and develop a marketing plan to meet those needs.	4,400 mtCO ₂ e	\$30 per household targeted	Non-Motorized Advisory Committee	Ann Arbor Transportation Authority, EMU
Partner with Eastern Michigan University to create a bike-sharing program and car-sharing network.	Bike sharing: 82.4 mtCO ₂ e Car sharing: 910 mtCO ₂ e	Bike sharing: \$492,000 initially \$229,000 annually Annual operating costs recouped via fees for subscription Car sharing: No cost to city	EMU	DDA, Hertz, Non-Motorized Advisory Committee
Implement a series of energy saving workshops in different venues.	640 mtCO ₂ e	---	EMU, Clean Energy Coalition	WARM Training Center, SHPO, BBFM
Develop home and business water efficiency financing program.	0.22 mtCO ₂ e per household 181.5 mtCO ₂ e by 2020	\$500 per household	YCUA	Regional Energy Office, City of Ann Arbor

POLICIES DRIVING CHANGE

One of the most effective ways for government to effect broad change in the community is through policy efforts that remove barriers to or provide incentives for certain activities. Land use policy and zoning, building codes, and use of tax abatements and financial incentives all provide opportunities to create a more attractive environment for low-carbon investments and behaviors.

↪ CITY ACTIONS: REFINE GOALS, CRAFT LEGISLATIVE OR POLICY LANGUAGE, ADOPT, APPLY AND PROMOTE.

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Adopt a Green Globes certification requirement for any development project receiving at least \$10,000 in municipal incentives or tax abatements in a single year.	272 mtCO ₂ e	City costs: staff time only, as part of incentive review process	Planning & Development Department	SPARK, local developers
Develop a utility costs disclosure ordinance for rental housing units.	6,443 mtCO ₂ e	City costs: staff time only, to develop ordinance and monitor as part of existing rental certification enforcement	Building Department	Planning & Development Department, City of Ann Arbor, Ypsilanti Township, local landlords
Identify funding sources to implement recommended tree planting program and continue policy support.	358 mtCO ₂ e	\$110 per tree or \$27,000 annually DTE grants or voluntary contributions appropriate	Planning & Development	Department of Public Services, individual residents and businesses

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Partner with DDA and AATA to provide a discounted transit pass via the City Treasurer as an alternative to downtown parking permits.	740 mtCO ₂ e	No additional cost or \$200 per employee	DDA	Ann Arbor Transportation Authority, Washtenaw County, Key Bank, EMU
Expand "Live Ypsi" public employee residency incentives.	240 mtCO ₂ e	\$5,000-\$10,000 Consider general fund seed funding as well as MSHDA and foundation sources	Eastern Leaders Group	EMU, Planning & Development, Washtenaw County, Ypsilanti Public Schools



COMMUNITY INITIATIVES

Ypsilanti has a strong tradition of grassroots citizen efforts, and several strategies arose in the community engagement process that would not necessarily need the involvement of the city government, but could be undertaken by community members. This category of strategies may require city support in the form of endorsement of grant applications, ordinance or policy changes, or similar actions.

The city will locate future citizen involvement in the plan in a few central locations. The City of Ypsilanti will communicate regularly with residents about progress towards plan implementation through events, a dedicated page on the City's website, and existing social and traditional media channels. The Michigan Suburbs Alliance webpage will host a model library of strategies to reduce greenhouse gas emissions and related resources for citizens to learn more about the issue. Eastern Michigan University students and professors will work with City and Suburbs Alliance staff to create an Ypsilanti Sustainability Library--a central location to house resources, host community dialogue and provide a gathering place for interested citizens. Finally, the city and EMU should consider a joint advisory committee, with campus staff, faculty and students working alongside city staff, residents and business owners. As an advisory body, this group would not have any formal policy-making powers but would facilitate collaboration and coordination by the various stakeholders. Ideally, this body could include Township, school district and hospital partners as well.

↪ CITY ACTIONS: SUPPORT, ENDORSE, REMOVE BARRIERS.

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Work with community stakeholders to initiate an energy competition.	1998 mtCO2e	\$2 to \$5 per person contacted	Neighborhood associations, DTE Energy	EMU, Ypsilanti District Library, residents
Create an Ypsilanti sustainability library.	Supports implementation of other efforts	Costs may include staff and volunteer time as well as the physical or online space for the library	Members of EMU community	Local residents, Ypsilanti Public School District (YPSD), Ypsilanti District Library
Utilize the community's experts to gather support for adding sustainability education to the curriculum in local K-12 schools.	Supports implementation of other efforts	Costs may include the training of educators and the purchase of supplies for lesson plans	YPSD	EMU, Central Gardens Middle School, Washtenaw Community College, Creative Change Educational Solutions, Growing Hope, Transition Ypsilanti

STRATEGY	SHARE OF TARGET	COST AND FUNDING SOURCES	LEAD ACTOR	PARTNERS
Implement a series of energy saving workshops in different venues.	640 mtCO2e	---	EMU, Clean Energy Coalition	WARM Training Center, SHPO, BBFM
Implement a pilot program for a municipal kitchen compost system with high food-waste generators.	450 mtCO2e	\$50,000 for biodigester unit	Growing Hope, Washtenaw County Kitchen Incubator	DDA, Downtown Association of Ypsilanti, Washtenaw County Kitchen Incubator, YPSD





michigan suburbs alliance



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22757 Woodward Avenue, Suite 250 Ferndale, MI 48220 | 34 N. Washington Street, Suite A Ypsilanti, MI 48197
www.MichiganSuburbsAlliance.org

The City of Ypsilanti



Alternative Fuel Policy

**Prepared by John Sherwood
Mechanic
Department of Public Services**

ALTERNATIVE FUEL POLICY

EXECUTIVE SUMMARY

The City of Ypsilanti seeks to be at the forefront of the implementation of alternative fuel technology. The City's goal is to increase the usage of alternative fuel vehicles (AFVs) each year as technology allows while monitoring each new technological advancement to suit the application and departmental needs. Currently, the capital costs for AFVs are greater than conventional vehicles. In addition, some alternative fuels are also more expensive than conventional unleaded or diesel fuels.

It is recommended that the City purchase three types of Alternative Fuel Vehicles (AFV) (1) Compressed Natural Gas (CNG) vehicles, (2) Flex Fuel vehicles, and (3) Hybrid vehicles. If the City actively pursues these AFV options, an expanded alternative fuel infrastructure must be developed either as a city-owned facility or in partnership with other agencies in Washtenaw County. Capital improvements needed for the alternative fuel infrastructure will be costly.

Although the City is not mandated by federal or state regulations to purchase alternative fuel vehicles (AFVs) or use alternative fuels, considerable efforts have been made since 1999 to analyze available alternative fuel vehicle options for City use. The City has made vehicle and equipment purchasing decisions based upon operational issues, fiscal concerns and responsible environmental stewardship.

When selecting AFVs, consideration is given to the end user application and their operational functions since the size and location of fuel tanks impact the storage, functionality and useful bed space of the vehicles. Other issues include availability of fuel supply, ability to refuel without long delays, driving range between fuel stops, vehicle usage by on-call staff including responding to emergency or disaster situations and the availability of original equipment manufacturer (OEM) vehicles.

ALTERNATIVE FUEL VEHICLE OPTIONS AND RECOMENDATIONS

The list of alternative fuels available since the year 1999 including methanol, liquid natural gas (LNG), compressed natural gas (CNG), and electric. The city is focusing on CNG as the most viable fuel due to availability, fuel characteristic and original equipment manufacturer (OEM) vehicle availability.

CURRENT STATE OF THE INDUSTRY

The Detroit Auto Show held in January, 2010 provided an indication of the alternative fuel vehicles available in the next several years. The most visible and promoted were hybrid vehicles by all major manufacturers. Several manufacturers debuted plug-in hybrid vehicles that will become available in limited production in 2010. Only one manufacturer continues to produce a dedicated CNG passenger vehicle, Honda Civic. In addition, only one manufacturer produces a hydrogen powered vehicle in limited numbers, also Honda Civic.

CNG continues to be a viable option for medium and heavy duty trucks yet automobile manufacturers have limited production of CNG vehicles. Therefore, after-market conversion kits will have to be added to the vehicle by a state certified installation facility in order to maintain existing warranties.

FUEL SAVING DEVICES AND ADDITIVES

Some vendors are promoting these devices and additives. The Federal Trade Commission (FTC) offers a fact sheet regarding these devices and found that even in instances in which such devices provided savings, the savings were minimal. The U.S. Environmental Protection Agency (EPA) has tested more than 100 devices and additives and has not found any that significantly increase fuel economy. Several were found to offer small improvement in fuel economy which also resulted in increased exhaust emissions. Also, installation of these devices may cause engine damage and may be considered illegal tampering (or void vehicle warranty) as cited in the FTC fact sheet mentioned above.

RETROFITTING VEHICLES TO OPERATE ON CNG

The availability of new light-duty OEM compressed natural gas vehicles has declined in recent years; however, it is possible to convert a conventional engine to one that can run on an alternative fuel, such as natural gas. Certified installers can reliably retrofit some light-duty vehicles for natural gas operation. A converted vehicle is one that was originally designed to operate on gasoline or diesel and has been altered to run on an alternative fuel; however, the retrofit comes at a significant additional cost (i.e., the purchaser must pay extra for the retrofit). An after-market conversion may only be performed on a vehicle if a Certificate of Conformity or California Air Resources Board (CARB) certification has been issued for that specific vehicle or engine. The City may direct future purchases and specifications to include these after-market conversions. The average cost of a conversion kit for a light truck is \$15,000, or approximately 75% of the average purchase price for that same truck of \$28,000. On heavy duty trucks up to 60,000 GVW, the average cost of a conversion kit is up to \$50,000 or approximately 45% of the average purchase price for that same truck of \$140,000.

FUEL OPTIONS

Ultra low sulfur diesel fuel has a much lower sulfur content (15 ppm) than the previous U.S. on-highway standard for low sulfur diesel (500 ppm), which not only reduces emissions of sulfur compounds but also allows advanced emission control systems to be fitted that would otherwise be poisoned by these compounds. Engines will no longer have to be redesigned to cope with higher sulfur content and may use advanced emissions control systems. The city currently purchases ultra low diesel fuel to power the heavy equipment and the larger vehicles.

Compressed Natural Gas (CNG) remains a viable fueling option for existing CNG light trucks and in heavy duty refuse vehicles. In regards to CNG vehicles, there is a 40% reduction in drivable miles per tank of fuel. Sanitation trucks may need to adjust their

pumps, hoses and gaskets in most of the equipment. As a result of the problems experienced with B-100 biodiesel they discontinued its use. We do not believe this is a viable option at this time.

Emerging Fuels

We are staying informed about the future of the fuel industry. There are many emerging fuels including Bioutanol, Biogas, and Biomass to liquids, and gas to liquids, these fuels will be evaluated as they become more practical. By following the industry and being active in trade organizations, staff will continue to stay informed and keep the City on the forefront of implementation, recommending those fuels that have low environmental impact and are economically and operationally feasible.

RECOMMENDED VEHICLE PURCHASE

The city's first alternative fuel vehicle is recommended to be a hybrid that would be used by the Director of the Department of Public Services.

CITY OF YPSILANTI

Non-Motorized Transportation Master Plan

2010-2015



Draft approved for distribution for comment on: **15 December 2009 (City Council Resolution 2009-273)**

Adopted by the Planning Commission on: **17 March 2010**

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PLAN ADOPTION

City Council

Paul Schreiber, Mayor
S.A. Trudy Swanson-Winston, Mayor
Pro-Tem
Lois Richardson, Ward 1
Michael Bodary, Ward 2
William Nickels, Ward 2
Peter Murdock, Ward 3
Brian Robb, Ward 3

Planning Commission

Roderick Johnson, Chair
Gary Clark
Brian McClemens
Brett Lenart
Daniel Lautenbach
Cheryl Zuellig
Kevin Smith
Roberta Wojcik-Andrews

Recreation Commission

Rebecca Dunkle, Chair
Amby Wilbanks
Amanda Maria Edmonds
Chana Hawkins
Matt Stone-Palmquist
Cathy Thorburn
Anne Brown
Katie Mattie

PLAN PREPARATION

The plan was prepared by the City of Ypsilanti Planning & Development Department.

Staff

Bonnie Wessler, Planning Intern, Planning & Development Department
Richard Murphy, Planner II, Planning & Development Department
Teresa Gillotti, Community & Economic Development Educator, MSU Extension
Stan Kirton, Director, Department of Public Services

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City of Ypsilanti

Stakeholders

Carolyn Grawi	Ann Arbor Council for Independent Living
Chris White	Ann Arbor Transportation Authority
Karen Perket	Low-Income Multi-Family Housing Liaison
Georgina Hickey	Bike Ypsi
Thomas Kula	Bike Ypsi
Eli Cooper, AICP	City of Ann Arbor Transportation Program Manager
Katie Mattie	City of Ypsilanti Parks & Recreation Commission
Kevin Smith	City of Ypsilanti Planning Commission
Ken Shannon	College Heights Neighborhood Association
Mackenzie Rettie	East Prospect Park Neighborhood Association
Chris Mayda	Eastern Michigan University Department of Geography and Geology
Candace Dorsey	Eastern Michigan University Police Department
Robin Miller	Eastern Michigan University student
Juanita House	Heritage Park
Rod Johnson	Historic East Side Neighborhood Association
Ann Harris	Meals on Wheels
Nat Holbrook	Midtown Neighborhood Association
Ian Wojcik-Andrews	Midtown Neighborhood Association

Rodney Nanney	Midtown Neighborhood Association
Colleen O'Brien	Ozone House
Kelly Koss	Pittsfield Township Department of Planning, Zoning, and Engineering
John Waterman	Program to Educate All Cyclists
Ruth Halsey	Prospect Gardens Neighborhood Association
Kurt Anschuetz	Prospect Park Neighborhood Association
Trey Allen	Riverside Neighborhood Association
Ann-Marie Steichmann	Stadium Meadows Neighborhood Association
Alex Williams	Superior Township
Ryan Buck	Washtenaw Area Transportation Study
Ken Pendergrass	Washtenaw Biking and Walking Coalition
Coy Vaughn	Washtenaw County Parks and Recreation
Brett Lenart	Washtenaw County Planning
Lily Guzman	Washtenaw County Public Health
Bob Krzewinski	Washtenaw Walking & Biking Coalition, Friends of the Border to Border Trail
Janice Thompson	Worden Gardens Neighborhood Association
Ron Wiedbusch	Ypsilanti Public Schools, Safe Schools Coordinator
Sandra Andreeson	Ypsilanti Township Recreation Commission
Art Serafini	Ypsilanti Township Recreation Director

Executive Summary

This plan is a policy document, identifying the means to establish a built and cultural environment that supports and encourages safe, accessible, comfortable, and convenient non-motorized and multimodal transportation options for both people and goods throughout the City and into the surrounding communities. A multimodal transportation system will result in a greater number of individuals choosing alternative transportation modes, including not only walking and bicycling, but also taking public transportation. This increase will lead to a safer transportation system, a more environmentally sustainable City, an increased quality of life of residents and visitors, and neighborhoods and business districts that are more attractive.

City of Ypsilanti Planning & Development staff, with aid and input from stakeholders and after careful review of demographic data, developed this plan in mid-2009. From that planning process came four goals: first, cultivate and maintain an accessible, equitable, and practical multi-modal transportation system that provides for the effective movement of people and goods within and through the City; second, to provide a safe transportation system for all transportation system users; third, to protect the environment, including the City's significant historic, natural, and scenic resources; and finally, to increase awareness of the ways all users can integrate motorized and non-motorized modes of transportation.

Ypsilanti's dense, historic land use pattern and gridded transportation network contribute greatly to the ready achievement of these goals. However, as with any system, improvements can be made. Five primary areas of improvement were identified and presented in **Section II** of the plan: administration, consisting of modifications that will help ensure that future development minimizes adverse impacts on accessibility; maintenance, ensuring that responsibilities are clear, consistent, and enforced; cooperation, ensuring that improvements throughout the can be similar, continuous, and based on a shared vision; building, to close infrastructure gaps and complete the physical network ; and promotion, with strategies for educating current and potential users about how to use and interact with Ypsilanti's transportation network.

The plan presents a rough implementation schedule, identifies several funding opportunities, and presents a prioritization mechanism for projects not identified within the plan in **Section III**.

Chapter 1: Introduction

This plan is a policy document to guide future policy and infrastructure decisions, and can be used to help Ypsilanti strategically apply for funding for projects it identifies. It identifies the means to establish a built and cultural environment that supports and encourages safe, accessible, comfortable, and convenient transportation options, focusing on non-motorized means such as biking and walking, for both people and goods throughout the City and into the surrounding communities. Such a multimodal transportation environment will result in a greater number of individuals choosing alternative transportation modes, including not only walking and bicycling, but also taking public transportation. This increase will lead to a safer transportation system, a more environmentally sustainable City, an increased quality of life of residents and visitors, and neighborhoods and business districts that are more attractive.

The Role of Multi-Modal Transportation

A comprehensive transportation system is vital to the health, safety, and welfare of the citizens of Ypsilanti. Improvements to non-motorized facilities, such as those for bicyclists and pedestrians, and multimodal facilities, those points where two or more types of transportation interact, are improvements for not only the eight percent of the U.S. population that does not have access to a personal vehicle¹ and the 13.6%² of Ypsilanti's households that do not own a vehicle, but all individuals, as almost all trips begin and end as a pedestrian. The benefits of a comprehensive transportation system extend beyond the users of the system to the public as a whole.

Multimodal: The availability of transportation options using different modes within a system or corridor.

¹ United States Census Bureau. *Journey to Work: 2000.* , 2004. Web. 1 Sep 2009. <<http://www.census.gov/prod/2004pubs/c2kbr-33.pdf>>.

² United States Census Bureau. *2005-2007 American Community Survey 3-Year Estimates.* 2004. Web. 1 Sep 2009.

Washtenaw County's traffic fatalities currently average over thirty per year.

A reduction in overall motor vehicle traffic could help reduce this number. ⁱ

Mobility: the time and costs required for travel. Mobility is higher when average travel times, variations in travel times, and travel costs are low. Indicators of mobility are indicators of travel times and costs and variability in travel times and costs.

A well-implemented transportation system will:

Increase Transportation Options

- Provide transportation alternatives for all individuals who are capable of independent travel.
- Improve access and mobility for not only the 15%³ of Ypsilanti residents who have a disability, but also Ypsilanti's aging population. ⁴
- Support public transportation, such as buses and trains.
- Provide transportation choices that respect an individual's religious beliefs, moral convictions, or uneasiness in driving.

Improve health and safety

- Create a stronger social fabric by fostering the social interaction that takes place outside of the car.
- Encourage healthy lifestyles and help to prevent chronic disease by promoting active transportation.
- Improve safety, especially for the very young and very old, who are often dependent on non-motorized facilities and connections between multiple modes of travel.
- Add "eyes on the street," which not only foster community but also serve to deter crime.
- Reduce the number of traffic crashes and fatalities by reducing the necessity for passenger car and light-truck vehicle use.

Conserve natural resources

- Reduce the local air, water, and noise pollution from automobile use by providing excellent alternatives to automobile travel.
- Reduce congestion by reducing the overall number of automobile trips taken.
- Reduce dependence on fossil fuels.

³ United States Census Bureau. 2005-2007 American Community Survey 3-Year Estimates. Disability.

⁴ Waldrop, Judith, and Sharon M. Stern. "Disability Status: 2000." *U.S. Census*. 2003. U.S. Census, Web. 1 Sep 2009. <<http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>>.

ⁱ "FARS Encyclopedia." *Fatality Analysis Reporting System*. 2008. Federal Highway Administration, Web. 1 Sep 2009. <<http://www-fars.nhtsa.dot.gov/main/index.aspx>>.

Stimulate the local economy

- Reduce the costs associated with automobile parking, automobile maintenance, and fossil fuels, making this money available for other goods and services.⁵
- Increase workers' access to job sites, ability to reliably reach those jobs, and the employment pool from which potential employers may choose.
- Make Ypsilanti's many commercial districts attractive and easy places to visit and do business through improvements to the whole transportation network.
- Sustain and increase property value throughout Ypsilanti.⁶

AAA estimates the cost of owning the average automobile at \$5,783/year, even before driving costs such as gas and maintenance are considered.^{iv}

⁵ Liao, Yihua. "Vehicle Ownership Patterns of American Households." *Urban Transportation Center at University of Illinois*. 2002. University of Illinois, Web. 1 Sep 2009. <<http://www.utc.uic.edu/~fta/Information%20Briefs/vehicles3.pdf>>.

⁶ Cortright, Jon. "Walking the Walk: How Walkability Raises Home Values in U.S. Cities." *CEOs for Cities*. Aug 2009. CEOs for Cities, Web. 1 Sep 2009. <http://www.ceosforcities.org/files/WalkingTheWalk_CEOsforCities.pdf>.

^{iv} "Your Driving Costs." *AAA Exchange*. 2009. AAA, Web. 1 Sep 2009. <<http://www.aaaexchange.com/Assets/Files/200948913570.DrivingCosts2009.pdf>>.

Building upon past work

This project gathers the work of recent Ypsilanti transportation-related initiatives into one whole. Past work has included the *2006 Non-Motorized Transportation Plan for Washtenaw County*, the recommendations of the *Ypsilanti Downtown Blueprint 2008*, the *2008 Transit Plan for Washtenaw County*, Promoting Active Communities assessments, and the *2008-2012 Parks & Recreation Plan*. This plan addresses, consolidates, and builds upon this work.

The *2006 Non-Motorized Transportation Plan for Washtenaw County* includes an inventory of existing sidewalk and bicycling facilities, provides a list of capital improvements needed to complete the networks, and notes several potential sources of funding, but does not prioritize these improvements or include recommendations for policy improvements.

The City of Ypsilanti Downtown Development Authority (YDDA) created the *Ypsilanti Downtown Blueprint 2008* to develop an economic enhancement strategy for downtown Ypsilanti. This strategy, part of the Cool Cities initiative, was crafted to strengthen downtown Ypsilanti and guide its future development in keeping with the community's vision. This blueprint advocated for increased walkability downtown, as well as linkages to any future commuter rail project.

The City participated in the State of Michigan's Promoting Active Communities Self Assessment Program in 2006, 2007, and 2008, earning the silver award each time. Key areas in need of improvement include changes in zoning and parking standards to encourage more biking and walking, a lack of trails and shared use paths, few bike lanes, limited bicycle parking facilities, the need for more education and promotion regarding biking and walking safely, and the need for better connectivity to, from, and through neighborhoods and shopping areas.

Furthermore, the *2008-2012 Parks & Recreation Plan* lists improving and expanding non-motorized transportation networks as one of the five primary goals to focus on in the next five years. This was the top priority identified in a survey of 450 Ypsilanti residents during the Parks and Recreation planning process.

Additionally, a 2007 YDDA survey of 250 downtown and Depot Town employees on commuting behavior found that a high percentage of these employees walk or bike to work, almost double the national average. Thirty-four percent of those surveyed live within five miles of their workplace, and therefore could, given the infrastructure, walk or bike to work. Some of the issues cited that prevented these respondents from biking or walking to work could be corrected in a relatively short period, including a lack of routing information.

Socio-cultural impetus

Ypsilanti benefits from its early history as a commercial center in southeast Michigan. The development of the City's core before automobile use became common gave rise to a dense grid pattern that encourages biking and walking to key destinations like parks, schools, and the central commercial areas of Downtown and Depot Town. Later, as automobiles became more popular, major streets shifted away from this pedestrian focus. Street improvements increased road capacity, allowing for more and quicker motor vehicle access to, from, and through Ypsilanti – in some cases even removing sidewalks in the process. In particular, the four major streets cutting through the center of the city, Washtenaw Avenue (MI 17), Michigan Avenue (Business Route US 12), Hamilton, and Huron, fail to accommodate bicycles and pedestrians. However, Ypsilanti's compact, historic form still provides the opportunity for people to live near work, shopping, and recreation – an option not available in many new-growth communities.

This dense grid pattern also gives Ypsilanti another advantage: such a system is not only historic and easily navigable, but also less resource-intensive. A dense downtown requires less infrastructure per business or residents, and thus less maintenance despite often more intense use, than does a less-dense area.⁷ Due to their smaller per capita demand on these municipal services, denser areas are often more environmentally friendly than their less dense counterparts, if well-designed. By capitalizing upon Ypsilanti's existing density, we can complete its already-extensive multimodal transportation network at a lower cost than newer cities with lower density.

Furthermore, communities with robust multimodal transportation networks appeal to cost-conscious creative professionals. Creating an excellent multimodal transportation infrastructure that works with Ypsilanti's residential density can meet both the needs of the population that is unable to afford a personal vehicle as well as the population that chooses to live without one. Such a network would also appeal to young, creative talent from the area's universities, who may have initially come to the area without a personal motor vehicle. Although there are challenges to improving connectivity, creating more bicycle- and pedestrian-friendly corridors, and improving accessibility for people with disabilities, the City's extant non-motorized infrastructure provides an excellent framework for future improvements.

⁷ Burchell, Robert, and Anthony Downs. *Sprawl costs*. Island Pr, 2005. Print.

Future directions: Land use drives transportation choice

While this plan focuses on policies and infrastructure that are directly part of the transportation system, land use patterns determine whether non-motorized options are even available. Transportation impacts should be considered during any future Master Plan amendments, zoning map changes, or similar actions. Whether or not someone can walk to their destination depends not only on the presence and condition of sidewalks and crosswalks, but also on the distance. If the beginning and end of a trip are close together, non-motorized options become much more reasonable for that trip.

Zoning and land use decisions determine this critical distance factor. Neighborhoods with higher residential density place more households close to their schools, jobs, and other amenities, making non-motorized options possible (as well as transit options). Permitting office and retail uses to be combined with residential uses places these destinations close to the people who need to access them, again supporting non-motorized travel.

Research is increasingly showing that households are willing to pay a premium to live in such compact, walkable, mixed-use areas, and sources ranging from the National Association of Realtors to the American Planning Association expect demand for small lot and multi-unit residential living to grow over the next few decades. The Center for Disease Control specifically addresses land use in their “Healthy Places” initiative, recommending, “Encourage mixed land use and greater land density ... so people can walk or bike more easily.” The most important land use decision, though, appears to be not “encouraging” but “permitting” – reviews of local zoning ordinances typically find that regulations push density downwards and restrict mixed use patterns.

Ypsilanti already has the basic structure of “traditional” neighborhoods in place, due to its age. However, the last several decades of zoning amendments and enforcement have been generally in the direction of reduced residential density and increased separation of uses. Most of these actions have been in response to nuisance conditions perceived to be linked to dense, mixed-use patterns. This plan does not have space to thoroughly examine the goals and outcomes of those actions. However, any future zoning amendments should be carefully examined to ensure they do not reduce vital transportation options, and the zoning ordinance should be further examined to determine how appropriate infill development, neighborhood-scaled businesses, and other land use options can be used to support non-motorized transportation.

Littman, Todd. “Where We Want To Be: Home Location Preferences and Their Implication for Smart Growth.” *Victoria Transport Policy Institute* 22 Nov 2009: n. pag. Web. 1 Sep 2009. <<http://www.vtpi.org/sgcp.pdf>>.

“Healthy Community Design.” *Designing and Building Healthy Places*. Jun 2008. Centers for Disease Control and Prevention, Web. 1 Sep 2009. <<http://www.cdc.gov/healthyplaces>>.

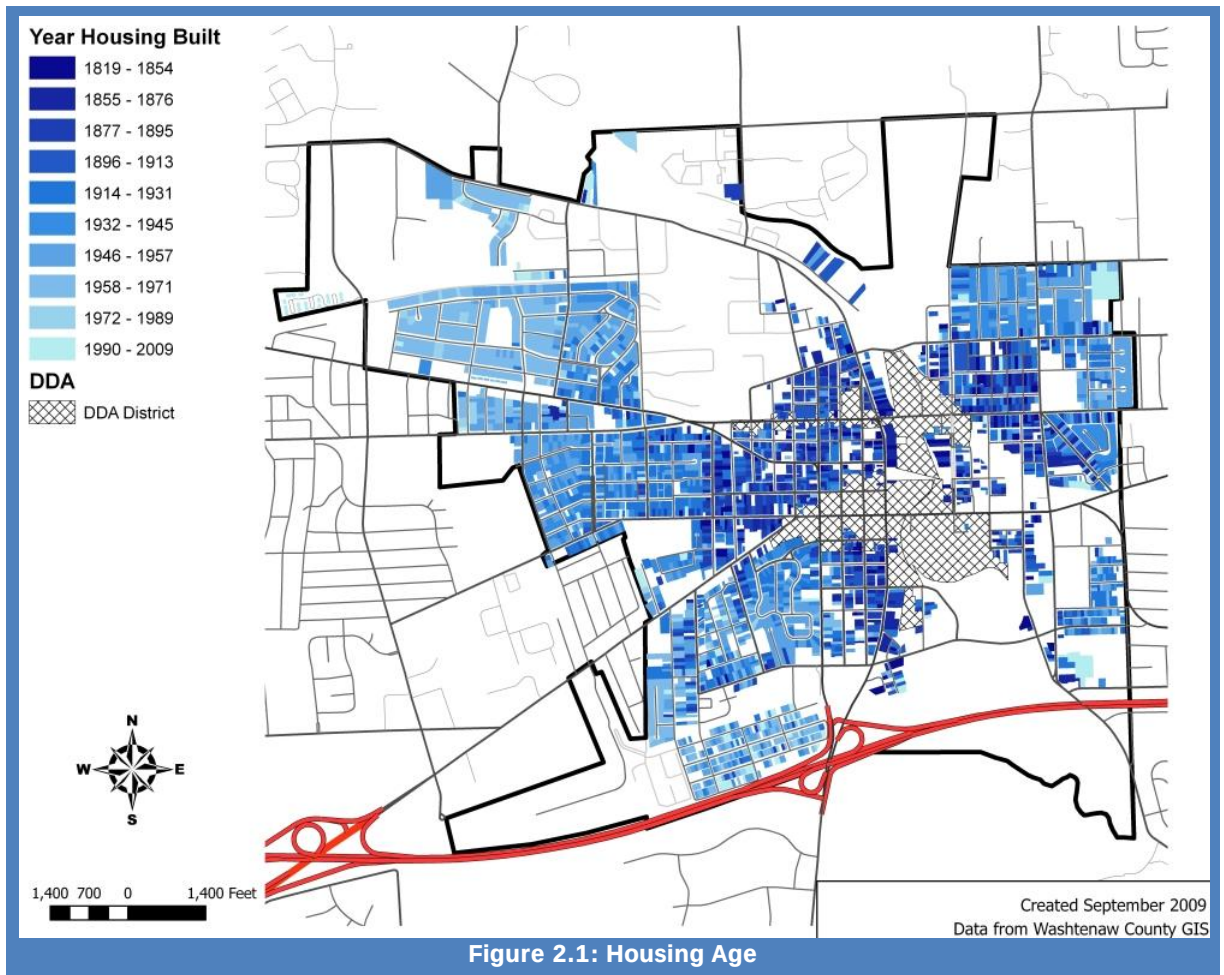
Levine, Jonathan. *Zoned Out*. Washington D.C.: RFF Press, 2006. Print.

Chapter 2: Status

Land Use

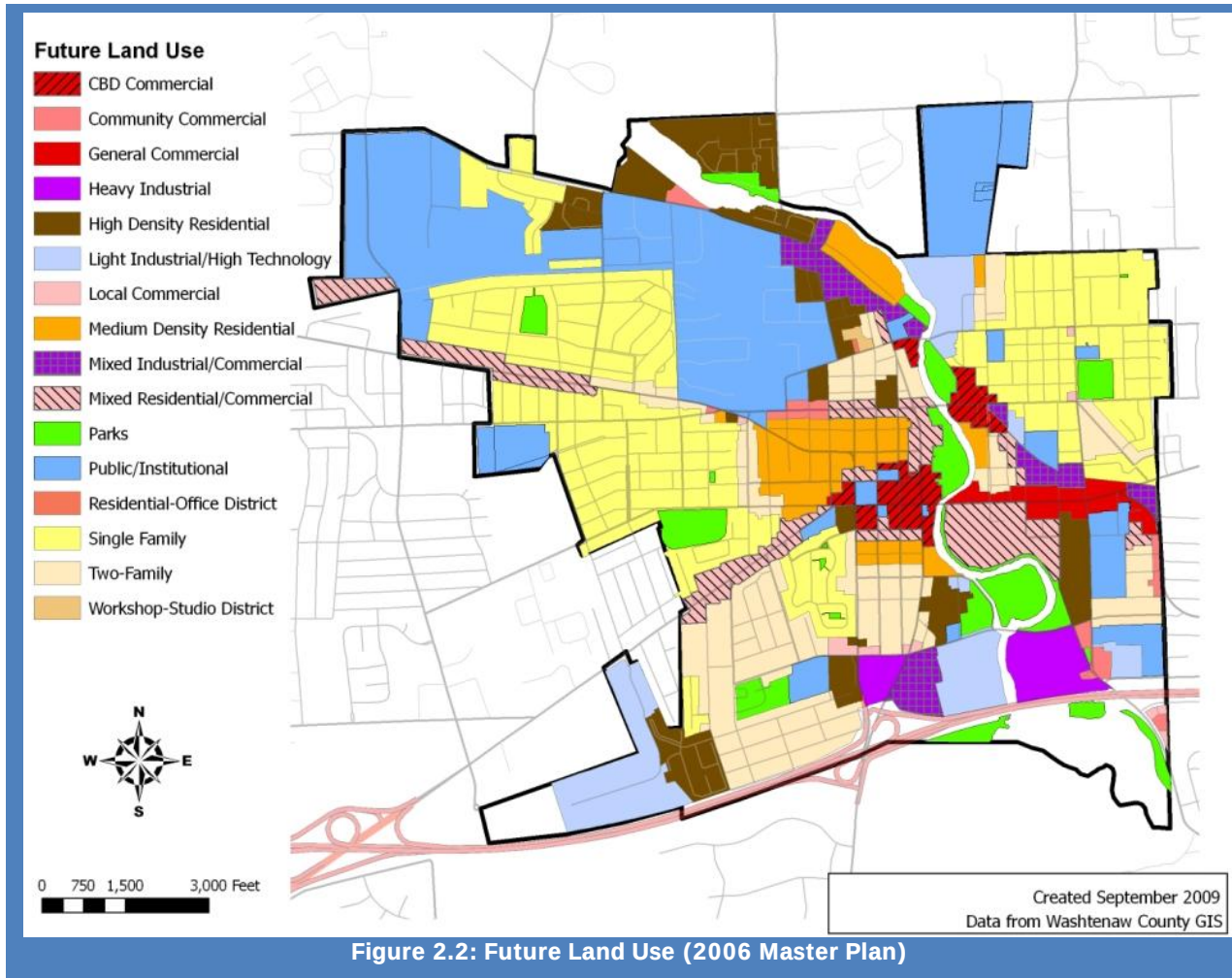
Ypsilanti has a rich heritage, reflected both in its pattern of land use and architecture. Commercial uses adjoin the main local thoroughfares, such as Cross Street, Huron Street, Washtenaw Avenue, and Michigan Avenue. Industrial uses are adjacent to regional distribution points, both historic and contemporary, including the railroad, the Huron River, and I-94. Housing development clustered at first near commercial areas, then became more dense, then spread out as the physical necessity of being adjacent to these commercial areas gave way to the convenience of automobile use. These patterns are shown in **Figures 2.1** and **2.2**. The current zoning ordinance and master plan, developed in the last half of the previous century, perpetuate this less-dense, single-use, auto-oriented pattern of land use, shown in **Figure 2.2**.

Eastern Michigan University (EMU) has also had a major impact upon land use in Ypsilanti. Not only is it a major employment center, but it is also an important destination, for both non-motorized transportation users and transit and motor vehicle users. Retail and dense housing adjoin the campus. This clustering of uses- employment, education, retail, and housing- indicate a strong potential for heavy non-motorized use.



Much of the area of these central business districts and neighborhoods make up the Ypsilanti Historic District, listed in the National Register of Historic Places and one of the largest municipal historic districts in Michigan. Further from the core

are more automobile-dependent land uses: uniform neighborhoods of single-family use; commercial bands along major road corridors, and larger industrial uses. This pattern of land use is relatively stable, as changes of use typically occur on a parcel-to-parcel basis over time.



Population

After a few decades of decline from its peak in the 1970s, Ypsilanti's total population is expected to remain fairly constant in coming years.⁹

Table 2.1: POPULATION AND HOUSEHOLDS⁸							
	Census 1960	Census 1970	Census 1980	Census 1990	Census 2000	SEMCOG 2009	SEMCOG 2035
Total Population	20,957	29,538	24,031	24,818	22,237	20,437	22,247
Households	n/a	7,519	8,451	8,539	8,551	8,687	8,996
Average Household Size	n/a	2.81	2.4	2.38	2.16	1.98	1.94
Approx. % of Population in Households	n/a	71.5%	84.4%	81.9%	83.1%	84.2%	78.4%

Unlike rapidly growing areas, the City does not need to plan for entirely new roads or systems to serve future population, but demographic characteristics can help the City focus its limited resources on improvement and extension of existing facilities. Several of these factors are identified in **Table 2.1**, including overall population distribution, age, income level, and disability status.

Ypsilanti's population loss is analogous to general demographic trends seen across the United States. As **Table 2.1** shows, Ypsilanti's average household size has dropped in recent decades, and is predicted to continue dropping. The City of Ann Arbor and surrounding Townships have also experienced this shrinking household size, as have communities around the state and nation.

In the face of declining household size and little developable land, total population can be maintained by adding households. Although common wisdom in Ypsilanti hints at decline, the number of total households in the City has in fact risen somewhat in recent years. The Census reports that the City's population dropped by 2,400 residents from 1990 to 2000, but the City gained occupied housing units. SEMCOG postulates that this seeming incongruity occurred because households have not been added quickly enough to compensate for shrinking average household size. SEMCOG forecasts developed in 2008 show that Ypsilanti's population will stabilize in coming years, as household size reaches around two people per

⁸ Data from US Census, SEMCOG Population Estimates (July 2009), and SEMCOG 2035 Regional Development Forecast (2008).

Notes:

1. Total population includes population in "group quarters", such as dormitories and assisted living facilities; household data does not include group quarters.
2. Numbers in italics are SEMCOG projections.
3. Percent change columns for 2010 are calculated from 2000 base
4. Changes in collection methods between 1970 and 1980 may account for some residents measured as "group quarters" in 1970 being measured as "households" in 1980.

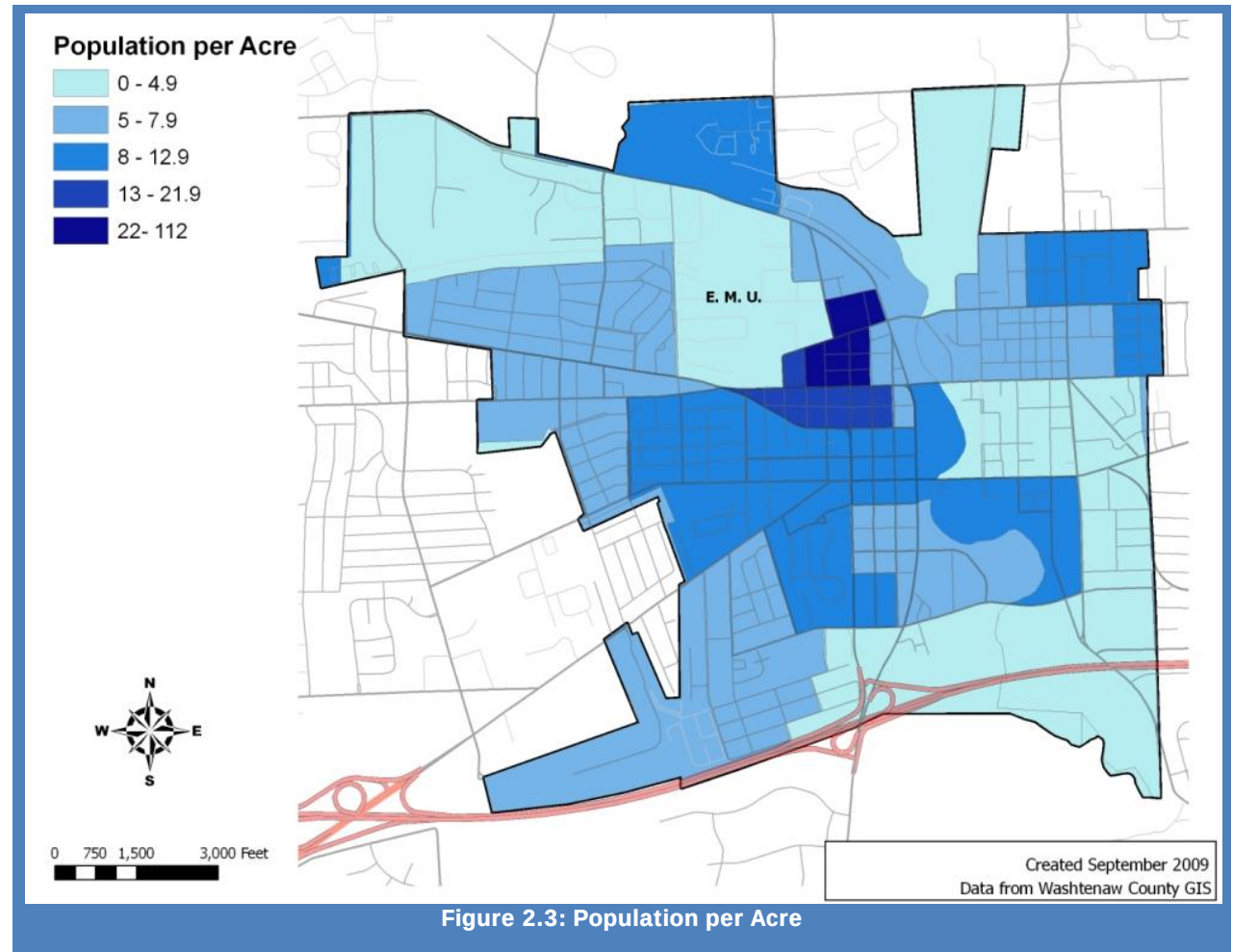
⁹ "Population and Household Estimates for Southeast Michigan." *Southeast Michigan Council of Governments* Jul 2009: n. pag. Web. 1 Sep 2009. <<http://www.semco.org/Population.aspx>>.

household. Should this trend continue, it is unlikely that Ypsilanti will again approach the population peak seen in 1970. However, if Ypsilanti pursues strategic densification, reinforces its infrastructure to support that density, and distinguishes itself with compelling amenities, it is possible that both population levels and number of households will increase.

Population Distribution

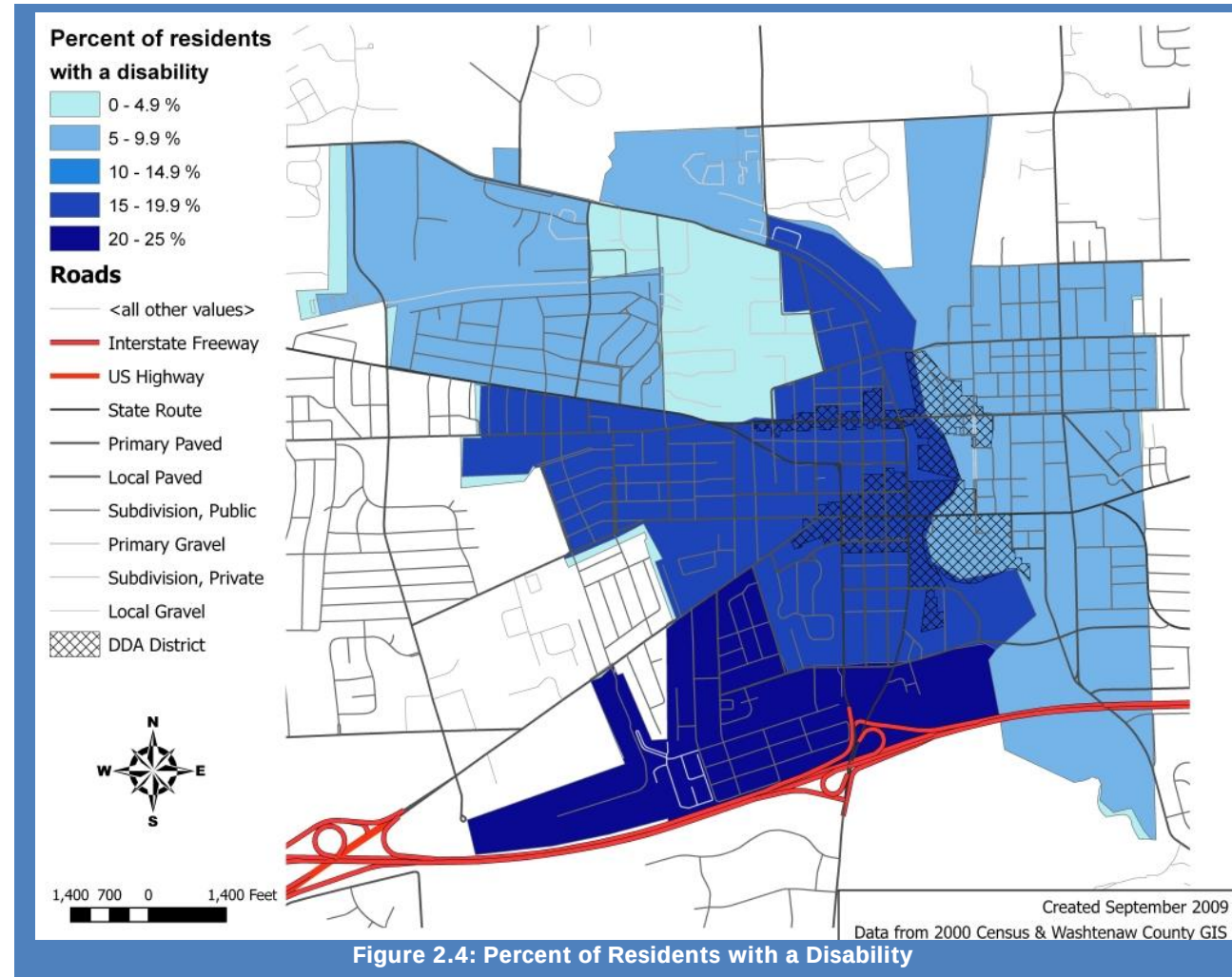
Ypsilanti has a dense core residential area concentrated in the Riverside and Midtown neighborhoods, between downtown and the EMU campus area. These older neighborhoods have smaller lots, houses divided into apartments, and small apartment buildings. The neighborhood to the north of EMU, between Huron River Drive and Clark on LeForge Road, has several large apartment complexes. In the southwest portion of the city, the neighborhoods feature mostly dense single family and duplex houses, with a few larger housing complexes. **Figure 2.3** shows population per acre throughout the City, divided by Census tract.

The lower density shown in the southwestern and southeastern-most tracts, as well as in the tract containing EMU, is likely due to the expanses of single-use non-residential land uses in those areas, such as light manufacturing, Ford Lake, and educational facilities. There are, however, significant concentrations of multi-family and single-family housing within those tracts.



Persons with Disabilities

Disability is defined by the U.S. Census bureau as having one or more of the following long-lasting conditions: a sensory, physical, or mental disability, any of which must consist of the condition lasting six months or more and making it difficult to



perform care for one's self, go outside the home, or maintain employment. According to the 2000 Census, nearly 32% of Ypsilanti residents suffered some disability by this definition. The more recent American Community Survey (ACS) data for 2005-2007 show a lower percentage of disabled residents, at 15%, a drastic change resulting from both a change in the survey instrument and the fact that the ACS does not include residents in non-institutionalized group quarters, such as college dormitories.¹⁰ However, it is notable that even with these data comparability issues,¹¹ the ACS asserts that 41% of those 65 and older are likely to have some sort

¹⁰ Waldrop, Judith, and Sharon M. Stern. "Disability Status: 2000." *U.S. Census*. 2003. U.S. Census, Web. 1 Sep 2009. <<http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>>.

¹¹ United States. *American Community Survey: 2005 Subject Definitions*. , 2005. Web. 1 Sep 2009. <http://www.census.gov/acs/www/Downloads/2005/usedata/Subject_Definitions.pdf#page=33>.

of disability.¹² These data, when taken together with ever-lengthening life expectancies, emphasize the importance of putting in place measures that encourage accessibility for and independent mobility of both the elderly and the disabled.¹³

As shown in **Figure 2.4**, the southwest portion of the City had the highest percentage of residents who had some sort of disability; the downtown area and neighborhoods immediately to the west had the next highest. Thus, the southwest and central areas of the city, as well as their connections to commercial areas, health care, and employment centers, are areas where accessible infrastructure upgrades should be prioritized.

Employment and Income

The City of Ypsilanti has a lower median income and higher level of poverty than many communities in the area. As shown in **Table 2.3**, the 2005-2007 ACS reported the median income of Ypsilanti households as \$34,959, 72% of the State-wide median and 70% of the nation-wide median of \$50,007; however, as these data were gathered prior to the recent economic downturn, it is quite likely that current income levels are significantly lower.

The current county-wide jobless rate, 5.9%, is re currently in line with the national rate of 5.8%, but significantly lower than the Michigan rate of 8.4%.¹⁴ At the time of this writing, Michigan unemployment rates are among the highest in the nation.¹⁵

Table 2.2: AGE DISTRIBUTION OF RESIDENTS

Age Group	Census 2000	SEMOG 2035	Change
Over 65	1,571	5,335	240%
35-64	5,046	6,184	23%
18-34	12,187	7,658	-37%
5-17	2,438	2,138	-12%
Under 5	1,120	932	-17%

Table 2.3: INCOME CHARACTERISTICS

	State	County	Ypsilanti
Median family income	\$60,269	\$80,779	\$60,207
Median household income†	\$48,642	\$59,887	\$34,959
Per capita income	\$24,966	\$31,002	\$19,734
Families below poverty level	13.7%	13.9%	13.0%
Children below poverty level	18.9%	12.3%	22.8%
Residents 65+ below poverty level	8.4%	5.5%	9.0%

Data from American Community Survey 2005-2007

† The Census defines a "household" as any occupied housing unit. A "family" is defined as a household with a number of related occupants.

¹² United States Census. *American Community Survey: 2008 Data Release*. Web. 1 Sep 2009. <<http://www.census.gov/acs/www/Products/index.html>>.

¹³ Beck, Graham T. "Streets Safe for Walking: How cities are making their byways user-friendly." *AARP Bulletin Today* 23 Mar 2009: n. pag. Web. 1 Sep 2009. <http://bulletin.aarp.org/yourworld/gettingaround/articles/streets_safe_for_walking.html>.

¹⁴ State of Michigan Department of Energy, Labor, & Economic Growth. *Labor Market Information*. 2009. Web. 1 Sep 2009. <<http://www.milmi.org/>>.

¹⁵ United States Bureau of Labor Statistics. *Unemployment Rates by State*. 2009. Web. 1 Sep 2009. <<http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?survey=la>>.

Two particular income-related measures important to transportation planning are the numbers of children in poverty and the number of households that do not have access to a personal automobile. Both of these demographic measures indicate

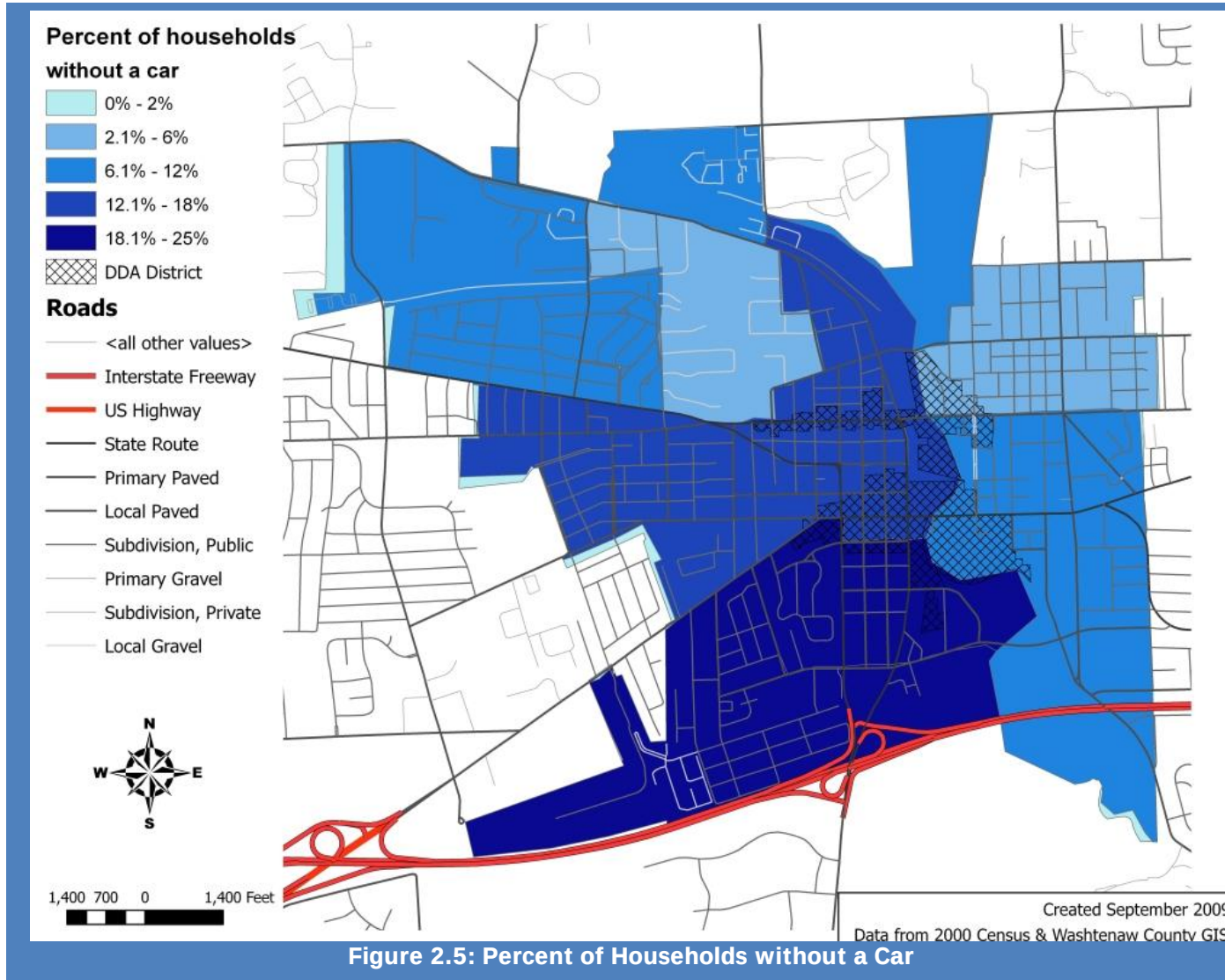
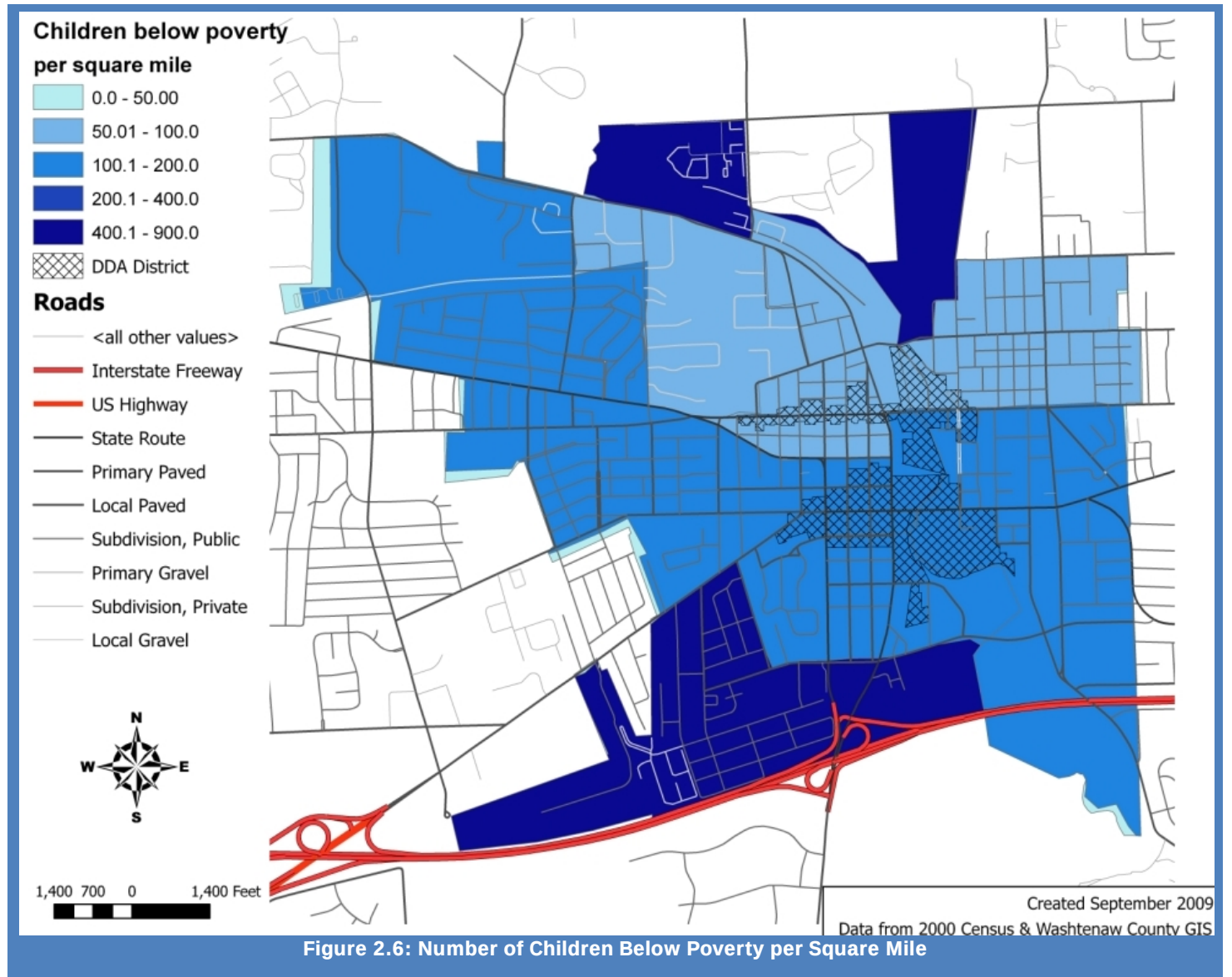


Figure 2.5: Percent of Households without a Car

residents who have limited mobility, often relying upon inadequate non-motorized or transit options, and cannot easily access amenities that are further away. **Figures 2.6 and 2.7** show concentrations of these demographic groups by Census tract as of the 2000 Census. Both metrics showed the greatest concentration in the southwest portion of the City. The northern part of the City also had above-average concentrations of these populations.



Transportation

The City of Ypsilanti benefits from a location convenient to a major north/south highway (US-23) and a major east/west expressway (I-94), providing residents with easy access to amenities around the region and carrying visitors to Ypsilanti’s various special events, though posing challenges to non-motorized travel by creating walls of fast-moving vehicle traffic to cross. Washtenaw Avenue (Business Route US-23) and Michigan Avenue (Business Route US-12) also run east and west through the heart of downtown. The traditional, easily-understood grid pattern generally followed by Ypsilanti’s streets lends itself to both motorized and pedestrian traffic, and the AATA serves to connect downtown Ypsilanti with its neighbors. The city features approximately 98 miles of pedestrian infrastructure, 5.55 miles of off-road bike routes, 3.71 miles of bike lanes, and many bus transit stops.

Commute Source of Over-16 Workers
(Census 2000)

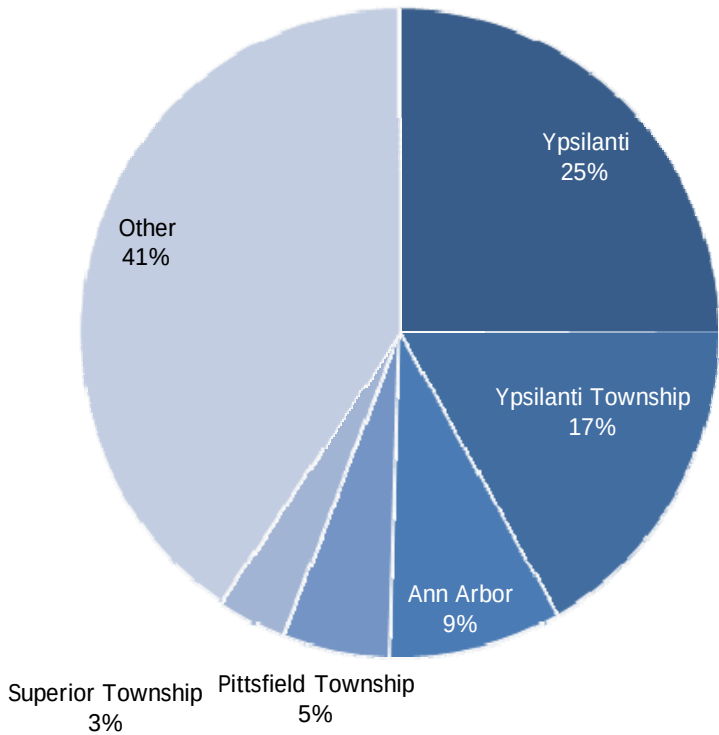


Figure 2.7: Commute Source of Over-16 Workers

Those who work in the City of Ypsilanti get here through many means, but the majority drive alone. Carpooling and walking are in second and third place, with those who bring their work to them bringing up fourth. The number of those who walk to and from work is very high compared to national and state averages, indicating that Ypsilanti's pedestrian network is above-average as well. However, the fairly low percentage of people who take public transit show room for improvement in that area. Among those who commuted to work, it took them on average 19.7 minutes to get to work, less than the national average of 25.1 minutes.¹⁶

Non-motorized access

As much of Ypsilanti was platted and developed before widespread use of the automobile, the overall layout of the City is friendly to bicycle and pedestrian traffic. The grid layout of streets, the predominantly complete sidewalk network, the compactness of neighborhoods and business districts, and the distribution of parks throughout the community all contribute to this by putting people close to amenities and providing direct routes to essential destinations.

Ypsilanti Commute Data Geographic Comparison

(ACS 2005-2007)

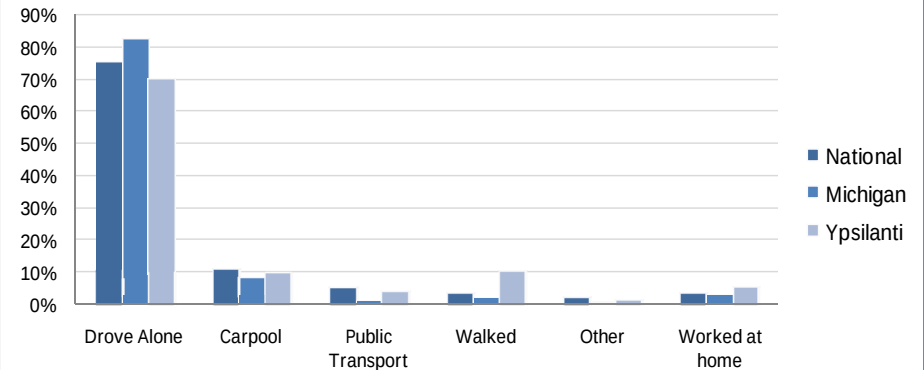


Figure 2.8: Ypsilanti Commute Data Geographic Comparison

Ypsilanti Commute Trends

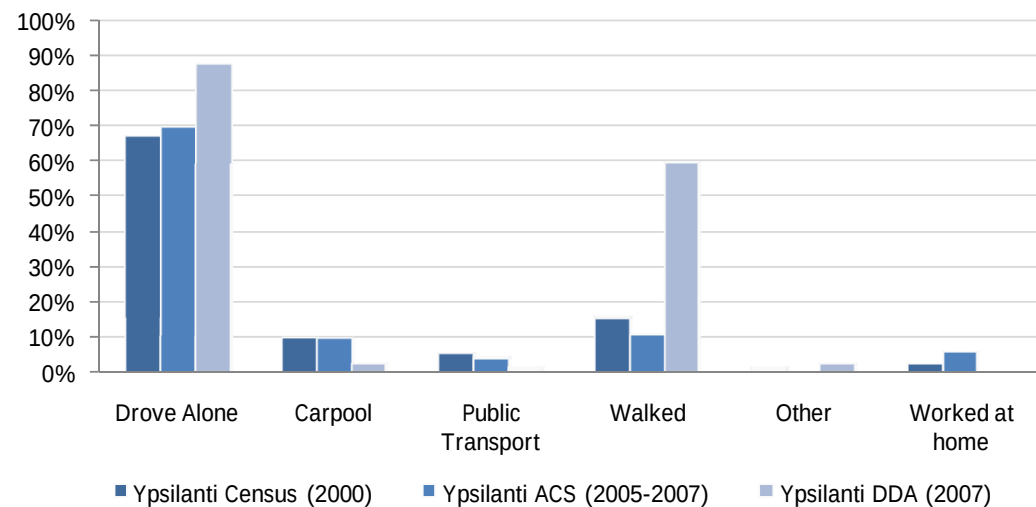
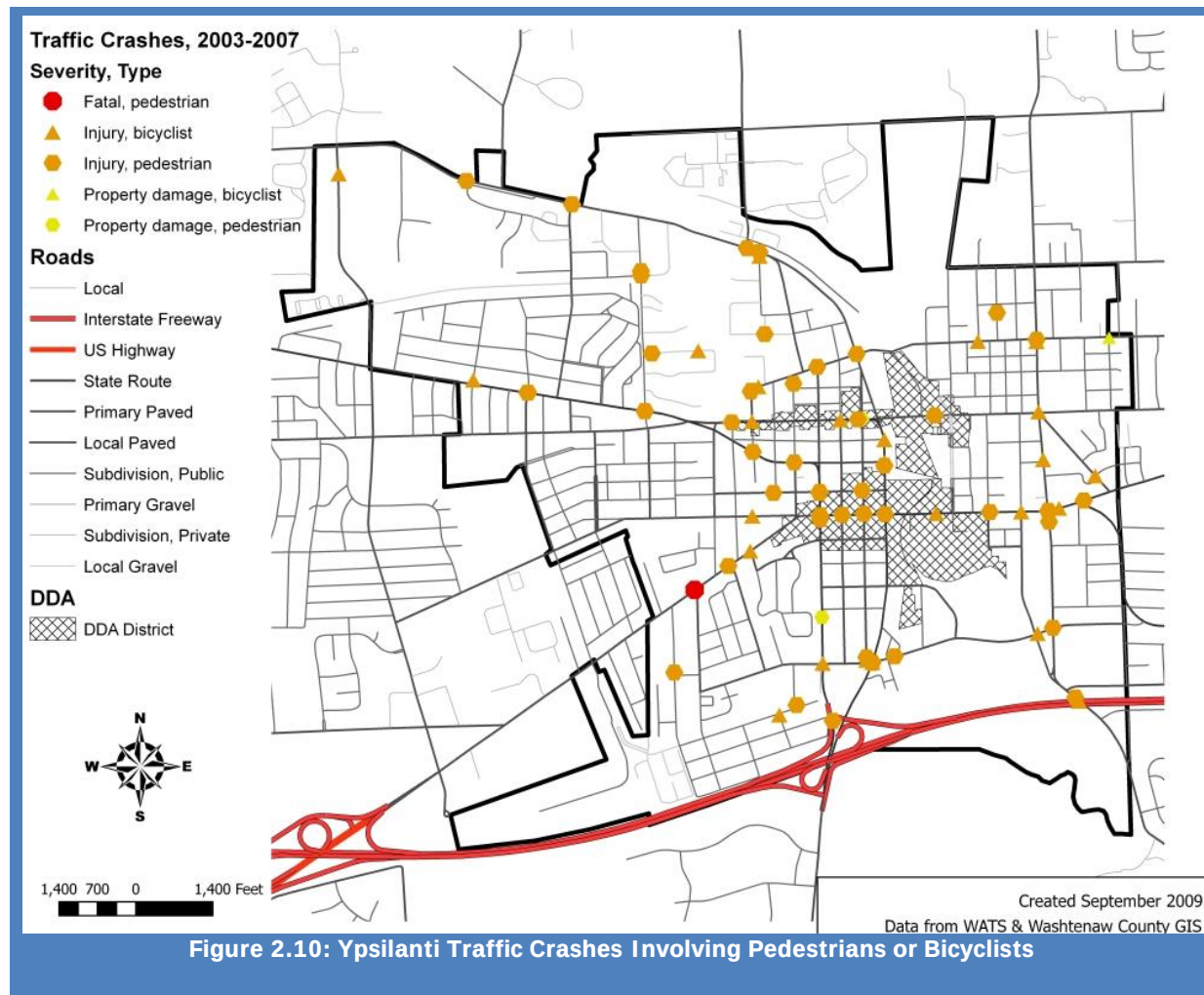


Figure 2.9: Ypsilanti Commute Data Trends

¹⁶ United States Census. *American Community Survey: 2008 Data Release*. , Web. 1 Sep 2009. <<http://www.census.gov/acs/www/Products/index.html>>.



In pleasant conditions, biking and walking may be by itself a recreational activity, not merely a method of transport, as automotive commuting is generally regarded. The Border-to-Border Trail (see **Appendix X**) aims to build on and expand non-motorized access to parks, to serve the recreational needs of residents who walk and bike for recreation, and to connect communities throughout Washtenaw County.

Bicyclists and pedestrians still encounter barriers to reaching critical destinations, however. The major streets which provide motor vehicle access to, from, and through Ypsilanti are often hostile to bicyclists and pedestrians due to the quantity and speed of traffic, amongst other concerns. Many of these major routes

are predominantly one-way streets, which both prioritizes motorized speed and volume over provision of a good environment for bicycling or walking. At the southern end of Ypsilanti, Huron and Hamilton Streets cross over I-94, but this bridge has no pedestrian facilities, creating a barrier between Ypsilanti Township and the City of Ypsilanti that impedes non-motorized traffic both from the City and from the Township. The City and Township worked with WATS and the Michigan Department of Transportation in 2005 (see **Appendix IV**) to study options for a safe pedestrian crossing.

The perception of unsafe or unpleasant environmental factors can reduce willingness to walk or bike. Recently, local and regional efforts have assessed the environmental and psychological environment for non-motorized travel in Ypsilanti. The *2006 Non-Motorized Plan for Washtenaw County* inventoried existing sidewalk and bicycling routes and provided a list of capital improvements needed to complete these networks. The goals of that plan are presented at left, and the infrastructure deficiencies are extensively referenced in later chapters. The plan encourages thinking of non-motorized transportation options not only on their own but also in the context of a “complete streets” view of roadways as multi-modal transportation systems.

Non-Motorized Plan for Washtenaw County Goals (WATS)

1. Create a countywide, non-motorized vision to provide complete sidewalk and bike facility networks and to support public transit service.
2. Increase awareness of non-motorized funding opportunities.
3. Institutionalize road agency and local community thinking regarding incorporation of non-motorized improvements as part of all transportation improvements.
4. Expand and enhance the non-motorized portions of the 2030 Long Range Transportation plan for Washtenaw County and the Washtenaw County Comprehensive Plan.
5. Improve safety for bicyclists and pedestrians.
6. Identify inter-county non-motorized connections.

The 2007 YDDA survey of downtown workers showed a strong relationship between distance to work and likelihood of walking or biking to work. No such relationship existed for carpooling or using public transit.

Mass Transit

Historically, Ypsilanti has had a healthy public transportation option in commuter rail, the interurban transport, and lately, the AATA bus system. The interurban service and commuter rail have long since been discontinued, but, commuter rail looks to be making a comeback in some form by late 2010. AATA bus service, however, is at risk due to funding difficulties.

The City of Ypsilanti currently has a purchase of service agreement with the Ann Arbor Transit Authority (AATA) to provide bus service to and from Ann Arbor, to and from the surrounding townships, and within the City of Ypsilanti itself. Four routes connect the cities, many currently terminating at the transit center on Pearl Street. The bus system runs seven days a week, but has limited service on weekends and during the evening hours. Door-to-door on-demand services are available through AATA's A-Ride service for people with disabilities, and through Northfield Human Services' People's Express system for those who meet income guidelines. There are several full-rate taxi services available as well.

Transit Plan for Washtenaw County Goals (WATS)

1. Recommend public transit service to promote economic vitality & quality of life in Washtenaw County.
2. Increase quantity and improve quality of transit service.
3. Improve mobility and access for residents using transit.
4. Develop education and advocacy program for transit plan.
5. Increase awareness of transit funding opportunities and identify opportunities for implementation of the plan.

These transit services provide access to crucial resources around the Ann Arbor and Ypsilanti area, such as Eastern Michigan University, Saint Joseph Mercy Hospital, the Veterans' Administration Ann Arbor Healthcare System, the University of Michigan, and Washtenaw Community College. As AATA service within Ypsilanti is supported through a contractual payment from the City, however, the City's financial situation has raised questions about how support for this service can be continued in the future, with discussion including a dedicated millage, fare increases, and long-term efforts at building regional support. The *2008 Transit Plan for Washtenaw County* by WATS, the goals of which are presented above, looks to broaden support for and access to transit service through the County.

Chapter 3: Process

This plan was developed from March 2009 to December 2009 by City of Ypsilanti Planning & Development staff and stakeholders, including representatives from the City's Planning Commission and Parks and Recreation Commission. During this period, the stakeholder group typically met once a month, holding a working session devoted to some aspect of the plan.

Initial Analysis

Staff reviewed the *2006 City of Ypsilanti Master Plan*, the *2006 Non-Motorized Transportation Plan for Washtenaw County* and *2007 Transit Plan for Washtenaw County*, and the *2008-2012 Parks & Recreation Master Plan*. Staff also reviewed other related City and regional plans, including the *2008 Ypsilanti Downtown Blueprint*, the *2004 Eastern Michigan University Master Plan*, prior Promoting Active Communities self-assessments, and various student projects, project studies, and other data.

Based on this background information and input from stakeholders, a vision and four primary goals were formulated for the plan, presented in **Chapter 4: Vision & Goals**. Recognizing the importance of maintaining and building upon the efforts of other entities, those goals place the City's role in the transportation system as providing an efficient, safe, and welcoming network in cooperation with non-profits, neighboring communities, and regional entities.

Stakeholder Input

Stakeholder representatives from throughout the City and neighboring communities were invited to take part in the planning process, as were members of community and advocacy organizations. These stakeholders included neighborhood associations, planning professionals, Eastern Michigan University employees, bicycling and walking enthusiasts, and disabled persons, for a total of thirty-seven stakeholder representatives, named on **page viii**. Six group meetings were held with these stakeholders, as well as many one-on-one conversations.

Agendas from these meetings are included in **Appendix II**.

Public Input Surveys

Over the course of July and August, the staff surveyed users of the transportation system. The surveys were designed to gather information about common non-motorized routes through Ypsilanti, as well as to collect feedback about barriers to walking, biking, and taking public transit. The surveys were available to participants interactively online, as a printable PDF, and on paper. The surveys were distributed through email to each neighborhood association as well as members of the public; through Ypsilanti Community Policing Action Council (CoPAC), an association of neighborhood associations; at City Hall; on the City's website; and at the July 28th Farmers' Market.

In total, seventeen bikeability and nineteen walkability/accessibility surveys were returned. Future outreach efforts could include distribution at local business, through local schools (when in session), door-to-door surveys, or coordination with non-profit organizations that work with Ypsilanti's residents. During implementation of major plan elements, such as those outlined in **Chapter 8: Build**, additional work should be performed to identify and engage stakeholders. The complete survey forms and results are provided in **Appendix II**. Results are also referenced throughout the plan.

Farmers' Market Input

Staff had a booth at the Downtown Ypsilanti Farmers' Market on July 28th, 2009. Surveys were distributed, as were maps, magnets, and other transportation-related "freebies" from the Ypsilanti DDA, the AATA, and the League of Michigan Bicyclists. The public meeting two days hence was advertised. Three large sheets of paper and markers were provided for interested passerby to answer the prompts "I like biking/walking in Ypsi because...", "I don't like walking/biking in Ypsi because...", and "Fantastic Ideas." A wide variety of feedback was recorded. This feedback is included in its entirety in **Appendix II**, and is referenced in throughout this plan.



July Public Meeting / City of Ypsilanti

Public Meeting Input

A public meeting was held on July 30th. This drew a diverse audience of seventeen members, including residents who use wheelchairs and live in low-income housing, planners from neighboring communities, and bicycling and walking advocates. Participants were divided into groups of three to six participants per table, each with a set of Ypsilanti maps, markers, and scratch paper. They were asked to mark on the map current deficiencies and desired improvements. Primary biking and pedestrian routes, as well as critical inter-neighborhood connections, were identified as part of this process. Participants placed heavy emphasis on snow removal and accessibility as well. Written record of this feedback is presented in **Appendix II**, and is referred to throughout this plan.

Action Plan Generation

From the assessment of current conditions, Vision & Goals, public input process, and community physical and demographic factors, staff and stakeholders generated recommendations for the City's multimodal transportation system and prioritized those recommendations into the action plan presented in **Section III**.

Public Review and Adoption

The draft plan was made available for public comment on 15 December, 2009. Within the City, copies of the draft were placed at City Hall. The plan was available as a PDF for download from the City's website, and a notice of the downloadable copy sent via email to community groups. Copies of the plan were provided to City Council members, the Planning Commission, and the Recreation Commission.

The plan was also sent to a number of regional entities for review, including the Washtenaw County Planning and Environment Department, Public Health Department, and Parks and Recreation Commission; the Ypsilanti Public School District; Eastern Michigan University; Washtenaw Area Transportation Study; the Ann Arbor Transit Authority; local utilities and railroads; Washtenaw County Road Commission; Michigan Department of Transportation; and the Planning Departments of Ypsilanti and Superior Charter Townships. A notice including information on the public hearing was placed in the Ypsilanti Courier, the paper of record, on 04 March, 2010.

On 17 March, 2010, the Planning Commission held a public hearing on the draft plan. Comments were heard from community members, and a summary of written comments received was provided to the Commission and the community

members in attendance. As a result of comments received on the draft plan, the Commission recommended adoption. The Commission adopted the plan on 10 March 2010. The notices, resolutions, and minutes for the meetings mentioned above are included in **Appendix VIII** for reference.

Chapter 4: Vision & Goals

Vision

This plan envisions a future in which Ypsilanti has a built and cultural environment that supports and encourages safe, accessible, comfortable and convenient transportation options for people and goods throughout the City and into surrounding communities. Residents and visitors enthusiastically choose to walk, bicycle, and take public transit over using a personal automobile. These choices lead to a safe transportation system, an environmentally sustainable City, a fantastic quality of life for residents, and neighborhoods and business districts that are stunningly attractive.

Goals

1. Cultivate and maintain an accessible, equitable, and practical multi-modal transportation system that provides for the effective movement of people and goods not only within the City, but also to neighboring jurisdictions. The success of this goal will be measured by an increase in lineal bicycle lane miles, an increase in lineal sidewalk feet, an increase in the number of sharrows and Share the Road signage, and an increase in the number of ADA-compliant curb ramps.
2. Provide a safe transportation system for both motorized and non-motorized users. The success of this goal will be measured by a decrease in traffic citations given, a decrease in the number of traffic crashes involving pedestrians and bicyclists, and a decrease in snow removal complaints.
3. Protect the environment, including the significant historic, natural, and scenic resources of the City of Ypsilanti.
4. Increase awareness of the ways all users can integrate motorized and non-motorized modes of transportation.

The following chapters address these goals through administrative and legislative means, by setting maintenance standards, and through strategies for building infrastructure and capacity.



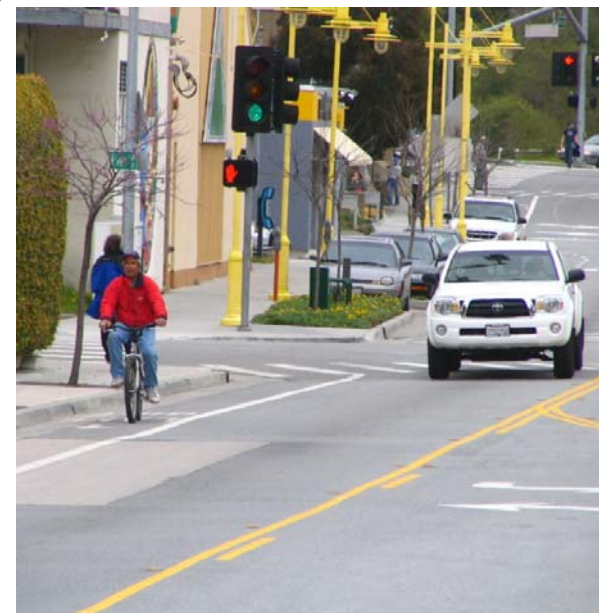
Chapter 5: Administer

During the public process, changes to City policies, regulations, and ordinances that would foster a robust multimodal transportation network were identified. In this chapter are recommendations borne of that process that will help ensure that future development minimizes adverse impacts on accessibility, instead promoting design that reduces the need for and use of single-occupant automobiles by removing barriers to the use of alternate means of transportation.

Adopt a “Complete Streets” ordinance. “Complete Streets” refers to streets that safely accommodate bicyclists, pedestrians, public transportation passengers, and users of all ages and abilities. The promotion of capital improvements that are planned, designed, and constructed to encourage walking, bicycling, and transit use increases the general safety and welfare all users of Ypsilanti’s transportation network. Complete streets guidelines encourage compliance with ordinances and speed limits through physical design standards. Furthermore, many roads are currently overbuilt, meaning they are built as though they were intended for a high volume of high-speed traffic, but are not currently required to handle either. Examples include Hamilton and Huron south of Michigan Avenue, which due to the currently high speed of traffic and scarcity of pedestrian crossings, discourage non-motorized connectivity and encourage disregard of the posted speed limit.

Passage of this ordinance is particularly important due to the current lack of a comprehensive capital improvements plan. Due to this lack, the Planning Commission is currently reviewing capital improvements projects on a case-by-case basis. The recent Michigan Planning Enabling Act (Act 33 of 2008) requires Planning Commission review of a comprehensive capital improvements plan, however. Having such a document available for review would enable the Planning Commission to check not only for the “completeness” of projects, but compliance with this non-motorized plan and the Master Plan.

Suggested language: Appendix I, 5.1, Complete Streets.



www.pedbikeimages.org / Dan Burden

Surveys conducted as part of the Blueprints process indicated both visitors and business owners believed that walkability, traffic circulation, and parking were important issues to address in downtown Ypsilanti.

Review requirements for loading zones in commercially zoned areas. The presence of specially designated loading zones discourages use of sidewalks, bike lanes, and other inappropriate spaces for loading and unloading vehicles. Currently, B3-zoned areas, which comprise the majority of the central business district, are exempted from the zoning ordinance's on-site loading space requirement. Loading space requirements in other districts are seemingly geared towards allowing space for tractor-trailer deliveries. Revise these requirements so that loading spaces for vehicles such as delivery vans are included in commercial, mixed-use, and high-density residential zones; lower minimum space requirements for tractor-trailer delivery spaces, as the need for these spaces is highly variable, depending on the business therein.

Current language: Chapter 122, Article XIII, Section 122-839: Off-street loading space requirements.



Streetswiki

Grant pedestrians the right-of-way when using street crossings without a stop sign or traffic light for oncoming traffic, known as unsignalized crossings. An example would be those at Cross between Oakwood and Summit, or at Pearl and North Huron. The high speed and volume of traffic at many existing unsignalized crossings is dangerous and generally discourages would-be pedestrians from using them. By granting, signing, and enforcing pedestrian right-of-way, these crossings may become safer and more commonly used, as well as bringing average speeds on these streets back in line with posted speed limits. Additionally, the City might explore creation of more unsignalized crossings at areas with high pedestrian volume, such as Ferris Street and Hamilton, linking senior housing to downtown amenities, or at Courtland and Washtenaw, where two multifamily developments sit directly across the street from neighborhood retail.

Suggested language: Appendix I, 5.3, Unsignalized Crossings.

Amend the language of the bicycle registration ordinance to remove the mandatory registration clause. Currently, users and owners of bicycles are required to register their bicycles with the Ypsilanti Police Department, and pay a fee to do so. The intent of this program is to aid in the recovery of stolen bicycles, but due to low levels of compliance, recovery rates are likewise low. Stakeholders have expressed concern that due to low resident awareness of this ordinance, enforcement could discourage nascent bicyclists from purchasing and using bicycles within the city. Amending this language would re-frame the ordinance as a tool for residents, not a threat.

Suggested language: Appendix I, 5.4, Bicycle Registration.



Rolling Meadows, Illinois

Incorporate bicycle parking into zoning & development guidelines. Bicycle parking, much like automobile parking, is crucial for users of those vehicles. However, unlike automobile parking, there are currently no standards, let alone consistent standards, for construction of these spaces. By requiring bicycle parking be provided during development, and providing standards for this parking, we help to allow practical bicycle access while providing developers and businesses with clear and legible guidelines. Furthermore, re-assessing current required levels of motor vehicle parking may allow these requirements to be reduced, which can not only aid non-motorized transportation but also encourage use of the City's limited real estate for economically active uses.

Current language: Chapter 122, Article XIII.



YDDA survey respondents indicated that they would be more likely to bike to work if there were more bicycle facilities available.



i. Update the general parking and loading requirements to require bicycle parking and to distinguish it from motor vehicle parking.

Currently, the general parking and loading requirements do not address bicycle parking at all, nor do they distinguish between types of vehicle parking or types of motor vehicles. Bicycle parking should be incorporated as distinct from motor vehicle parking; it may also be advisable to consider incorporating requirements for motorcycle or motor scooter parking, as these vehicles seem to be locally popular.

Suggested language: Appendix I, 5.5i, Distinguish Bicycle Parking from Motor Vehicle Parking.

ii. Institute design standards for bicycle parking. By adopting standards similar to those already in use by Ypsilanti's neighbors in Southeast Michigan, such as Ann Arbor, we provide clarity and a predictable experience for both developers and users.

Suggested language: Appendix I, 5.5ii, Bicycle Parking Facilities.

iii. Update current parking quantity requirements to ensure bicycle parking and motorized vehicle parking levels are appropriate. The parking ratio table should also be brought in line with current use definitions in the zoning ordinance for usability.

Current language: Chapter 122, Article XIII, Sec. 122-836: Table of required number of parking spaces.

iv. Review the “fee in lieu of parking” ordinance. The current ordinance only provides for public parking in place of private parking, but could be leveraged to provide for non-motorized transportation in place of motor vehicle parking. Consider modifying this ordinance to allow for public provision of bicycle parking facilities, substantial pedestrian improvements, or transit facilities, and consider expanding this ordinance’s application beyond the central business district.

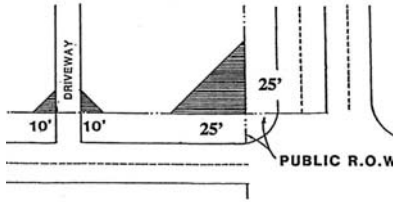
Current language: Chapter 122, Article XIII, Sec. 122-841: Fee in lieu of providing off-street parking.

“Cities can also give developers the option to reduce the demand for [motor vehicle] parking rather than increase the supply, and this modest reform will create substantial benefits for all parties:

1. The reduced demand for parking can shift land from parking spaces to activities that employ more workers and yield higher tax revenue.
2. By reducing the number and size of parking lots, reducing the demand for parking improves urban design.
3. Employers use their savings from providing less parking to offer new fringe benefits—[transit passes] or parking cash out—for commuters. This new fringe benefit resembles a wage increase that helps recruit and retain new workers.
4. Commuters gain new fringe benefits—free public transit or cash payments—beyond the usual offer of free parking to work.
5. Developers and property owners save money. They can replace a high capital cost for parking with a low annual cost for public transit, parking cash out, or car sharing. Fewer vehicle trips reduce a project’s environmental impact and can help developers satisfy traffic mitigation requirements.
6. Supply-side capital subsidies for required parking are converted into demand-side subsidies for public transit, and the increased transit ridership enables transit agencies to improve service.
7. Fewer vehicle trips reduce traffic congestions, air pollution, and energy consumption.

[...] The low cost of reducing the demand for parking compared with the high cost of increasing the supply shows that [transit passes] and parking cash out are cost-effective strategies... [that] can probably achieve good results in other cities.”

Shoup, Donald. *The High Cost of Free Parking*. American Planning Association, 2005. Print.



Ordinance 122-649, fig 1

An overwhelming majority of walkability- and accessibility-related comments noted that snow and ice accumulation were significant barriers to walking, biking, or otherwise using a form of non-motorized or alternative transportation during the winter.



Review current ordinances regarding landscaping and fencing to ensure that pedestrians are visible to vehicles at potential points of conflict, such as crosswalks, alleys, and driveways. Motor vehicle drivers may unknowingly block the path of pedestrians or bicyclists when they pull out of a parking lot, driveway, alley, or around a corner. By ensuring that drivers of these vehicles can see those who may be on the sidewalk or in the bike lane, and those using the sidewalk or bike lane can see motor vehicles, we reduce potential conflicts.

Suggested language: Appendix I, 5.6i Parking Area Landscaping, 5.6ii: Front Greenbelts, 5.6iii: Front Fencing, 5.6iv: Parking Lot Screening.

Review snow and ice removal ordinances and policies for clarity, consistency, and adequacy to ensure that mobility and accessibility are preserved. Currently, confusion exists amongst residents and property owners regarding snow removal on sidewalks; specific and vociferous confusion exists regarding the accumulation at which snow removal is required and who is responsible for the removal. This results in inconsistent snow removal throughout the city, from central business districts to residential areas. Conversations with stakeholders indicate that accumulation of greater than one inch of snow is too much for motorized wheelchair users to overcome, and accumulations of greater than four inches is too much for all but the most dedicated of healthy, able-bodied pedestrians to overcome. Thus, setting a threshold of removal of less than one inch is prudent.

Current language: Chapter 94, Article V, “Snow removal.”

Consider re-instating the “Adopt-a-Street” program. Encouraging neighborhood associations and community organizations to adopt a street, bike lane, or sidewalk would help maintain these facilities as well as help build a sense of ownership and community around them. This process could be similar to the existing Adopt-a-Park program.

Cities with active Adopt-A-Street programs: Seattle, Washington; Greensboro, North Carolina.

Empower residents and businesses to participate in transportation network-building, such as provision of public bicycle parking and public benches for pedestrians. This participation will not only provide facilities to users of the non-motorized network, but will also invest neighboring properties in network completion and help reduce direct costs to the City. Businesses and property owners have expressed interest in this issue previously, even collaborating with the DDA to install several bike racks in the DDA districts; however, clarity about who bears the cost of the structure, the installation and long-term maintenance has prevented several businesses from taking part in this project.

Suggested language: Appendix I, 5.9: Donations to the City to be Placed in the Right-of-Way.



Review and revise the current sidewalk occupancy standards and permit process. Ensure that businesses and festivals, when conducting business or placing signage on the public right-of-way or sidewalk, allow for a clear path of travel. Currently, the section of City of Ypsilanti code governing outdoor businesses, including those in the right-of-way, is part of the zoning code. It limits its purview to sidewalk occupation by adjacent food service businesses only, not vendor carts or adjacent retailers. Sidewalk occupation ordinances could be revised to include provision for vendor carts or tables, advertising signs such as sandwich boards, or sidewalk sales. Furthermore, it would likely enhance the clarity of such ordinances to separate provisions for outdoor cafes in the right-of-way, vendor carts, and other forms of sidewalk occupation from Chapter 122, “Zoning,” to Chapter 94, “Streets, Sidewalks and Certain Other Public Places.” Cooperation with the YDDA during this revision is strongly recommended.

Recommended changes: Appendix I, 5.10: Sidewalk & Right-Of-Way Occupation.

Create standards for openings and fixtures in sidewalks, such as vaults and utility accesses. Standards are currently in place regarding direct work on or under the streets and sidewalks, as well as temporary patches and fixes, but do not provide for long-term installations in the right-of-way.

Suggested language: Appendix I, 5.10: Openings and Fixtures in Sidewalks.

Update sidewalk construction standards to allow use of permeable pavements, such as brick, concrete pavers, permeable concrete, recycled rubber pavers, and other materials. Currently, the sidewalk standards call for sidewalks to be constructed using only Portland cement, unless other materials are approved by the Historic District Commission, thus limiting the use of alternate materials to the historic district. Advances in paving materials, however, have made such a specific requirement obsolete. Furthermore, the Border-to-Border Trail construction is generally of asphalt, in accordance with American Association of State Highway and Transportation Officials' standards, and as completion of the Border-to-Border Trail is desired, allowing the use of such materials in certain circumstances might be desirable. By updating and publicizing sidewalk construction standards, we enable the construction and completion of a functional, environmentally-sensitive, and historically appropriate sidewalk network.

Current language: Chapter 94, Article VII, Divisions 2 & 3.

Provide accurate and complete guidelines for working with the Department of Public Services for trees planted in the lawn extension. Such provision will enable and encourage property owners to help maintain and create tree-lined streetscapes. Current confusion regarding responsibility for upkeep and replacement prevents proactive property owners from attempting to engage in these tasks.

Current language: Chapter 110, Article II.

Consider compact, higher-density, mixed-use land use designations during land use planning decisions, such as the Master Planning process. These land use designations contribute to both the historic and natural environment of Ypsilanti. Historically, Ypsilanti has been relatively dense, and so ensuring that density can be built would maintain the historic character. As denser development requires fewer resources in the long-term, it is also more ecologically sensitive.

Review the intent and application of the existing Student Overlay district, the Residential-Commercial Overlay

district, and Entryway Overlay district. The intent of the Student Overlay district is to allow for denser development and more pedestrian-focused infrastructure, but motor vehicle parking requirements are still high relative to this intent, and bicycle parking is not mentioned. Furthermore, as the intent of this overlay district as stated is to be *less* restrictive than the underlying zoning, this plan advises considering making this overlay district into a regular zoning district.

As the intent of the Residential Commercial Overlay and the Entryway Overlay appear to be similar, and frequently overlap, this plan recommends reviewing the intents, specific regulations, and geographic bounds of these districts to reduce confusion, increase clarity of purpose, and maximize opportunities for multimodal transportation. This could include increased density, more pedestrian and bicycle accommodation requirements, or more highly visible pedestrian and bicycle accommodations.

Current language: Chapter 122, Article VII, Division 3, “S Student Overlay District,” Division 4, “RCO Residential-Commercial Overlay District,” and Division 5, “Entryway Overlay District.”

Reword B4 zoning Section 122-411 “Description & Purpose.” The extant wording begins “The B4 general business district is designed to provide for a variety of commercial uses, including more intensive commercial uses not permitted in the B1, B2, and B3 districts and *which can be incompatible with pedestrian movement.*” More intensive uses are not necessarily incompatible with pedestrian or non-motorized transportation, and as the B4 zones are currently served by public transit, need to also be served by non-motorized infrastructure. Removal of the clause “...which can be incompatible with pedestrian movement” would clarify this and perhaps help address resistance to non-motorized system development seen in developers in the past. Consider replacing this clause with “...due to this intensity of use, may require special attention to developing and maintaining safe and accessible pedestrian access.”

Suggested language: Appendix I, 5.15: B4 Zoning Description.

Chapter 6: Maintain

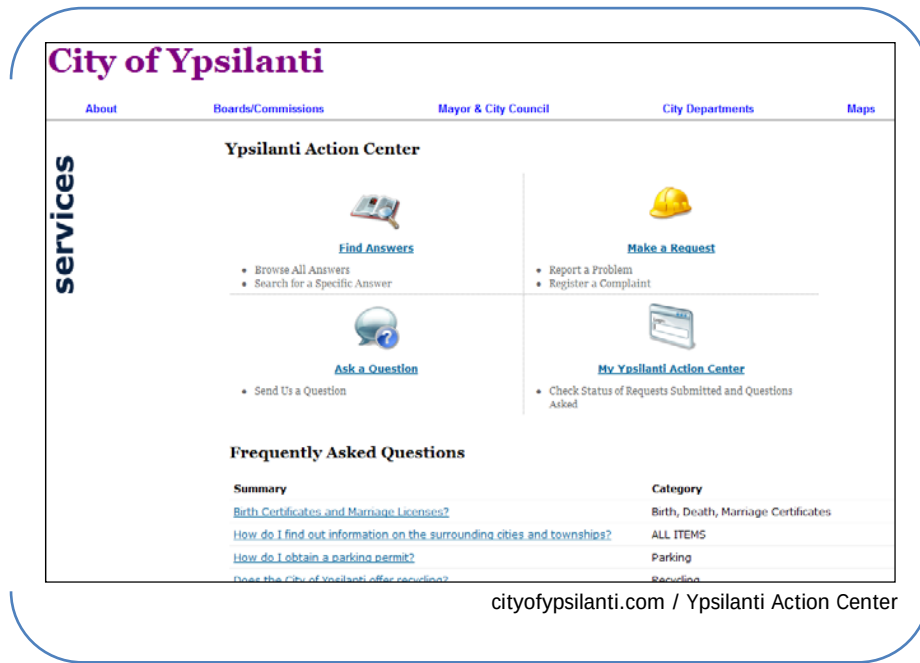
Even the best-built sidewalk, bench, bike rack, or curb cut needs to be maintained for it to remain useful. By ensuring that maintenance responsibilities are clear, consistent, and enforced, we can ensure that Ypsilanti's infrastructure contributes to a welcoming atmosphere and has a long, useful life. This chapter aims to help clarify maintenance responsibilities, suggest methods to ensure maintenance is performed, and standards by which infrastructure condition can be judged.

Adopt and publish prevailing American Association of State Highway and Transportation Officials (AASHTO) construction standards for non-motorized facilities, per the recommendation of the 2006 *WATS Non-Motorized Transportation Plan*. Currently, those who wish to construct or repair sidewalks or curbcuts must seek out verbal guidance from the Department of Public Services. Adopting nationally recognized standards and publishing them would reduce the demand for staff time on this routine matter and, in conjunction with Americans with Disabilities Act standards, enable uniform construction throughout the City.

Ensure that each intersection has visible and consistent street signs to aid navigability. Residents and visitors to Ypsilanti frequently mention the difficulty of navigating Ypsilanti as a barrier to visiting its commercial areas by any means of transportation. By adequately signing Ypsilanti's streets and central business district, we can reduce this barrier.

Monitor the transportation system using crash, speed, snow complaint, mode-split, transit ridership, and sight distance data, as well as other tools which may become available, to identify and mitigate safety problems.

Monitoring the whole transportation system is important to ensure that it is functioning well and that safety issues are not barriers to use; if not, to identify physical deficiencies, enforcement issues, and public education opportunities that need to be addressed, the timeframe they need to be addressed in, and with what level of urgency.



Empower residents to participate in the code enforcement process. To reduce the frustration and powerlessness often felt by residents who encounter a deficiency in the transportation system, publicize the Ypsilanti Action Center, an existing online problem-reporting interface for residents, and an easy administrative means of recording, reporting, and responding to code enforcement and other issues. Ensure that City staff are utilizing this process as well and giving feedback to citizens when issues are being addressed.

Prioritize maintenance projects that bridge service or infrastructure gaps, improve and maintain critical links between both modes and locations, and attend to equity issues. See **Chapter 10: Prioritize** for a series of questions that may help rank projects.

Institute a system of proactive, targeted maintenance enforcement on major routes and intersections. Detailed examinations of the area immediately around these facilities can identify and address issues from sidewalk condition to motor vehicle traffic, providing a basis for improving the safety and enjoyment of biking or walking. Walkability audits would be most appropriate within a one to two block radius, while a bikeability audit could be community-wide. These audits could be performed as neighborhood groups, schools, or other partners were interested in participating. Although scattered non-motorized evaluations have been made in recent years, including 2004 and 2008 walking audits of downtown and a 2009 walkability audit of Depot Town, a more coordinated and widespread evaluation program would help prioritize future projects.

Provide special attention to the area within a half-mile radius of the planned Ann Arbor to Detroit commuter rail stop in Depot Town. The Federal Highway Administration identifies one half-mile as a reasonable outer bound for walking trips to access commuter rail. All of Depot Town, as well as parts of downtown and Eastern Michigan University, are within this distance. Thus, this area has a high potential to become an entry point and locus of activity for non-motorized users. Ensuring that maintenance, signage, and facilities are consistent and excellent throughout this area will help facilitate their movement.



The Oregannian / Fredrick D. Jone

Provide special attention to the area within a three-block radius of the Ypsilanti Transit Center. The bus system is crucial in the transportation of many Ypsilanti residents and visitors, and has the potential to become more heavily-utilized with the construction of the commuter rail stop. Maintaining facilities and signage in this area will help to ensure that using this service is a positive experience for all who use it.



www.pedbikeimages.org / Dan Burden

Aggressively enforce snow removal standards on non-motorized facilities such as bike lanes and sidewalks.

There exist no provisions to ensure that on-street bicycle lanes or non-motorized pathways are kept clear of snow and ice. Motor vehicle snow routes are generally limited to the state trunklines, many of which have significant non-motorized deficiencies, thus rendering snow removal there of little use to those who do not drive a personal automobile. These trunklines include part or all of Michigan Avenue, South Hamilton, South Huron, West Cross, North Huron, Ecorse, Washtenaw, and North Hamilton.

High-priority routes which should be included in snow removal enforcement include those linking residential areas to Eastern Michigan University; grade schools; the central business district; lifeline resources such as pharmacies, doctors' offices, and City services; and roads with bus stops.

Enforce traffic ordinances, such as turn signal use, encroachment on crosswalks, speed limits, bicycle use, and pedestrian right-of-ways. Both law enforcement officials and other stakeholders spoke of the importance of enforcement, both from a public safety perspective as well as a public awareness and education standpoint. By periodically targeting enforcement, Ypsilanti can better manage budget impacts.

Chapter 7: Coordinate

Road agencies such as the Washtenaw County Road Commission, Michigan Department of Transportation, Ypsilanti Community Utility Authority and the City of Ypsilanti own and are responsible for maintaining various pieces of the City's road network. Land use within Ypsilanti is generally the responsibility of the City, with the exception of the land controlled by EMU, Ypsilanti Public Schools, and other government agencies. As a result of this patchwork control, there is often a disconnect between land use and transportation that creates situations where improvements are not continuous or where responsibility is ill-defined. All stakeholders need to be involved when transportation decisions are made, so that improvements can be similar, continuous, and based on a regional vision. Ypsilanti can leverage the connections it makes as part of the Washtenaw Metro Alliance, Greenways Advisory Committee, Washtenaw Area Transportation Study, and the Southeast Michigan Council of Governments to ensure that this coordination takes place.

Create a Non-Motorized Transportation Advisory Committee that includes members of the Planning Commission, the Parks & Recreation Commission, the YDDA Board of Directors, and other stakeholders. This group would ensure that mobility and accessibility needs and goals put forth in this plan are met by championing implementation of its recommendations.



Support the establishment and improvement of critical multimodal transportation linkages between jurisdictions throughout the County. These linkages can include park-and-ride lots, the Border-to-Border Trail, and transit stations.

Preserve current and planned rights-of-way for the transportation system. One such planned right-of-way is adjacent to the Huron River; such a right-of-way would serve conservation, recreation, and transportation needs.

Work with the Michigan Department of Transportation and Washtenaw County Road Commission to review the appropriateness of one-way streets, speed limits, left turns, and turning radii throughout the City. In the long run, this may include: restoring two-way traffic to Huron, Hamilton, Cross, and Washtenaw; working to lower 85th-percentile

speeds¹⁷ on selected streets; and building pedestrian bump-outs in areas with potential or realized high volumes of non-motorized traffic. Especial consideration should be given to restoring two-way traffic on Cross and Washtenaw, as well as on North Huron and Lowell, due to the potentially high number of train commuters seeking access to Depot Town.

Work with MDOT to revise light timings, locate pedestrian crossing buttons, and adjust traffic light sensors.

Pedestrian surveyed noted that crosswalk lights did not consistently allow adequate time to cross the streets, and that non-functional or confusing crossing buttons often caused more frustration than intersections without buttons, where pedestrian crossing was simply part of the light cycle. This frustration can lead to noncompliance, which can be extremely dangerous, especially at high-volume or limited-visibility crosswalks. Bicyclists surveyed noted that traffic lights that require activation, rather than relying upon timing, were impossible to activate by bicyclists. This forced either very long waits at the light or noncompliance, both of which can be dangerous.

Coordinate public parking in the central business district through the YDDA. By coordinating public parking supply in these high-demand and high-traffic areas through a single entity, we can ensure not only a steady supply of uniform parking for all users, but also legible and consistent wayfinding, design, multimodal connections, and pricing. The YDDA would need to recapture the operating costs of the parking as well as set aside some portion for long-term maintenance and capital improvements of the lots, but some portion of the revenue should go to the City general funds to ensure that the lots are well-integrated with a highly functional citywide transportation network.

Coordinate site plan review with the AATA on sites that are adjacent to a major bus route. Currently, the AATA coordinates site plan review with the City of Ann Arbor and surrounding townships. By coordinating site plan review with the AATA, the City will ensure integration with the AATA's mass transit system.



Work with AATA, local community organizations, and local businesses to improve the accessibility, usability, and attractiveness of bus stops. Publicize and encourage the AATA's "Adopt-A-Stop" program, which recognizes and supports those who volunteer their time and effort to keep bus stops tidy and accessible.

¹⁷ *Speed Zoning Information*. 2008. Institute of Transportation Engineers, Web. 1 Sep 2009. <http://www.ite.org/standards/speed_zoning.pdf>.

Work with current property owners, current business, and prospective property owners and businesses to bridge gaps and complete the “last mile” of network-building. By cooperating with these stakeholders and property owners, especially during the site plan review process, the City might be better able financially to address projects as they come, rather than relying purely on its own priorities and budgetary constraints. The City may be able to put in place a system of incentives for non-motorized network completion projects, perhaps in the form of reduced motor vehicle parking requirements.

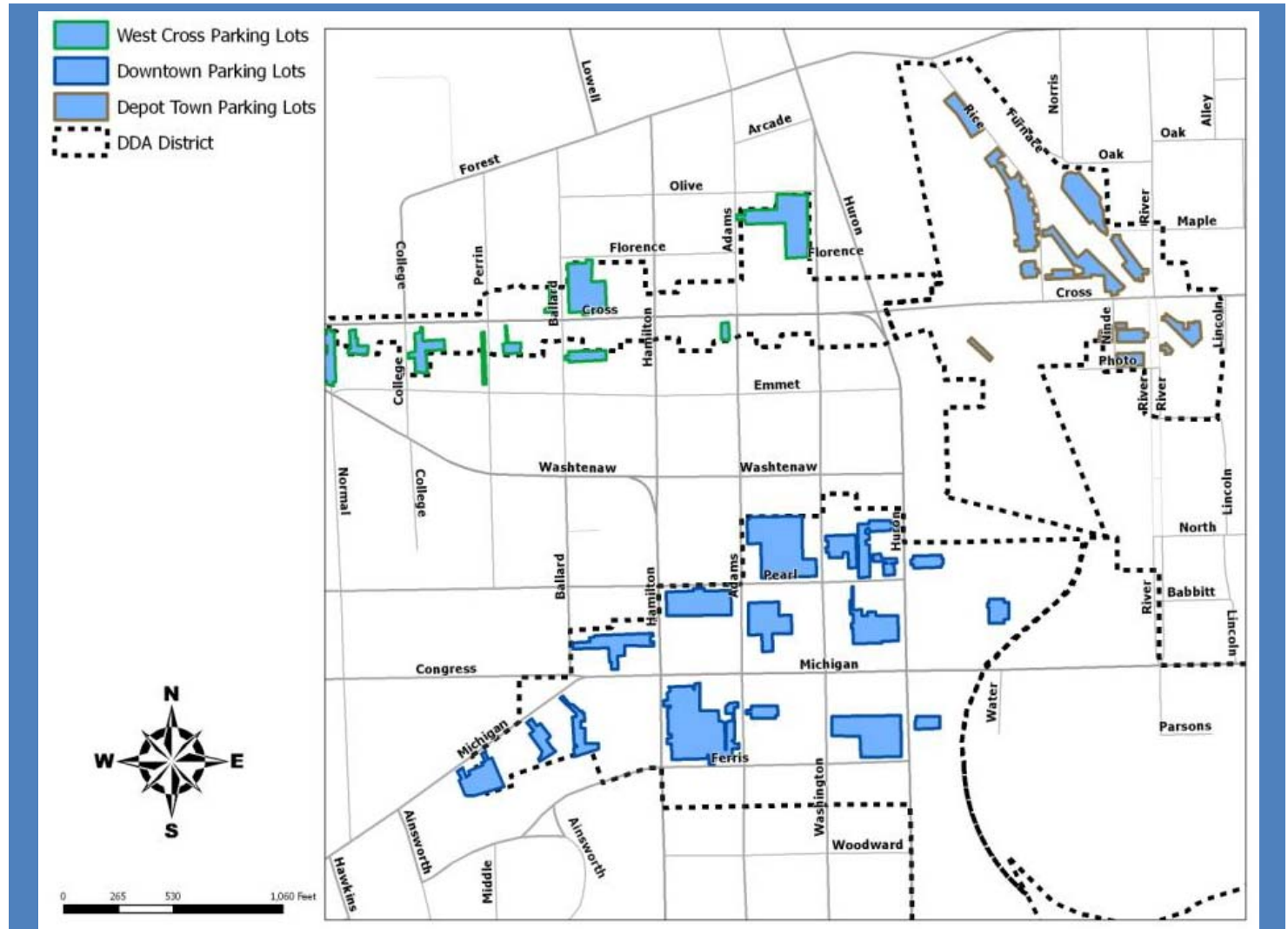


Figure 7.1: Parking in the Downtown Development Authority district

Chapter 8: Build

Components of Ypsilanti's transportation are currently incomplete. Several of these deficiencies have been called out in the *Non-Motorized Plan for Washtenaw County* and in other studies. This chapter calls particular attention to several critical disjunctions and prioritized the remedying of deficiencies. Approximate costs are given, but as these are only rough approximations, it is not recommended that these be included in a budgeting process or as an indication of final cost.

Survey respondents and public participants overwhelmingly indicated that they wanted a safe non-motorized route over I-94 at Huron, as well as a safer crossing over I-94 at Grove. At Huron, those who lived in the City wanted easier access to the shopping center and main library branch; those who lived in the Township wanted easier access to downtown, Depot Town, farmer's markets, and jobs. At Grove, City residents expressed concern over the extra distance necessary to travel to the pedestrian bridge, a significant detour that many mentioned was impossible for those who used battery-powered wheelchairs (power chairs) or had personal mobility challenges.

Provide a non-motorized crossing on Huron Street at I-94. A study completed in 2005 provides background for this recommendation, as well as several options and recommendations for such a non-motorized crossing. The final preferred option includes the connection to the existing sidewalk systems, modifications to vehicle travel lanes, revised intersection configurations, and potential signage and signalization configurations. It is included in **Appendix IV**.

Improve the existing non-motorized crossing on Huron and Grove/Ecorse. Extensive residential areas, a shopping center, and an elementary school sit to the south of I-94 at Grove, and employment centers, a middle school, dense residential, and government services sit to the north of I-94. Completing the sidewalk network at the crossing over I-94 at Grove Road would complement the pedestrian route to the east in the residential area, and enable employees, residents, and visitors in these areas to move more freely between these concentrations of assets. This crossing is part of the Border-to-Border Trail network, and has the potential to attract a high number of recreational users, in addition to satisfying the latent demand of neighboring residents. This area also had a relatively high concentration of traffic accidents involving pedestrians and bicyclists, which indicates not only that this is an area of high non-motorized use, but also that non-motorized facilities that currently exist do not adequately provide for safe movement.



Ensure that pedestrian crossings in high-traffic areas, such as those within the central business district and within one-half mile radius of transit centers, are handicap-accessible. A sidewalk which terminates at the road without a ramp can be an impossible barrier for a person in a wheelchair or walker to navigate, and dangerous for those with even relatively slight motor or sensory impairments. In order to ensure Ypsilanti is accessible to all its visitors and residents, the City should inventory current curbcuts in these areas and develop a prioritized improvement plan. As the sidewalks and curbcuts are the responsibility of the adjacent property owner, the financial responsibility and ultimate benefits of these upgrades pass to them.



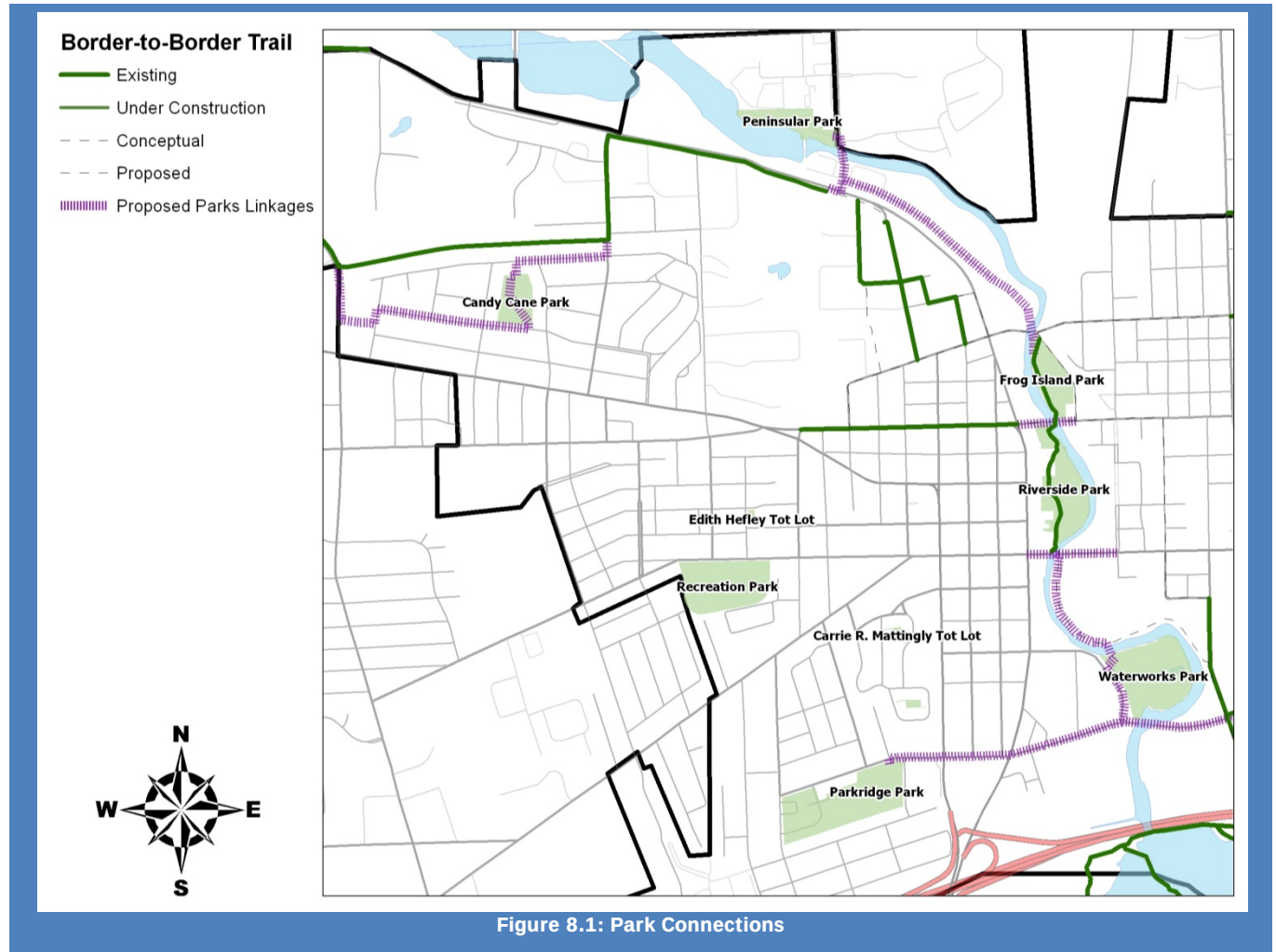
Consider installing blue light emergency telephones strategically throughout the City. Due to Ypsilanti's proximity to Ford Lake and the Huron River, as well as its ownership of many large parks, there are areas in town with low public visibility, such as Spring Street between Huron and Prospect. Installation of blue light emergency telephones in these areas should be considered to maintain public safety and encourage people to use what otherwise may feel like unsafe or remote areas. Installation of blue light emergency telephones along the Border-to-Border Trail should also be considered. Cooperation with EMU in ordering and installing these systems should be sought out, as EMU not only has an extensive system of such devices, but also is adjacent to many portions of the Border-to-Border Trail.

Public input identified main walking and biking routes as all or parts of Michigan Avenue, Hamilton and Huron, East and West Cross, Huron River Drive, and Washtenaw.

Construct robust unsignalized pedestrian crossings at key locations throughout the City. Several crossings identified by stakeholders as unsafe or currently popular "jaywalking" locations include Hamilton at Ferris, Hamilton at Pearl, Huron at Pearl, Washtenaw at Courtland. These crossings would require the cooperation of MDOT or the WCRC. At these and existing unsignalized pedestrian crossings, pedestrian refuges should be upgraded or built, signage should be upgraded or installed, and traffic light installation should be considered in the long-term.

Link the Border-to-Border Trail with Ypsilanti's parks system. Creation of a continuous non-motorized pathway linking Ypsilanti's parks with each other, and also linking to the Border to Border trail at the north and south points, would have integrate the parks system with the trail. Furthermore, robust connections between the parks and Ypsilanti's transportation network would provide for easy access to and through the City by both visitors and residents. As many of Ypsilanti's parks abut the scenic Huron River, creating a non-motorized pathway is a logical step, both recreationally and for north-south non-motorized transportation circulation.

The City could utilize current easements and rights-of-way along the Huron River and assemble future easements on private shoreline during the redevelopment process. The Ypsilanti Public School District bus garage facility on Railroad Street is likely the next low-hanging fruit during this process, but potential shoreline easements at the recently vacated Ford plant and the former Motor Wheel on Norris Street site warrant consideration as well. See **Figure 8.1.**



Complete the pedestrian network in Ypsilanti. Table 8.1, below, is based on the *2006 Non-Motorized Plan for Washtenaw County* list of pedestrian deficiencies in Ypsilanti. Cost is estimated at \$200,000 per mile for new installation of a five-foot wide concrete sidewalk. Curbcuts were not inventoried as part of this process. Priorities were determined based on location and severity of deficiency, as determined by conversations with stakeholders, but should be reviewed periodically by the Planning Department and the Non-Motorized Task Force. Length is noted in feet, and price is shown in thousands of dollars.

Table 8.1: PEDESTRIAN DEFICIENCIES							
Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
1	Huron	I-94 north to Spring 1200' both sides.	--	--	City of Ypsilanti	State Route	Non-motorized crossing of I-94; Appendix IV contains study
1	Huron River Drive	Lowell to Cornell north side	3,725	\$141	City of Ypsilanti	Primary Paved	ROW constraints in Appendix V
1	S. Hamilton	Harriet south to I-94 1000' both sides.	--	--	City of Ypsilanti	State Route	Non-motorized crossing of I-94; Appendix IV contains study
1	Washtenaw	Bellevue to Cornell north side of street.	3,013	\$114	City of Ypsilanti	State Route	Gaps exist; major east-west corridor
1	Washtenaw	West limit to Ann south side of street.	1,999	\$76	City of Ypsilanti	State Route	Gaps exist; major east-west corridor
1	Woods	Linden to Pleasant 1500' north side of street.	743	\$28	City of Ypsilanti	Subdivision, Public	Recreation Park
1	Roosevelt	Courtland to Mansfield at Candy Cane Park 500' north side of street.	868	\$33	City of Ypsilanti	Subdivision, Public	Candy Cane Park
1	Huron River Drive	Cornell to Westwood both sides	3,281	\$66	City of Ypsilanti	Primary Paved	Would become part of B2B trail
2	Grove	Spring south to Grove 500' east side of street.	1,040	\$39	City of Ypsilanti	Primary Paved	Improve access at major interchange
2	Congress	Wallace to N. Congress 500' north side of street.	570	\$22	City of Ypsilanti	Primary Paved	

Table 8.1: PEDESTRIAN DEFICIENCIES

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
2	Cornell	Collegewood north to Huron River Drive 1800' east side of street.	891	\$34	City of Ypsilanti	Primary Paved	
2	Anna	Cross to Washtenaw 700' west side of street.	589	\$22	City of Ypsilanti	Primary Paved	
2	Catherine	Spring to Huron both sides.	1,912	\$72	City of Ypsilanti	Primary Paved	Improve access to Waterworks Park
2	Cornell	Gregory to Ainsley 800' west side of street.	818	\$31	City of Ypsilanti	Primary Paved	Adjacent to Autism Center, high-density housing; connects Huron River Drive to Washtenaw
2	Mansfield	Congress to Westmoorland east side of street	1,707	\$65	City of Ypsilanti	Primary Paved	Many gaps. Adjacent to elementary and middle schools.
2	Rice	Forest to Market Pl both sides.	1,100	\$42	City of Ypsilanti	Subdivision, Public	Connects Forest St to Cross; provides non-motorized access from Forest to Frog Island, recycling center, Freighthouse, Farmers' Market, Depot Town.
2	Charles	Oak south 400' east side of street.	400	\$15	City of Ypsilanti	Subdivision, Public	Adjacent to Prospect Park and Adams Elementary
2	Chidester	Catherine to Spring 1500' both sides.	3,000	\$114	City of Ypsilanti	Subdivision, Public	Adjacent to public housing, would connect public housing to Waterworks Park
2	Spring	Bell east to Catherine 1600' south side of street.	1,600	\$61	City of Ypsilanti	Primary Paved	Adjacent to Waterworks Park, would improve lateral non-motorized mobility significantly on southern side of City; potential future tie-in to B2B
3	Ainsley	Cornell west to end of Ainsley 800'.	800	\$30	City of Ypsilanti	Subdivision, Public	Spur of the B2B trail; low-traffic dead-end to motorized traffic; adjacent to Autism Center
3	Casler	Huron to Spring 1000 both sides'.	2,000	\$76	City of Ypsilanti	Subdivision, Public	Adjacent to public housing
3	Courtland	Washtenaw to Cross 600' both sides.	1,200	\$45	City of Ypsilanti	Subdivision, Public	Non-motorized connection between Washtenaw commercial area and surrounding neighborhood

Table 8.1: PEDESTRIAN DEFICIENCIES

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
3	Holmes	Prospect west to Dwight 600' both sides.	1,200	\$45	City of Ypsilanti & Ypsilanti Township	Subdivision, Public	
3	Lincoln	Michigan north to Ferrier 800' both sides.	1,600	\$61	City of Ypsilanti	Subdivision, Public	
3	Maple	River west to end maple 300' south side of street.	600	\$23	City of Ypsilanti	Subdivision, Public	Would provide safe pedestrian access from parking area to Depot Town
3	Marion	Washtenaw to Cross 600' both sides.	1,200	\$45	City of Ypsilanti	Subdivision, Public	
3	Martin Place	Prospect to Miles 1200' both sides.	2,400	\$91	City of Ypsilanti	Subdivision, Public	
3	Whittier	Bellevue east 600' south side.	600	\$23	City of Ypsilanti	Subdivision, Public	
3	Westmoorland	West from Mansfield to end.	253	\$10	City of Ypsilanti	Subdivision, Public	Would provide winter access from Mansfield/Westmoorland to West/Estabrook schools
4	Virginia Place	Charles east to end 1400' both sides.	2,800	\$106	City of Ypsilanti	Subdivision, Public	
4	Brooks	Watling to Jefferson 400' west side of street.	400	\$15	City of Ypsilanti	Subdivision, Public	
4	Huron	Jarvis to Lowell both sides.	1,882	\$143	City of Ypsilanti	Primary Paved	ROW constraints in Appendix V
4	St. Johns	Lowell east to end of street 400' both sides.	800	\$30	City of Ypsilanti	Subdivision, Public	Would connect Lowell to Jarvis; connect student overlay residential to EMU
4	Park	Cross south to rails 700' west side of street.	700	\$27	City of Ypsilanti	Subdivision, Public	Could become good north/south pedestrian route
5	Bell	Harriet south to end of Bell 600' west side.	600	\$23	City of Ypsilanti	Subdivision, Public	
5	Bell	North from Spring to Casler 500' both sides.	1,000	\$38	City of Ypsilanti	Subdivision, Public	

Table 8.1: PEDESTRIAN DEFICIENCIES

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
5	Bellevue	Whittier north to Collegewood 800 west side of street.	800	\$30	City of Ypsilanti	Subdivision, Public	
5	Briggs	Bell to Kramer 300' both sides.	600	\$23	City of Ypsilanti	Subdivision, Public	
5	Cherry Court	River east to end of street 300' both sides.	600	\$23	City of Ypsilanti	Subdivision, Public	
5	Collegewood	Bellevue west to end of Collegewood 200' both sides.	400	\$15	City of Ypsilanti	Subdivision, Public	
5	Emerick	Ecorse north to end 600' both sides.	1,200	\$45	City of Ypsilanti	Subdivision, Public	
5	Ferrier	Lincoln west to end 400' both sides.	800	\$30	City of Ypsilanti	Subdivision, Public	
5	Kramer	Huron to end of Kramer 400' both sides.	800	\$30	City of Ypsilanti	Subdivision, Public	
5	Norris	West curve to River 600' both sides.	1,200	\$45	City of Ypsilanti	Subdivision, Public	
5	Photo	Ninde to River 300' both sides.	600	\$23	City of Ypsilanti	Subdivision, Public	
5	Railroad	LeForge to end 1100' north side.	1,100	\$42	City of Ypsilanti	Subdivision, Public	ROW constraints (railroad- adjacent); duplication of B2B/rec trail effort
5	S. Mansfield	Michigan to end of Mansfield 1800' both sides.	3,600	\$136	City of Ypsilanti	Subdivision, Public	
5	Warner	Michigan north to end of street 1000' both sides.	2,000	\$76	City of Ypsilanti	Subdivision, Public	

Complete the bicycle transportation network in Ypsilanti. Table 8.2,

below, is based on the WATS Non-motorized Plan for Washtenaw County list of bicycle deficiencies in Ypsilanti. Cost is estimated at \$25,000 per mile for a standard bicycle lane. Priorities were determined based on location and severity of deficiency, as determined by conversations with stakeholders.

Pavement markings indicating that motor vehicle operators should share the road with bicyclists, or sharrows, should be considered in areas too narrow to accommodate a full bike lane, as a temporary measure in areas where cost is prohibitive, or on roads where good visibility, low motor vehicle traffic speed, low motor vehicle traffic volume, or excellent motor vehicle driver habits do not implicate a need for a separate bike lane. Sharrows are

relatively inexpensive, and for the purposes of this plan, are estimated at approximately \$100 per marking.¹⁸ Likewise, “Share the Road” signage, approximately \$200 per unit, should be placed at the beginning and ending of any bike lane and at all major entrances to the City.¹⁹

Bike lane length is noted in feet, and price is shown in thousands of dollars.



Ballard News Tribune / Dean Wong

Table 8.2: BICYCLE DEFICIENCIES (bike lanes only)

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
1	Hamilton	Washtenaw to I-94	4,744	--	City of Ypsilanti	State Route	Non-motorized crossing of I-94, Appendix IV contains study; entrance to Ypsilanti
1	Huron River Drive	Hewitt to Huron Street	8,218	\$78	City of Ypsilanti/Superior Township (Hewitt to Superior); City of Ypsilanti/Ypsilanti Township (Superior to Cornell); City of Ypsilanti (Cornell to N Huron St)	Primary Paved	B2B Trail tie-in; entrance to Ypsilanti
1	N Huron Street	Huron River Drive to Cross	3,698	\$35	City of Ypsilanti	Primary Paved	B2B Trail tie-in; entrance to Ypsilanti

¹⁸ Sallaberry, Michael. "Shared Lane Markings." *Pedestrian and Bicycle Information Center*. Web. 1 Sep 2009.

<http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=711>.

¹⁹ Meletiou, Mary Paul. "Share the Road Sign Initiative." *Pedestrian and Bicycle Information Center*. Web. 1 Sep 2009.

<http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=708>.

Table 8.2: BICYCLE DEFICIENCIES (bike lanes only)

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
1	N Huron Street	Cross to MI Ave	2,009	\$19	City of Ypsilanti	State Route	B2B Trail tie-in; entrance to Ypsilanti
1	S Huron St	Michigan Ave to I-94	4,616	\$44	City of Ypsilanti	State Route	Entrance to Ypsilanti
1	Michigan Avenue	Warner to Hamilton	3,757	\$36	City of Ypsilanti	Primary Paved	Entrance to Ypsilanti
1	Michigan Avenue	Hamilton to eastern boundary of City	5,478	\$52	City of Ypsilanti	State Route	Entrance to Ypsilanti
1	Washtenaw	Hewitt to Hamilton	8,407	\$80	Ypsilanti Township (Hewitt to Berkley); City of Ypsilanti (Berkley onwards)	State Route	B2B trail tie-in; entrance to Ypsilanti
1	West Cross St.	Western boundary of City to Washtenaw	4,379	\$41	City of Ypsilanti	Primary Paved	Adjacent to Ypsilanti High School; entrance to Ypsilanti
1	West Cross St.	Washtenaw to Normal Street	819	\$8	City of Ypsilanti	State Route	High-visibility; university-adjacent
2	Hamilton	Forest to Washtenaw	1,754	\$17	City of Ypsilanti	Primary Paved	B2B Trail tie-in
2	Harriet / Spring / Factory / Maus	First to Emerick	7,917	\$75	City of Ypsilanti	Primary Paved	East-west connector; access to Waterworks Park
2	Leforge	Clark to Huron	2,172	\$21	City of Ypsilanti (Huron River Dr to the Huron River); mixed Ypsilanti Township and City of Ypsilanti (the Huron River to Clark)	Primary Paved	High-density residential; access to Peninsular Park; entrance to Ypsilanti
2	Forest	College Place to Prospect	5,336	\$51	City of Ypsilanti	Primary Paved	East-west north side connector; eventually connects Border to Border trail to Prospect Park

Table 8.2: BICYCLE DEFICIENCIES (bike lanes only)

Priority	Road Name	Limits	Length	Price	Jurisdiction	Road Type	Notes
3	Washtenaw	Hamilton to Huron	1,192	\$11	City of Ypsilanti	Primary Paved	
3	Catherine	Hamilton to Spring St	3,105	\$29	City of Ypsilanti	Primary Paved	East-west connector
3	Congress	Michigan Ave. to Mansfield	4,675	\$44	City of Ypsilanti	Primary Paved	
3	Prospect	Grove to Holmes	7,709	\$73	City of Ypsilanti	Primary Paved	High-volume north-south connector on eastern side of city
5	Michigan Avenue	Mansfield to Warner	1,998	\$19	Ypsilanti Township/City of Ypsilanti	Primary Paved	Entrance to Ypsilanti
5	Hewitt	Huron River Drive to Washtenaw	4,203	\$40	City of Ypsilanti (Huron River Drive to Stadium View); City of Ypsilanti/Ypsilanti Township (Stadium View to Washtenaw)	Primary Paved	
5	Oakwood	Huron River Drive to Congress	3,866	\$37	City of Ypsilanti	Subdivision, Public	Border of EMU; possible B2B Trail tie-in
5	Park St.	Michigan Ave. to Cross	1,789	\$17	City of Ypsilanti	Subdivision, Public	

Chapter 9: Promote

A built-out and well-maintained fully multimodal transportation network will likely be under-utilized if residents and visitors are unaware of it, and experienced users may become frustrated by an influx of new users unfamiliar with the norms and laws regarding its use. By educating current and potential users about Ypsilanti's transportation network, non-motorized traffic can be increased while minimizing potential conflicts between users and motorized traffic or new and continuing users. Many of these promotion strategies should be launched or re-intensified at the change of the seasons, as people often see these as opportunities to change habits.

General Public Education Strategies

- Include information about walking, biking, and taking transit within Ypsilanti in City mailings, such as property tax bills, water bills, and Department of Public Services announcements.
- Partner with Community Television Network, WEMU, and the Ypsilanti District Library to provide periodic non-motorized education sessions and public service bulletins.
- Create educational posters for display at high-traffic areas such as Ypsilanti District Library branches and local grocery and convenience stores.
- Work with local organizations, such as Bike Ypsi and Program to Educate All Cyclists (PEAC), to offer courses on how to operate a bicycle safely.
- Work with local landlords to distribute information to residents each fall and spring. Due to the high number of students who rent, fall is a common move-in time in Ypsilanti.
- Create a "Transportation in Ypsilanti" webpage that encapsulates relevant ordinances, transit routes, and safety tips. Include links to this website on all promotional materials and maps distributed.

The most common issue cited by drivers, bikers, and pedestrians on surveys, at the Farmers' Market, and at the public meeting was that parties involved in traffic conflicts seemed to be unaware of the law. These participants repeatedly recommended further education about traffic laws.

- Work with the AATA on outreach to bus system users, including providing area maps and directional signage at bus stops.
- Work with Wireless Ypsi, local businesses, and the Convention and Visitor's Bureau to raise awareness in visitors to the City.
- Partner with EMU to distribute information about opportunities for walking, biking, and taking transit within Ypsilanti as part of welcome events, student orientations, and other special events.
- Work with the Ypsilanti High School and drivers' education providers to educate new drivers about interactions with bicyclists and pedestrians.
- Promote May as "Commuter Challenge Month," and provide special information via press releases, community listservs, and the City's website on transit, carpooling, biking, and walking options.

Promotion to Future Residents and Employers

- Promote and support such programs as Safe Routes to School, toDowntown, Guaranteed Ride Home, and car-sharing.
- Pursue national certifications, such as the League of American Bicyclist's "Bike-Friendly City" award.
- Participate in the State of Michigan's "Promoting Active Communities" assessment each year that it is offered. The Promoting Active Communities assessment can help identify deficiencies in non-motorized infrastructure, policy, and procedures, as well as serve as a publicity tool.
- Distribute press releases when significant non-motorized transportation and accessibility achievements are made.

Chapter 10: Prioritize

As Ypsilanti prepares to address the deficiencies identified by this plan, it will need to prioritize. The questionnaire in **Table 10.1** may be useful in determining where to begin work. Projects which garner more points with “yes” answers are likely to have a more significant positive impact than those projects which garner fewer points with “no” answers. This questionnaire may also be useful when revisiting and revising this plan at the proscribed five-year intervals.

The language in this questionnaire is designed to address not only financially or physically large gaps in infrastructure, but also to address issues of socioeconomic disparity, as problems in non-motorized infrastructure often affect those who have a physical handicap or no personal motor vehicle disproportionately.

Table 10.1: PRIORITIZATION QUESTIONNAIRE

Criteria	Points Awarded
Is the project located in an area with an above-average concentration of...	
those living below the poverty level	5
the elderly	5
disabled persons	5
households with children	5
Would it connect areas with above-average concentrations of households with children, elderly, &/or disabled to...	
health care	10
lifeline retail	7
transit stop(s)	10
a park, natural area, or recreational area	5
a school	7
government service(s)	7
employment center(s)	7
historic/cultural site(s)	3
Is the project within 1/8, 1/4, 1/2, or 1 mile of...	
health care	10/7/7/6
lifeline retail	7/4/4/3
transit stop(s)	10/7/4/3
a park, natural area, or recreational area	5/3/1/1
a school	7/4/4/4
government service(s)	7/4/4/4
employment center(s)	7/4/2/2
historic/cultural site(s)	3/2/1/1
Does the project fill a gap in the existing non-motorized network?	7
Does the project remedy an issue that presents a significant barrier to personal mobility? (ex, curb cuts)	7
Does the project remedy a potential safety issue?	5
Has there been an incident(s) resulting in injury or property damage resulting from a deficiency in this project site, and would this project remedy that deficiency?	10

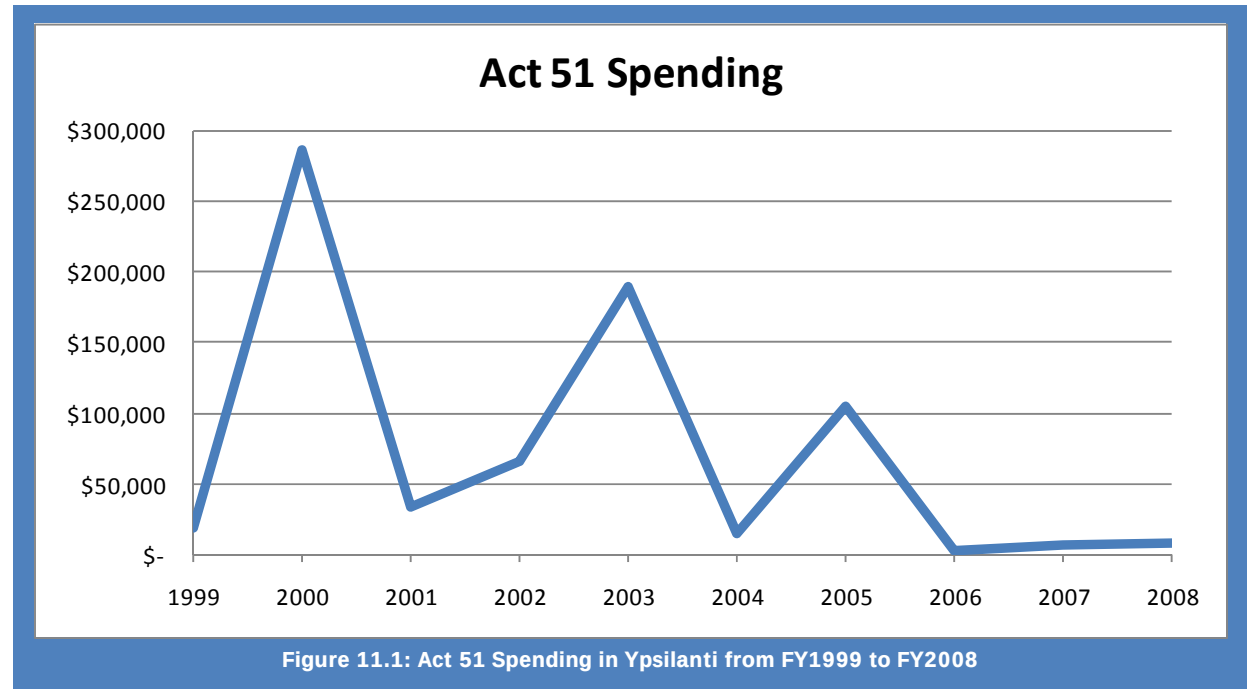
Chapter 11: Fund

As the City of Ypsilanti's budget has tightened over the past several years, general fund expenditures on transportation system improvements and operations have been significantly reduced. Sustainable financing mechanisms for multimodal transportation policy development, policy implementation, construction and maintenance of facilities, education, and other needs are listed below. Although many of these have been used by the City at some point in the past, some would require action by voters, in cooperation with another agency, or by a higher level of government.

Ongoing

• Michigan Transportation Fund (Act 51)

Revenues from the Michigan Transportation fund are generated from state gas and value taxes. The funding is divided among the Michigan Department of Transportation, road commissions, cities and villages. Each Act 51 agency is required by law to spend a minimum average of 1% of their Act 51 dollars on non-motorized improvements during a rolling ten-year period. A recent change in State legislation eliminated the ability to use this money on maintenance projects, such as street sweeping, in an effort to increase the number of improvements constructed. This funding may be used to provide the match for federal funds. WATS encourages agencies to spend more than this minimum allotment wherever possible. Ann Arbor has



recently increased their set-aside to 5%. Ypsilanti's spending on non-motorized projects from Act 51 funds has been decreasing over the past decade, as shown in **Figure 11.1**, but still constitutes approximately 5.7% of dollars received. This suggests that Ypsilanti is well-able to set 5% aside. It is also possible that by creating an internal mandate to spend 5% of these funds on non-motorized transport, spending on these projects may stabilize, guaranteeing future funding. In the past three years, Ypsilanti has spent less than 1% of Act 51 funds annually on non-motorized transportation, a process which, if continued into the future, will jeopardize all future Act 51 funds.

- **Local, Regional, or County Dedicated Millage**

As the majority of Ypsilanti's budget is drawn from property taxes, the amount of land area occupied by public, semipublic institutional uses, and other non-profit, non-property-taxpaying uses has a significant impact upon Ypsilanti's financial wellbeing. Although EMU accounts for a significant share of this area, Ypsilanti also hosts long-established institutional uses such as schools, cemeteries, non-profits, and churches that serve both residents of Ypsilanti and residents of surrounding areas. Such service is not only in terms of literal service, but also in terms of employment. As such, capturing regional monies to support regional access to these services makes sense. This option is available to the County and to extant regional authorities. A new regional authority could be formed with neighboring communities, or an existing regional authority could expand to seek a regional transportation revenue. This option would not likely provide a massive influx of money into Ypsilanti's transportation system, however, as the authority's spending would also be regional in scope. Such an authority would have greater benefits in terms of coordination of programming, construction, and maintenance than in direct spending.

- **Traffic bureau**

Establishing a police traffic bureau would normalize funding for traffic enforcement and education. Having a dedicated force for traffic enforcement would also enable Ypsilanti to attract additional future grant funding.

Project-Based

• Surface Transportation Program – Urban Funds (STP-U)

Washtenaw County is allocated approximately \$4 million in STP-U each year. This money must be spent each year, does not carry over, and requires a twenty percent match. WATS has an policy of spending ten percent of the County's STP-U funds to non-motorized projects over time. This amounts to \$400,000 per year. In recent years, few non-motorized improvements have been submitted for by agencies during the call for improvements. This plan will serve as a resource of possible improvements that can be submitted for STP-U funding consideration.

• Transportation Enhancement Funds

Enhancement funding is awarded to local road agencies through a competitive process managed by MDOT. The State of Michigan receives approximately \$20-25 million annually to be spent on enhancement projects. A rolling application period allows agencies to submit projects at any time, and awards are made up to three times per year. This funding requires a minimum twenty percent match, with over-matching given additional consideration. Enhancement awards can be used for: provision of non-motorized facilities; provision of safety and educational activities for pedestrians and bicyclists; preservation of abandoned railway corridors (including the conversion and use for non-motorized trails); streetscape and landscape improvements; and environmental mitigation to address water pollution due to highway runoff or reduce vehicle caused wildlife mortality while maintaining habitat continuity.

• Congestion Mitigation / Air Quality (CMAQ)

CMAQ funding is provided to areas that are not in compliance or are in a maintenance area for air quality standards; as Washtenaw County is a

Fig. 1 Bicycle/Pedestrian Funding Opportunities

	NHS	STP	HSIP	SRT
Bicycle and pedestrian plan		*		
Bicycle lanes on roadway	*	*	*	*
Paved Shoulders	*	*	*	*
Signed bike route	*	*		*
Shared use path/trail	*	*		*
Single track hike/bike trail				
Spot improvement program		*	*	*
Maps		*		*
Bike racks on buses		*		
Bicycle parking facilities		*		*
Trail/highway intersection	*	*	*	*

An easy-to-understand federal funding eligibility matrix is available on the website of the Federal Highway Administration.

designated non-compliance area, the City of Ypsilanti is eligible, and has been able to use these funds in the past for signal upgrades on Michigan Avenue. CMAQ funds are awarded on a competitive basis by MDOT and SEMCOG and must demonstrate that they reduce emissions to be eligible. Washtenaw County CMAQ projects are prioritized by WATS Committees. This funding requires a minimum twenty percent match. Approximately \$8 million is available in the Southeast Michigan region for CMAQ non-transit improvements.

Federal Funding Limitations

In general, MDOT will not approve federal funding for new non-motorized facilities categorized as “sidewalks” as part of an adjacent road reconstruction, unless this project disturbs an existing sidewalk. However, MDOT allows a metropolitan planning organization (MPO), to adopt a policy that allows for the spending of federal funds on the construction of new sidewalks; WATS has done so, which allows Ypsilanti to spend MDOT funding new sidewalk construction.

- **Safe Routes to School**

The federal Safe Accountable Flexible Efficient Transportation Equity Act, A Legacy For Users (SAFETEA-LU), passed in 2005, made Safe Routes to School programs eligible for transportation enhancement funding. Michigan received approximately \$19 million during fiscal years 2006-2009, during which time three Ypsilanti Public Schools (Adams, Erikson, and Chappelle) took advantage of the program to complete Safe Routes to School action plans. To date, however, these schools have not yet applied for federal funds to execute these plans. The data collected by WATS on the accessibility of schools by non-motorized means may be used by any school or agency interested in pursuing Safe Routes to School funding. Funding is for 100% of the cost, and no local match is required.

- **Community Development Block Grant (CDBG)**

Ypsilanti is part of the Washtenaw Urban County Partnership, and thus considered an entitlement community. The Urban County, a partnership between the Washtenaw County Board of Commissioners and the elected officials of Ypsilanti and other area jurisdictions, receives direct federal allocations together, rather than applying for competitive funds separately,

in order to meet their individual community and economic development goals. The Office of Community Development (OCD) administers CDBG and HOME Investment Partnership Program (HOME) funds collectively for member jurisdictions. The annual allocation to jurisdictions takes into account the total population, low-income population, and housing issues for each jurisdiction. Portions of this funding are often used for transportation and accessibility projects, such as curb cuts and bike lanes, and could be used for future infrastructure development.

• Other Federal Grants

*Energy Efficiency and Conservation Block Grant (EECBG) Program*²⁰: makes grants to develop and implement projects to improve energy efficiency and reduce energy use and fossil fuel emissions in communities.

*Transportation, Community, and System Preservation Pilot (TCSP)*²¹: makes grants to plan and implement strategies which improve the efficiency of the transportation system, reduce environmental impacts of transportation, reduce the need for costly future public infrastructure investments, ensure efficient access to jobs, services and centers of trade, and examine development patterns and identify strategies to encourage private sector development patterns which achieve these goals.

• Washtenaw County Connecting Communities Initiative

Washtenaw County's Parks and Recreation Commission established the Connecting Communities initiative in 2009 to fund construction of non-motorized trail projects that are not part of the County's Border-to-Border trail. The intent of the Connecting Communities initiative is to work in partnership with other communities and organizations, providing funds to supplement those of the partner organization. Approximately twenty percent of the County's development millage, up to \$600,000 per year, will be made available 2010 through 2014 for eligible projects. Development of a County-wide non-motorized trail network requires a multi-agency and multi-organization effort. Funding will be available only for construction, not for planning or design development. Eligible projects will be those that accomplish the Commission's primary goal of providing valuable, non-motorized connections between communities and activity centers thus offering a healthy alternative for recreation, transportation, fitness and energy conservation.

²⁰ United States Department of Energy Efficiency and Renewable Energy. *Energy Efficiency and Conservation Block Grant Program Home Page*. , 2009. Web. 1 Sep 2009. <<http://www.eecbg.energy.gov/>>.

²¹ United States Department of Transportation Federal Highway Administration. *Transportation, Community, and System Preservation Program Home Page*. , 2009. Web. 1 Sep 2009. <<http://www.fhwa.dot.gov/tcsp/>>.

The City of Ypsilanti, due to its placement along the Border-to-Border trail and the Huron River corridor, is in a position to take advantage of either or both the Connecting Communities fund and Border-to-Border trail funding, which the City has used in such recent projects as the Forest Avenue bike lane striping.

- **Downtown Development Authority**

In recent years, the Ypsilanti DDA has taken the initiative in helping create bicycle and pedestrian amenities, including bicycle parking, medians, and pedestrian refuges. The YDDA may be willing to engage in future efforts to complete the non-motorized network, such as cost-sharing for bicycle parking, cost-sharing for bus passes, or partnerships with car-sharing organizations, such as ZipCar.

- **Donations and Foundation Grants**

Businesses, corporations, private clubs, community organizations, and individuals will often contribute to programs to benefit the communities in which they are located. Private sector contributions may be in the form of monetary contributions, the donation of land, the provision of volunteer services, or the contribution of equipment or facilities. Four such grantors that may be interested in funding Ypsilanti's transportation system improvements due to their strong interest in promoting public health and the health of the environment, are the Charles Stewart Mott Foundation, the Kresge Foundation, the Bikes Belong Coalition, and the Robert Wood Johnson Foundation.

- **Special assessments**

A special assessment is a special kind of tax on a subset of a community. Special assessments are placed on those adjacent landowners who will receive the greatest benefit from a project to be funded using a special assessment. In areas with significant non-motorized deficiencies, special assessments may be used to pay for the improvements. As sidewalks and are currently the maintenance responsibility of the adjacent property owner, in cases of deficiency, the City may elect to remedy the deficiency and assess the property owner for the work performed.

- **Leverage Private Development**

As development occurs near critical transportation elements, such as planned right-of-ways for the Border-to-Border Trail, stretches with un-built or under-built sidewalks and crossings, and catchments with no bicycle parking, work with the developers and private landowners to help provide for these public goods (see also **Chapter 7: Cooperation**).

Chapter 12: Implement

The goal of implementation is to introduce changes, upgrades, and new facilities into the network with the least amount of disruption and the highest level of interoperability. The table below presents the recommended improvements, relative cost, relative impact, and an approximate timeframe for implementation or completion of the projects presented by this plan. Of course, projects may take more or less time depending on funding availability and coordination with other capital improvement projects. This table, as with all other elements of this plan, should be reviewed after five years for progress and updated as necessary.

Table 12.1: ADMINISTRATION								
Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Adopt a "Complete Streets" ordinance. (p 27)	Ordinance adoption	Planning Commission	\$	++	✓			
Review requirements for "loading zones" in commercially zoned areas. (p 28)	Ordinance revision	Planning Commission	\$	++	✓			
Grant pedestrians the right-of-way when using street crossings without a stop sign or traffic light for oncoming traffic, known as unsignalized crossings. (p 28)	Ordinance adoption	Planning Commission	\$	++	✓			
Amend the language of the bicycle registration ordinance to remove the mandatory registration clause. (p 29)	Ordinance adoption	Planning Commission	\$	+	✓			
Incorporate bicycle parking into zoning & development guidelines.	-	-	-	-				
Update the general parking and loading requirements to require bicycle parking and distinguish bicycle parking from motor vehicle parking. (p 30)	Ordinance revision	Planning Commission	\$	++	✓			
Institute design standards for bicycle parking. (p 30)	Ordinance adoption	Planning Commission	\$	++		✓		

Table 12.1: ADMINISTRATE

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Update current parking quantity requirements to ensure bicycle parking and motorized vehicle parking levels are sufficient. (p 30)	Ordinance adoption	Planning Commission	\$	+++		✓		
Review the “fee in lieu of parking” ordinance. (p 31)	Ordinance adoption	Planning Commission	\$	++	✓			
Review current ordinances regarding landscaping and fencing to ensure that pedestrians are visible to vehicles at potential points of conflict, such as crosswalks, alleys, and driveways. (p 32)	Ordinance revision	Planning Commission	\$\$	++		✓		
Review snow and ice removal ordinances and policies for clarity, consistency, and adequacy to ensure that mobility and accessibility are preserved. (p 32)	Factsheet created	Department of Public Services	\$	+++	✓			
Consider reinstating the “Adopt-a-Street” program. (p 32)	Documentation of factors which would affect reinstitution	Department of Public Services & Recreation Commission	\$	++	✓			
Empower residents and businesses to participate in transportation network-building, such as provision of public bicycle parking and public benches for pedestrians. (p 33)	Ordinance adoption, resolution of DDA support	Department of Public Services	\$	+	✓			
Review and revise the current sidewalk occupancy standards and permit process. (p 33)	Ordinance adoption, resolution of DDA support	Department of Public Services	\$\$	++	✓			
Create standards for openings and fixtures in sidewalks, such as vaults and utility accesses. (p 34)	Ordinance adoption, resolution of DDA support	Department of Public Services	\$	++	✓			
Update sidewalk construction standards to allow use of permeable pavements, such as brick, concrete pavers, permeable concrete, recycled rubber pavers, and other materials. (p 34)	Ordinance adoption, published factsheet	Department of Public Services	\$	+	✓			

Table 12.1: ADMINISTRATE

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Provide accurate and complete guidelines for working with the Department of Public Services for trees planted in the lawn extension. (p 34)	Ordinance adoption, published factsheet	Department of Public Services	\$	++	✓			
Consider compact, higher-density, mixed-use land use designations during land use planning decisions, such as the Master Planning process. (p 34)		Planning Commission	\$	+++				✓
Review the intent and application of the existing Student Overlay district, the Residential-Commercial Overlay district, and Entryway Overlay district. (p 35)		Planning Commission	\$\$	+++		✓		
Reword B4 zoning Section 122-411 "Description & Purpose." (p 35)	Ordinance revision	Planning Commission	\$	+	✓			

Table 12.2: MAINTAIN

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Adopt and publish AASHTO construction standards for non-motorized facilities. (p 37)	Adoption and Publication	Department of Public Services	\$	++	✓			
Ensure that each intersection has visible and consistent street signs to aid navigability. (p 37)	Creation and implementation of a sign audit and repair schedule	Department of Public Services	\$\$	++				✓
Monitor the transportation system to identify and mitigate safety problems. (p 37)	Creation and implementation of a audit cycle	Planning Department	\$\$	++				✓
Empower residents to participate in the code enforcement process. (p 38)	Factsheet distribution	Building Department, Department of Public Services	\$	+++				✓
Prioritize maintenance projects that bridge service or infrastructure gaps, improve and maintain critical links between both modes and locations, and attend to equity issues. (p 38)	Potential projects scored as part of Planning Commission review	Planning Commission	project-dependent	+++				✓
Institute a system of proactive, targeted maintenance enforcement on major routes and intersections. (p 38)	Creation and implementation of an infrastructure audit cycle	Building Department	\$\$\$	+++				✓
Provide special attention to the area within a half-mile radius of the planned Ann Arbor to Detroit commuter rail stop in Depot Town. (p 39)	Creation and implementation of an infrastructure audit cycle	Planning Commission, YDDA	\$\$	+++				✓
Provide special attention to the area within a three-block radius of the Ypsilanti Transit Center. (p 39)	Creation and implementation of an infrastructure audit cycle	Planning Commission, YDDA	\$\$	+++				✓

Table 12.2: MAINTAIN

Project	Progress Metric	Initiating Agency	Cost	Impact	Time to complete			
			\$ (low) to \$\$\$ (high)	+ (low) to +++ (high)	1-3 years	3-5 years	5+ years	ongoing
Aggressively enforce snow removal standards on non-motorized facilities such as bike lanes and sidewalks. (p 40)	Number of snow-related complaints received	Building Department	\$\$	+++				✓
Strategically enforce traffic ordinances, such as turn signal use, encroachment on crosswalks, speed limits, bicycle use, and pedestrian right-of-ways. (p 40)	Number of traffic crashes involving a pedestrian or bicyclist	YPD	\$	++				✓

Table 12.3: COORDINATE

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Create a transportation commission that includes members of the Planning Commission, the Parks & Recreation Commission, the YDDA Board of Directors, and other stakeholders. (p 41)		Planning Commission	\$	++	✓			
Support the establishment and improvement of critical multimodal transportation linkages between jurisdictions throughout the County. (p 41)	Resolutions of support	Planning Commission	project-dependent	+++				✓
Preserve current and planned rights-of-way for the transportation system. (p 41)		Planning Commission	\$	+++				✓
Work with the Michigan Department of Transportation and Washtenaw County Road Commission to review the appropriateness of one-way streets, speed limits, left turns, and turning radii throughout the City. (p 41)		Department of Public Services	\$\$\$	+++				✓
Work with MDOT to revise light timings and adjust traffic light sensors. (p 42)		Department of Public Services	\$\$	++				✓
Coordinate public parking in the central business district through the YDDA. (p 42)	Contract with the YDDA	YDDA	\$\$	+++		✓		
Coordinate site plan review with the AATA on sites that are adjacent to a major bus route. (p 42)		Planning Commission	\$	+++				✓
Work with AATA, local community organizations, and local businesses to improve the accessibility, usability, and attractiveness of bus stops. (p 42)	Percent of Ypsilanti stops adopted	AATA	\$	++				✓
Work with current property owners, current business, and prospective property owners and businesses to bridge gaps and complete the “last mile” of network-building. (p 43)		Planning Department YDDA	\$	+++				✓

Table 12.4: BUILD

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Provide a non-motorized crossing on Hamilton/Huron at I-94. (p 45)	% of non-motorized crossing build process complete	Planning Commission , Department of Public Services	\$\$\$	+++			✓	
Improve the existing non-motorized crossing on Huron and Grove/Ecorse. (p 45)	% complete	Department of Public Services	\$\$\$	+++		✓		
Ensure that pedestrian crossings in high-traffic areas, such as those within the central business district and within one-half mile radius of transit centers, are handicap-accessible. (p 46)	% of eligible ramps complete	Department of Public Services	\$\$	+++				✓
Install blue light emergency telephones strategically throughout the City. (p 46)	need assessment completed; cost estimates procured	Planning Department	\$\$\$	++			✓	
Construct unsignalized pedestrian crossings at key locations throughout the City. (p 46)	% of identified key locations with improved unsignalized crossings built	Planning Department	\$\$	++		✓		
Link the Border-to-Border Trail with Ypsilanti's parks system. (p 47)	% completed	Planning Department	\$\$\$	+++			✓	
Complete the pedestrian network in Ypsilanti. (Priority 1 items from Table 8.1, minus projects elsewhere in this table.) (p 48-51)	% completed	Planning Department	\$\$\$	+++		✓		
Install sharrows and "Share the Road" signage in prominent places throughout the City. (p 52)	% completed	Planning Department	\$\$	+++		✓		

Table 12.4: BUILD

Project	Progress Metric	Initiating Agency	Cost \$ (low) to \$\$\$ (high)	Impact + (low) to +++ (high)	Time to complete			
					1-3 years	3-5 years	5+ years	ongoing
Complete the pedestrian network in Ypsilanti. (Priority 2 items from Table 8.1) (p 48-51)	% completed	Planning Department	\$\$	++			✓	
Complete the bicycle transportation network in Ypsilanti. (Priority 1 items from Table 8.2) (p 52-54)	% completed	Planning Department	\$\$	+++		✓		
Complete the pedestrian network in Ypsilanti. (Priority 3 items from Table 8.1) (p 48-51)	% completed	Planning Department	\$\$	++			✓	
Complete the bicycle transportation network in Ypsilanti. (Priority 2 items from Table 8.2) (p 52-54)	% completed	Planning Department	\$\$	++			✓	
Complete the pedestrian network in Ypsilanti. (Priority 4 items from Table 8.1) (p 48-51)	% completed	Planning Department	\$\$	++			✓	
Complete the bicycle transportation network in Ypsilanti. (Priority 3 items from Table 8.2) (p 52-54)	% completed	Planning Department	\$\$	++			✓	
Complete the bicycle transportation network in Ypsilanti. (Priority 4 items from Table 8.2) (p 52-54)	% completed	Planning Department	\$\$	++			✓	
Complete the pedestrian network in Ypsilanti. (Priority 5 items from Table 8.1) (p 48-51)	% completed	Planning Department	\$\$	+			✓	
Complete the bicycle transportation network in Ypsilanti. (Priority 5 items from Table 8.2) (p 52-54)	% completed	Planning Department	\$\$	++			✓	

Table 12.5: PROMOTE

Project	Cost	Impact	Time to complete			
	\$ (low) to \$\$\$ (high)	+ (low) to +++ (high)	1-3 years	3-5 years	5+ years	ongoing
General Public Education Strategies						
Include information about walking, biking, and taking transit within Ypsilanti in City mailings, such as property tax bills, water bills, and Department of Public Services announcements. (p 55)	\$	+++				✓
Partner with Community Television Network, WEMU, and the Ypsilanti District Library to provide periodic non-motorized education sessions and public service bulletins. (p 55)	\$	+				✓
Create educational posters for display at high-traffic areas such as Ypsilanti District Library branches and local grocery and convenience stores. (p 55)	\$	+				✓
Work with local organizations to offer courses on how to operate a bicycle safely. (p 55)	\$\$	++				✓
Work with local landlords to distribute information to residents each fall and spring. (p 55)	\$\$	+++				✓
Create and promote a "Transportation in Ypsilanti" webpage that encapsulates relevant ordinances, transit routes, and safety tips. (p 55)	\$	++				✓
Work with the AATA on outreach to bus system users, including providing area maps at bus stops. (p 56)	\$\$	+++				✓
Work with Wireless Ypsi, local businesses, and the Convention and Visitor's Bureau to raise awareness in visitors to the City. (p 56)	\$	++				✓
Partner with EMU to distribute information about opportunities for walking, biking, and taking transit within Ypsilanti as part of welcome events, student orientations, and other special events. (p 56)	\$	++				✓
Work with the Ypsilanti High School and Drivers' Education providers to educate new drivers about interactions with bicyclists and pedestrians. (p 56)	\$\$	+++				✓

Table 12.5: PROMOTE

Project	Cost	Impact	Time to complete			
	\$ (low) to \$\$\$ (high)	+ (low) to +++ (high)	1-3 years	3-5 years	5+ years	ongoing
Promotion to Future Residents and Employers						
Promote and support such programs as Safe Routes to School, toDowntown, Guaranteed Ride Home, and car-sharing. (p 56)	\$\$	+++				✓
Pursue national certifications, such as the League of American Bicyclist's "Bike-Friendly City" award. (p 56)	\$	++				✓
Participate in the State of Michigan's "Promoting Active Communities" assessment each year that it is offered. (p 56)	\$	++				✓
Distribute press releases when significant non-motorized transportation and accessibility achievements are made. (p 56)	\$	++				✓