


CHICAGO
CLIMATE
ACTION
PLAN

OUR CITY. OUR FUTURE.



CONTENTS

- 1 Chicago's Vision
- 2 A Message from Mayor Richard M. Daley
- 4 Climate Change
- 6 The Role of Cities
- 8 Chicago Leads by Example
- 12 Five Strategies
 - 14 Introduction
 - 19 Energy Efficient Buildings
 - 25 Clean & Renewable Energy Sources
 - 29 Improved Transportation Options
 - 35 Reduced Waste & Industrial Pollution
 - 39 Adaptation
- 44 Regional, State and National Solutions
- 46 Moving Forward
- 50 Chicago 2020 Proposed Mitigation and Adaptation Strategies
- 54 Acknowledgements

CHICAGO'S VISION

Throughout Chicago's history, we've stepped forward to reclaim our environment and build a new future.



After the Great Chicago Fire of 1871, Chicago reinvented itself as a thriving hub that anchored the nation's commerce. In 1909, the Burnham Plan envisioned a "City Beautiful" —and called on all residents to act in the public's best interest to create it.

Chicagoans have always faced obstacles with determination and imagination, and emerged all the stronger.

More than 15 years ago, Mayor Richard M. Daley began to transform Chicago into the most environmentally friendly city in the nation. Today, Chicago is one of the world's greenest and most livable cities, thanks to strong partnerships between government, residents and businesses. We lead the way from green roofs to green buildings and policies. We've become the nation's laboratory for studying ways to reduce the "urban heat island" effect, which can raise a city's temperature 4 to 10 degrees Fahrenheit on hot summer days. Our extensive public transit system offers a low-cost, energy-efficient alternative to solo driving. Our bicycling program has produced more bike parking than any other U.S. city and 165 miles of bike-ways. Our Green Homes and other programs help families save thousands of dollars through energy efficiency.

The past 15 years have also seen a tremendous growth in our understanding of climate change and the important role that cities can play in addressing it. This worldwide threat to our planet demands an encompassing plan from every city, state and nation and action from every resident and business to reduce emissions of heat-trapping gases and to ensure a good quality of life for future generations.

It was with that charge in mind that Mayor Daley created a multi-stakeholder task force to produce a Chicago Climate Action Plan (CCAP).

The Task Force created a Plan that:

- Determines the challenges we face as our climate changes
- Describes the sources of our greenhouse gas emissions
- Sets goals to reduce our emissions and adapt to changes already affecting us
- Finds ways to leverage our knowledge to improve our economy and quality of life
- Outlines concrete, achievable goals for all those who make Chicago their home

This overview report summarizes the Chicago Climate Action Plan. For more detailed information, and to see the full scientific reports, visit www.chicagoclimateaction.org. Please join us by finding your role in implementing the Chicago Climate Action Plan.



“...Together, we can preserve the city, remain prosperous and build a future in which we, our children and grandchildren can thrive for generations to come.”
—Richard M. Daley

Mayor Daley (shown above) stands atop the green roof at City Hall. Chicago has more green roofs built or under construction than any North American city.

Chicago Climate Task Force

Sadhu A. Johnston, *co-chair*
Adele Simmons, *co-chair*
Ellen Alberding
Michael Berkshire
Scott Bernstein
Timothy H. Brown
Mary Gade

Bill Gerwing
Karen Greenbaum
Geoffrey Hewings
Karen Hobbs
Helen Howes
Richard Lanyon
Mary Laraia

Jack Lavin
Howard Learner
Kevin Lynch
Suzanne Malec-McKenna
Jim Mann
Ronald E. Meissen
Charles L. Owen

Raymond T. Pierrehumbert
Patrick Sarb
Doug Scott
Rebecca Stanfield
Donald Wuebbles

A MESSAGE FROM MAYOR RICHARD M. DALEY

My fellow Chicagoans,

It gives me great pleasure to present the Chicago Climate Action Plan, which describes the major effects climate change could have on our city and suggests ways all of us can work together to address those challenges.

Early on in my administration, I made a commitment to enhance our environment and make Chicago the most environmentally friendly city in the nation. When I became mayor, “climate change” wasn’t on the radar for most cities, states and nations around the world—or even for most people.

I believed then and believe even more deeply today that when you do such things as planting trees and creating open space, when you invest resources to remove pollution from the air and encourage construction of buildings that are smart for the environment, then you enhance quality of life for all the residents of the city.

I’m proud of the environmental leadership example that Chicago has set and that is being replicated by cities here and around the world. I believe our efforts demonstrate that embracing an environmentally friendly way of managing government can protect not only the environment, but our taxpayers as well.

Chicago is recognized around the world as a leader in protecting our environment. I’m proud that we acted many years ago in areas that many cities are just beginning to appreciate today.

The Chicago Climate Action Plan outlines a road map of what we hope to achieve by 2020 to expand on our successes in slowing the effects of climate change.

What’s clear is that this will require an enormous amount of hard work and cooperation. It will require the commitment of not only government but also of every individual and business in our city.

Each of us has a critical role to play in this effort.

As you will see when you read this report, some of the things we need to do—such as investing in transportation infrastructure—require the involvement of state and federal government.

Other important steps are much simpler and within the reach of each individual, such as driving less and walking more, using more energy-efficient light bulbs or turning down the thermostat a few degrees in the winter.

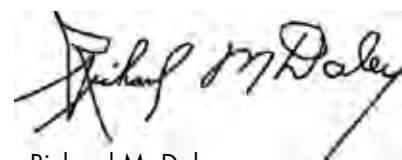
I thank the members of the Task Force for the leadership and guidance that led to this plan.

In Chicago we have long appreciated that cities are no longer the enemies of the natural environment; rather, they’re leading the way in preserving and protecting it.

Since I have been mayor, my goal has been to make Chicago a shining example of how a large city can live in harmony with its environment and as a result, be a better place for all its residents.

I am confident that if we address the climate change challenge together, with creativity and boldness, then our city will continue to lead the world in designing a path to a more secure future.

Sincerely,



Richard M. Daley
Mayor, City of Chicago

THE GREENHOUSE EFFECT

Some of the infrared radiation emitted by the Earth passes through the Earth's atmosphere but most is absorbed and re-emitted in all directions by greenhouse gases and clouds. The effect of this is to warm the Earth's surface and the lower atmosphere.

REFLECTION

Some solar radiation is reflected back into space by the Earth, and some by the Earth's atmosphere.

HUMAN EMISSIONS OF GREENHOUSE GASES

Carbon dioxide is produced from burning fossil fuels. These trap additional heat inside the atmosphere, raising the Earth's temperature above what it would normally be.

SOLAR HEATING

About half the solar radiation is absorbed by the Earth's surface and warms it.

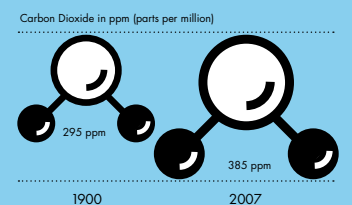
CLIMATE

Scientists, business leaders and heads of government around the world are in agreement: climate change is one of the most serious issues facing the Earth today. There is strong consensus that most of the changes in world climate during the last 50 years are a result of man-made emissions of greenhouse gases (GHGs), which have been heating the Earth's atmosphere. Naturally occurring levels of GHGs keep temperatures on Earth stable. But the burning of fossil fuels, increasing rates of deforestation and development have produced growing amounts of carbon dioxide (CO₂), methane and other heat-trapping gases. Other causes are agriculture, waste treatment and industrial processes. In the last 50 years, levels of CO₂ in the atmosphere have risen 25 percent; levels of methane, an even more potent greenhouse gas, have more than doubled. Because of these increases in heat-trapping gases, average temperatures are projected to increase by 1–1.5 degrees F over the next few decades and to reach unacceptable levels in this century.

The situation grows more urgent with every new scientific finding. For example, the Arctic ice cap is shrinking much faster than scientists predicted. Greenland's two-mile-deep ice sheet has begun a melting process that could eventually raise sea levels enough to have devastating impacts on coastal communities of people and thousands

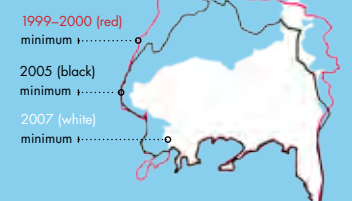
KEY FACTS:

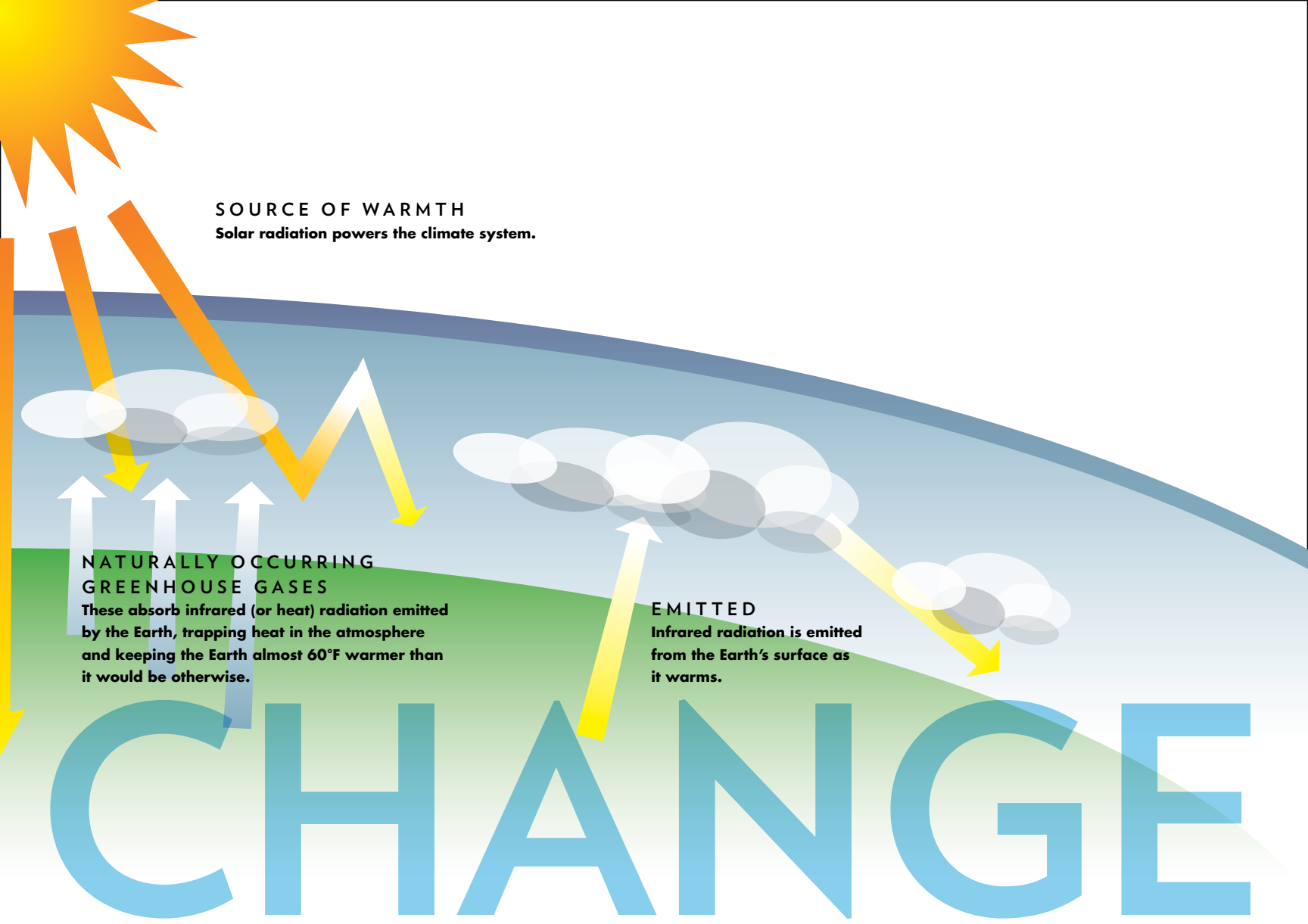
LEVELS OF CO₂ HAVE RISEN 25 PERCENT IN THE LAST CENTURY.



KEY FACTS:

THE ARCTIC ICE CAP IS SHRINKING FASTER THAN PREDICTED.





SOURCE OF WARMTH
Solar radiation powers the climate system.

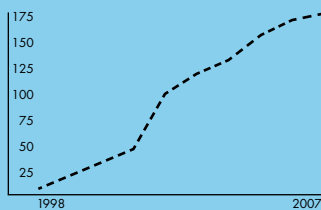
NATURALLY OCCURRING GREENHOUSE GASES
These absorb infrared (or heat) radiation emitted by the Earth, trapping heat in the atmosphere and keeping the Earth almost 60°F warmer than it would be otherwise.

EMITTED
Infrared radiation is emitted from the Earth's surface as it warms.

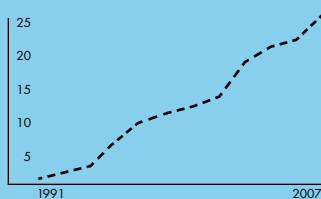
CHANGE

KEY FACTS:
KYOTO ACCORD

As of April 2007, 177 countries have signed and ratified the Kyoto Protocol to the United Nations Framework Convention on Climate Change, aimed at combating global warming.



KEY FACTS:
CUMULATIVE NUMBER OF U.S. STATES WITH A RENEWABLE ENERGY REQUIREMENT



of species of plants and animals. No nation or economy will be immune from the consequences of climate change.

With ever greater determination, the world has responded. By the end of 2007, 177 countries and other government entities had ratified the Kyoto Protocol;* of these, 36 developed countries pledged to reduce their heat-trapping gas emissions to specified levels. A number of U.S. states, including Illinois, are supporting programs to cap greenhouse gas emissions. Companies have found ways to reduce their energy use, reuse industrial byproducts and switch to renewable energy sources, saving millions of dollars annually. Individuals everywhere are making climate-friendly buying choices, such as switching to energy-saving light bulbs and opting for more fuel-efficient cars.

We are moving in the right direction. But we must move faster, and on a far broader scale, if we hope to make a genuine impact. We believe that the initiatives already under way in Chicago, and the strategies and goals outlined in this plan, can inspire similar initiatives in cities around the world. Chicago—the city that works—will be the city that continues to lead the way.

*The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change. Ratified in 1997, its objective is to reduce greenhouse gases that cause climate change.



THE ROLE OF CITIES

While climate change is a worldwide issue, 75 percent of all greenhouse gas emissions are generated in the world's urban areas. Reducing energy use and emissions in cities is therefore fundamental in any effort to reverse the trajectory of global warming. No one city can do it alone. But the collective actions of cities across the world can make a difference.

Cities, by their very nature, have great potential to be green. A compact environment means many shared services. A rich transit infrastructure results in fewer automobile miles traveled per person. Smaller dwelling units, such as apartments, especially when they are attached, result in lower energy use per person.

Local governments and agencies, in both developing and developed countries, have great influence over their city's greenhouse gas emissions. They can enhance the energy efficiency of buildings through codes and ordinances. They own or manage landfills and waste treatment plants, a significant source of

methane gas. They operate public transport and maintain its infrastructure. They often determine land use policies. City purchasing power can affect markets for vehicles, new technologies and eco-friendly equipment and practices.

Cities also make news. Much of the world's public information is generated and disseminated in cities. Each individual city can publicize its efforts, spurring further action around the globe.

As the reality of climate change has grown more apparent, cities have become increasingly involved in solutions. Many mayors are spearheading emission or energy reduction initiatives. Mayor Daley's efforts date from 1989 and have continued throughout the years. More recently, Mayor Daley was one of the first to sign the U.S. Conference of Mayors Climate Protection Agreement, which, as of February 2008, has been signed by 780 other mayors, including 24 in Illinois. Late in 2007, more than 100 of these mayors asked for a federal partnership to boost



OF CITIES

**KEY FACTS:
A DYNAMIC,
GROWING CITY**



The business as usual (BAU) projections in the Plan assume a continuing increase in Chicago's population. Population projections in the Plan were from the Chicago Metropolitan Agency for Planning (CMAP), which forecasts that Chicago's population will grow to 3.26 million people by 2030.

energy independence and avert the worst impacts of global warming. The 40-member Large Cities Climate Leadership Group, which includes Chicago, partnered with the Clinton Climate Initiative to develop ways for cities to measure emissions, band together to purchase technology at a low cost and finance emissions reduction programs.

Beyond helping to solve a global problem, cities and their residents can immediately benefit from their efforts to reduce emissions. One result will be better air quality, leading to improved health for everyone. Raising the energy efficiency of buildings saves money, lowers housing costs for families and creates jobs, especially for local businesses. Economic development gets a boost. As people are able to live closer to work, schools and services, they enjoy a better quality of life.

It is important to recognize, however, that the impact of any individual city on climate change is limited. To achieve progress, all cities, states and nations

must act and work together. As we move forward, we need to continue to recognize our connection to the larger world community. We are all residents of our planet, and our differences matter less than the shared purpose and pressing commitment to foster a better world for ourselves and our children.

CHICAGO

The Landscape Ordinance requires developers to integrate green elements into city projects. (The ordinance was updated in 1999.)

The Chicago Brownfields Initiative is adopted. To date, nearly 900 acres of brownfields have been returned to productive use.

Greencorps, Chicago's green collar jobs initiative, is launched to support the city's community gardens and provide job training in environmental fields.

The Cityspace Plan is adopted leading to the Campus Parks program to convert asphalt play lots to green space.

1989

Mayor Richard M. Daley launches a tree planting campaign that has resulted in more than 500,000 trees planted to date.



1990

1991

1992

The Bike 2000 Plan establishes a network of 114 miles of on-street bike lanes, 50 miles of trail and 10,000 bike racks in Chicago.



1993

1994

1995

Landscaping begins on more than 80 miles of median strips throughout Chicago.



1996

1997

1998

Working with 270 mayors in the metropolitan region, the City initiates "Clean Air Counts," a voluntary program to improve air quality.

When it comes to greening a city, Mayor Daley sets a high bar for mayors and governors across the nation. In Chicago, businesses have achieved huge gains in energy efficiency; unions have trained workers to install new renewable energy technologies; architects have built award-winning green buildings; environmental organizations have helped businesses and government to craft innovative green policies; museums, schools and universities have incorporated environmentally friendly practices in their facilities and programs; and foundations have funded many of these efforts. Residents have done their share as well, taking numerous actions inside and outside their homes. Together, we are changing our city for the better.

LEADS BY EXAMPLE

The City installs its first alternative fueling station to power its municipal fleet. Since then, the City has installed five compressed natural gas stations and four ethanol stations.

The City completes energy retrofits of more than 15 million square feet of City buildings.

City Hall Rooftop Garden officially opens. To date, more than 4 million square feet of green roofs are completed or under construction in Chicago.

Chicago Water Agenda introduces a series of initiatives and policies to protect and conserve freshwater and manage rainwater to improve Chicago's overall water quality.

Green Building Permits Program is introduced.

The City's first Environmental Action Agenda is released.

Chicago Public Library opens its seventh LEED Silver certified neighborhood branch library at the Vodak-East Side Library.

Bird Agenda and Nature and Wildlife Plan is introduced.

Chicago Climate Action Plan is announced.

1999 **2000** **2001** **2002** **2003** **2004** **2005** **2006** **2007** **2008**

The Historic Chicago Bungalow Initiative is introduced to provide homeowners with assistance in conducting energy retrofits.



The Chicago Center for Green Technology opens, the first municipal renovation LEED Platinum building in the world.

Chicago joins the Chicago Climate Exchange as a charter member, committing to lower its greenhouse gas emissions by 6 percent by 2010.

Millennium Park opens as one of the city's premier outdoor entertainment venues, the same year the Green Building Agenda is launched.

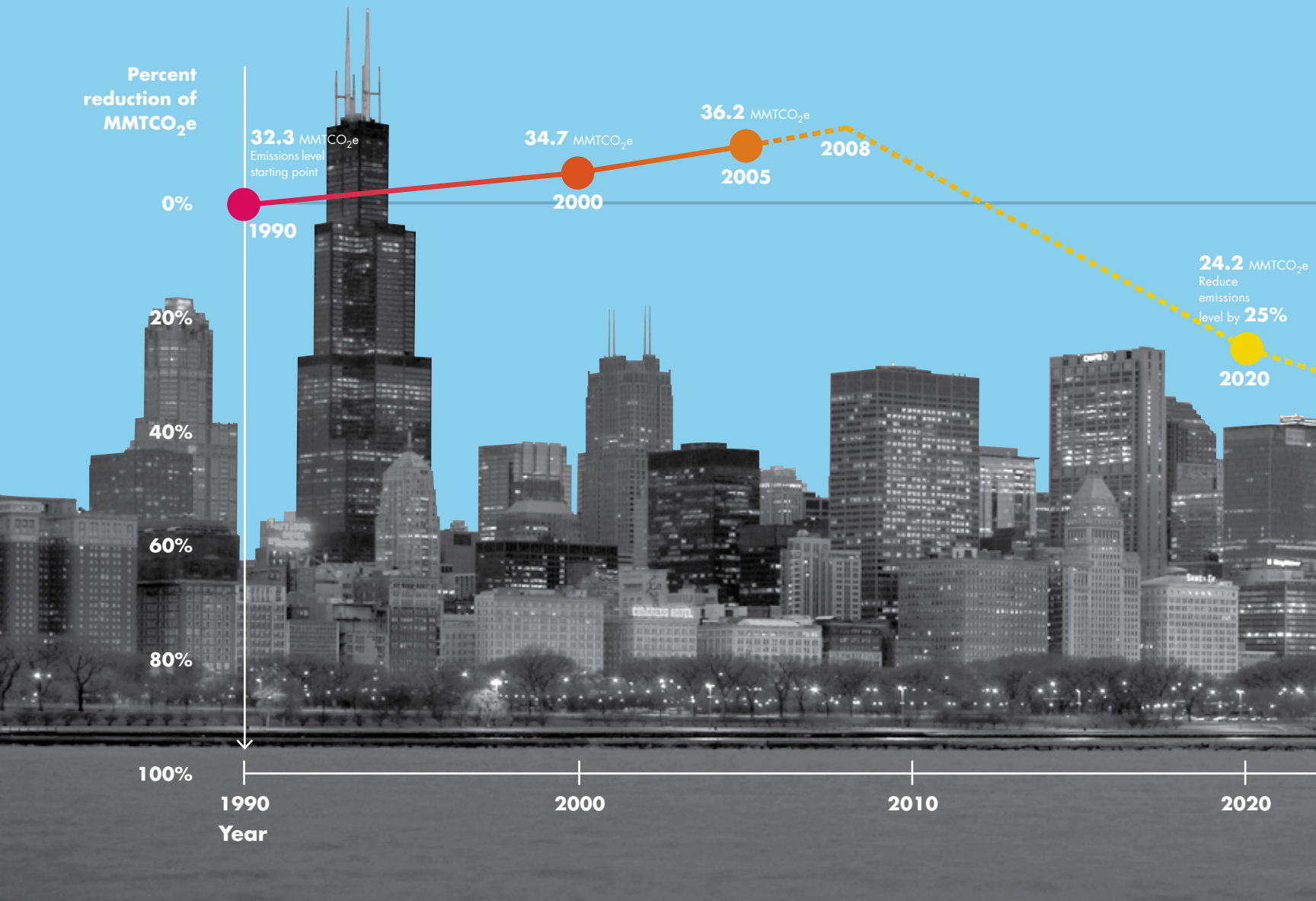


Chicago is the only city in the world to have four LEED Platinum buildings. Chicago River Agenda is launched.

Chicago Conservation Corps is started, offering an opportunity for individuals and Chicago Public Schools to become environmental leaders.

Green Alley Program is implemented, offering residents a better way to manage stormwater in city alleys.





From the start, the charge and scope of the Chicago Climate Task Force was broad and ambitious. Dozens of experts and a nationally recognized research advisory committee took part in discussions. Leading scientists were consulted to describe various scenarios for Chicago’s climate future and how these would impact life in the city. What would happen if the amount of heat-trapping gases grew unabated? How would various levels of reductions of global emissions affect our climate? The Task Force’s researchers looked to the Nobel Peace Prize–winning Intergovernmental Panel on Climate Change for methods and guidelines. Another team analyzed the costs and benefits of various ways to best reduce Chicago’s emissions. A third group studied how Chicago could best prepare for climate changes expected in the future.

As information came in, the Task Force shared initial findings and received feedback from several hundred Chicago business, civic and environmental leaders.

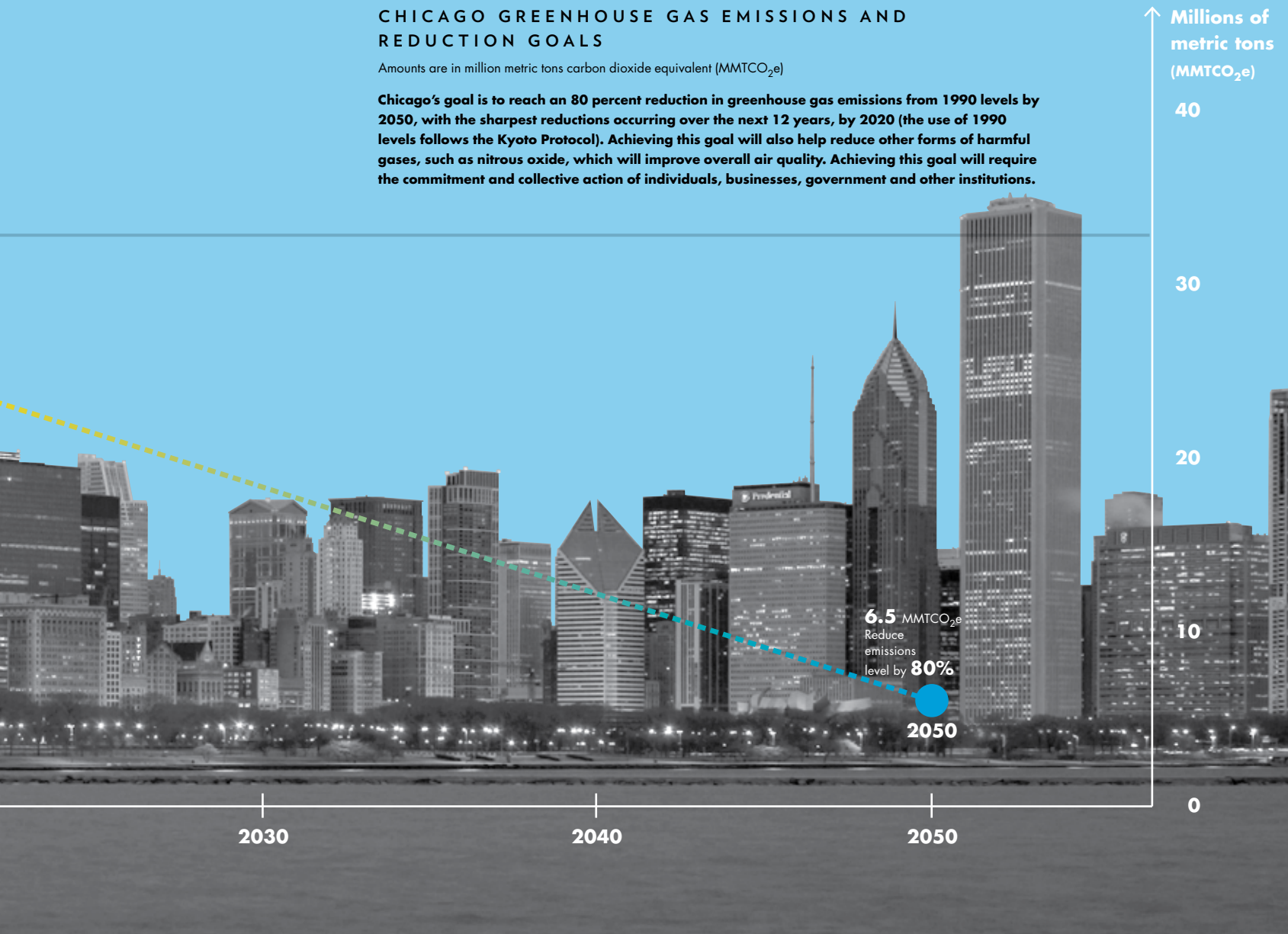
A Finance Committee recommended tools for funding the proposed actions, often in ways that allowed energy savings to cover the costs. A Communications Committee recommended ways to share this information and educate residents about ways to take action. Guided by its Research Advisory Committee, the Task Force set the following criteria for choosing a goal for emissions reductions: The goal must be 1) sufficient to avoid a climate so altered that scientists agree there will be adverse impacts; 2) advantageous for Chicago by improving the quality of life and boosting the economy; and 3) feasible given current technologies and resources.

The results of the research are both serious and encouraging. They clearly demonstrate that our current trajectory poses risks to our economy and health. They demonstrate that we need to act now to reduce our emissions, while preparing for climate changes that cannot be avoided. We face a big challenge—but we have also been granted a big opportunity. Every Chicago resident and business

CHICAGO GREENHOUSE GAS EMISSIONS AND REDUCTION GOALS

Amounts are in million metric tons carbon dioxide equivalent (MMTCO₂e)

Chicago's goal is to reach an 80 percent reduction in greenhouse gas emissions from 1990 levels by 2050, with the sharpest reductions occurring over the next 12 years, by 2020 (the use of 1990 levels follows the Kyoto Protocol). Achieving this goal will also help reduce other forms of harmful gases, such as nitrous oxide, which will improve overall air quality. Achieving this goal will require the commitment and collective action of individuals, businesses, government and other institutions.



KEY FACTS: A SNAPSHOT IN TIME

While based on extensive research and analysis, the Chicago Climate Action Plan represents a snapshot in time, using the best information available today. But technology and markets change almost daily, which is why we expect the Plan to evolve over time. A strategy identified today may become obsolete, just as new technologies may emerge that weren't even considered possible when this plan was written. As a result, like Chicago itself, the Plan is dynamic and nimble.



has a role to play in implementing the Plan, which will not only ensure a more livable climate for the world, but also for the city. The economy and quality of life could improve. Jobs could be created. New technologies will emerge.

The Strategies section of this Plan outlines 26 actions for mitigating greenhouse gas emissions and nine actions to prepare for climate change. These actions call upon a range of government bodies—local, regional and national—to improve policies. Companies whose actions are already making a difference need to do more; other businesses must begin. Environmental, community and faith-based organizations have a key role to play. All Chicagoans bear a new responsibility. The Plan details steps for organizations of all kinds and suggests actions for every individual.

The Plan is a snapshot in time—the actions detailed in the Strategies section draw on current technology and options now available in the market. As new

technologies and options emerge, actions may change. The goal, however, remains the same: to reduce our emissions and prepare for change.

This report can be thought of as an overview document to help everyone learn about Chicago's Climate Action Plan—how it was created, why it is necessary, what are its goals. Reports on the scientific research are available at www.chicagoclimateaction.org. This website also provides more detailed steps that City government, individuals and organizations are taking to implement change.

We will share our progress citywide. We also must communicate it to cities nationwide and worldwide if we are to have a true global impact. Chicago can make a difference by reducing our own emissions—and by standing as a model for how cities worldwide can tackle this urgent issue.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimateaction.org.



FIVE STR

page 14 | INTRODUCTION

page 19 | STRATEGY 1. ENERGY EFFICIENT BUILDINGS

page 25 | STRATEGY 2. CLEAN & RENEWABLE ENERGY SOURCES

page 29 | STRATEGY 3. IMPROVED TRANSPORTATION OPTIONS

page 35 | STRATEGY 4. REDUCED WASTE & INDUSTRIAL POLLUTION

page 39 | STRATEGY 5. ADAPTATION

STRATEGIES





FIVE STRATEGIES: INTRODUCTION

The scientific and economic analysis commissioned by the Task Force makes one thing clear: there is no time to lose. If Chicago continues on its current path, just like many other cities, its greenhouse gas emissions could increase 35 percent by the year 2050. If the world continues on its present path, Chicago could experience extreme heat in summer, many more heavy rain storms, growing flood risks, stresses on our public health and threats to the city's economy.

What level of action is required?

As part of its research, the Task Force looked at outcomes from several possible future greenhouse gas (GHG) emission levels. Continued global dependence at current levels on coal, gas and oil would radically alter the city's climate so that a Chicago summer late in this century could feel like that of Mobile, Alabama, today. By the end of the century, the number of extremely hot days (over 100°F) could increase from the current two days per year to as many as 31 days per year. There may be fewer extremely cold days in winter—but more heavy rains and snow storms. A lower emissions scenario, with emissions cut to 60 percent below their 1990 level by 2050, could produce a less dramatic change but would still not prevent troubling impacts.

The Task Force agreed that Chicago needs to achieve an 80 percent reduction below its 1990 GHG emissions level by the year 2050 in order to do its part

to avoid the worst global impacts of climate change. To achieve the desired 80 percent reduction, the Task Force proposed an initial goal of a 25 percent reduction below 1990 levels by 2020, a midterm goal that was far enough in the future to allow time for major infrastructure and behavioral changes, but soon enough to ensure we are on the right course.

PICKING TARGETS

In 2005, 36.2 million metric tons (MMT) of greenhouse gases in carbon dioxide equivalent units (MMT_{CO₂e}) were emitted in Chicago, averaging 12.7 tons per year for each of Chicago's 2.8 million residents. The 1990 baseline level of emissions is 32.3 MMT (1990 is specified by the Kyoto Protocol). If Chicago continues on its current path, which assumes continued population growth, its emissions would grow to 39.3 MMT_{CO₂e} by 2020. To achieve the Task Force's targeted 2020 goal of 24.2 MMT_{CO₂e}, projected emissions will need to be cut by 15.1 MMT_{CO₂e} by 2020.

What kind of action is required?

A team of researchers analyzed Chicago's building stock, transportation systems and energy infrastructure to identify emissions reduction actions. The Task Force and several hundred stakeholders then reviewed all the research findings on climate impacts, greenhouse gas emissions, and mitigation and adaptation strategies.

After extensive analysis, the Chicago Climate Task Force settled on 26 "mitigation" or emissions reduction actions that, together, could provide a road

KEY FACTS:

AN ILLUSTRATION OF EMISSIONS REDUCTIONS

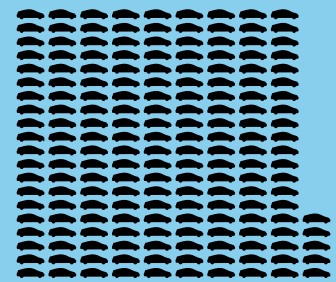
A reduction of one metric ton (one MT) of greenhouse gas emissions is equivalent to driving 2,500 fewer miles or removing almost 1/5 of a car from the road.

1 MTCO₂e reduction =



A reduction of one million metric tons (one MMT) of greenhouse gas is equivalent to removing nearly 185,000 cars from the road.

1 MMTCO₂e reduction =



-185,000 cars

Each icon in the above graphic represents 1,000 cars.

KEY FACTS:

THE ANATOMY OF MMTCO₂e

MMT_{CO₂e}
MMT =
million metric tons

MMT_{CO₂e}
CO₂e =
the term for the quantity of any greenhouse gas, including carbon dioxide, methane and others, translated to CO₂ by weighting it by its relative global warming potential.

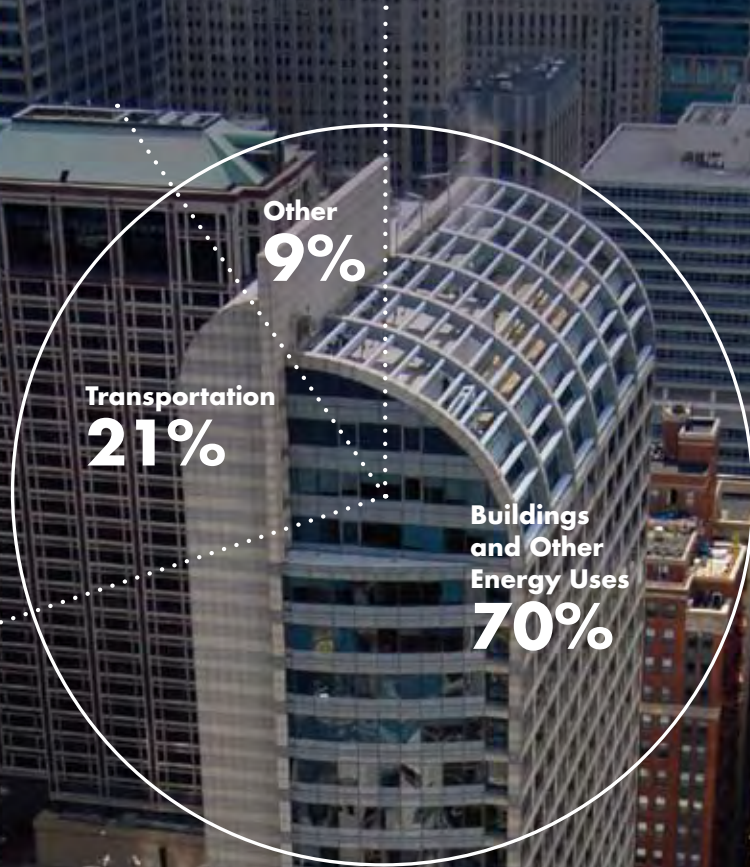
PROJECTED NUMBER OF 100-DEGREE DAYS PER YEAR IN CHICAGO



Fortunately, we can choose our future. We can preserve the quality of life in our city—provided we take action now.

2000 CHICAGO GREENHOUSE GAS EMISSIONS

Buildings are the primary target of reductions, as they account for roughly 70 percent of emissions. Cars, trucks, buses and trains are responsible for 21 percent. The remaining 9 percent comes from industrial emissions and waste.



THE SIX-COUNTY METRO AREA—COOK, WILL, DUPAGE, KANE, MCHENRY AND LAKE COUNTIES

As in Chicago, energy and transportation accounts for 91 percent of the regional emissions. However, transportation is a larger share of total emissions in the region—30 percent—than in Chicago—21 percent.



KEY FACTS:

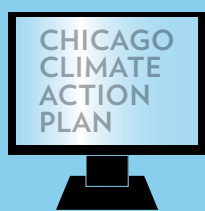
RESEARCH FOR THE CHICAGO CLIMATE ACTION PLAN PRODUCED FIVE KEY FINDINGS.

- Without rapid local and global action, impacts on Chicago's climate could be adverse.
- Electricity and natural gas consumed by buildings and transportation are the main sources of Chicago's emissions.
- While we reduce emissions, we must prepare for the changes in climate that are already occurring.
- There is no single remedy, but rather many remedies with many benefits.
- The benefits of early action will improve quality of life and preserve Chicago for future generations.

KEY FACTS:

A COLLABORATION OF MANY RESEARCHERS, SCIENTISTS AND ANALYSTS

Researchers at the University of Illinois and Texas Tech University led a team that produced the climate change research report, supplemented by work on economic costs by Oliver Wyman and on adaptation by the engineering firm MWH. The Center for Neighborhood Technology (CNT) prepared the baseline emissions inventory and the analysis that informed the mitigation strategies. Delta Institute also contributed to research on the mitigation strategies. The Regional Economic Applications Laboratory at the University of Illinois prepared the analysis of job impacts. To read more, go to www.chicagoclimateaction.org.



map for Chicago to reach that goal. Each of these actions was carefully evaluated and chosen with the following criteria in mind:

- **REDUCTION POTENTIAL:** total achievable greenhouse gas emissions reductions
- **COST-EFFECTIVENESS:** cost of implementation and the potential savings generated
- **FEASIBILITY:** ease of achievement and potential to overcome barriers
- **BENEFITS AND BURDENS:** advantages and drawbacks to the action, such as savings to residents, job creation and quality of life improvements
- **REGIONAL IMPACT:** level of opportunity for the larger six-county area (Cook, Will, DuPage, Kane, McHenry and Lake)
- **RAPID DEPLOYMENT:** opportunity to effect changes quickly

The findings for each action can be found in the research reports at www.chicagoclimateaction.org.

HOW THE PLAN IS BUILT

The actions needed to reach our 2020 goal fall into five strategies:

- **BUILDINGS** account for approximately 70 percent of all city emissions and are the primary target for our reductions. Key opportunities here are improving the energy efficiency of residential, commercial and industrial buildings.
- **CLEAN AND RENEWABLE ENERGY SOURCES** include higher standards for fossil fuel plants and replacing energy from fossil fuel plants with renewable energy.
- **TRANSPORTATION** accounts for 21 percent of all GHG emissions in the city. We need to reduce the amount people drive (measured in vehicle miles traveled or VMT) and improve vehicle fuel efficiency.
- **WASTE AND INDUSTRIAL POLLUTION** account for a much smaller share of Chicago's emissions, but we must change our waste and industrial processes to achieve our emissions reduction goal.

- **ADAPTATION** is crucial to ensure that the City can manage the changes that will come because of the level of GHGs already in the atmosphere. The Plan identifies the steps required—and some already taken.

EXTRA BENEFITS

Beyond averting changes to our climate, these actions have the potential to offer many other important benefits. Thousands of jobs may be created annually once the actions are under way.

The City is working with the Center on Urban Economic Development, Center on Wisconsin Strategy and Green for All to develop a comprehensive green jobs strategy to fully understand the job development potential in each area of mitigation and adaptation.

The benefits of these actions promise tremendous gain to Chicagoans today and to the children who will inherit our city tomorrow.

Most of the strategies in this plan are cost-effective and are improvements that will often pay for themselves. For example, over the past four years, the City has retrofitted 15 million square feet of its office space, saving \$6,000,000 on energy costs. The City worked with F&F Foods to do an energy, waste and water audit of their manufacturing facility. Their \$780,000 investment—which created a closed loop water pumping system and resulted in more efficient energy systems—resulted in \$280,000 in energy savings per year (a 2.6 year payback followed by substantial annual savings). Technology and market changes could make these strategies even more cost-effective—or change the approach identified here altogether. The City will utilize new funding sources that are already becoming available, such as the State's Energy Efficiency Portfolio Standard and will continue to advocate for additional federal and state funding.

Note: Mitigation actions don't add up to the 15.1 MMTCO₂e goal for Chicago because savings from some activities offset potential savings from others. For instance, if someone decides to buy a hybrid car, and then leaves that car at home to use transit three times a week, the full emissions reduction value of both activities cannot be counted together. The reduction number for all the strategies added together, without double-counting, is sufficient to meet our goal.



ADDRESSING THE CHALLENGE
OF CLIMATE CHANGE

ENERGY EFFICIENT BUILDINGS
8 ACTIONS

CLEAN & RENEWABLE ENERGY SOURCES
5 ACTIONS

IMPROVED TRANSPORTATION OPTIONS
10 ACTIONS

REDUCED WASTE &
INDUSTRIAL POLLUTION
3 ACTIONS

ADAPTATION
9 ACTIONS

=

35 WAYS

TO ENSURE A RESILIENT CITY



STRATEGY 1.

ENERGY EFFICIENT BUILDINGS

GOAL:

REDUCE ENERGY USE IN BUILDINGS

- CO - BENEFITS:
-  reduced energy costs
 -  jobs
 -  improved air quality and health
 -  water conserved
 -  quality of life
 -  adaptation



STRATEGY 1. ENERGY EFFICIENT BUILDINGS



Without global and local action, impacts on Chicago's weather could be dramatic.

Actions

1. Retrofit commercial and industrial buildings
2. Retrofit residential buildings
3. Trade in appliances
4. Conserve water
5. Update City energy code
6. Establish new guidelines for renovations
7. Cool with trees and green roofs
8. Take easy steps

For more information, see Chicago 2020 Mitigation and Adaptation Strategies chart on page 50.

Chicago will continue to see an increase in its population, which is why improving energy performance in the majority of the city's buildings is a prime target of this Plan. That goal, though ambitious, could be achieved with a concerted effort by government and its many public and private partners along with residents improving the energy efficiency of their own homes. Increasing the efficiency of buildings will result in significant financial savings for everyone—government, residents and business owners. Often those savings can cover the upfront costs of a retrofit for a high-rise office or a single-family home. There is a further benefit to the economy citywide: retrofitting buildings results in the creation of local employment opportunities for Chicagoans.

Saving energy—from bungalow to skyscraper

This initiative has two fronts: commercial/industrial and residential. Chicago currently has upwards of 23,000 commercial, institutional and industrial buildings, which range from municipal structures, office buildings, schools, universities and hospitals to the corner grocery store. Reducing energy consumption and emissions by an average of 30 percent in 9,200 buildings by 2020 could produce reductions of 1.3 MMTCO₂e.

Chicago's two most prominent large buildings—the Sears Tower and the Merchandise Mart—have already set an example. Both have agreed to

participate in a new Clinton Climate Initiative program, which brings together one of the world's largest energy service companies, five of the world's largest banks and 17 of the world's largest cities in a program to reduce energy consumption in existing buildings. The program provides both cities and private building owners with access to financing to retrofit buildings and upgrade them with more energy-efficient products, leading to energy savings of between 20 and 50 percent.

There are slightly more than one million residential housing units in Chicago, ranging from single-family homes to multi-family apartments. Recent development, plus the sturdiness of Chicago's building stock, means that at least 80 percent of the buildings that exist today will still be standing in 2020. If 40 percent of Chicago's residential housing stock could be retrofitted by 2020, this could result in a greenhouse gas emissions reduction of 1.44 MMTCO₂e by 2020. We will work with a range of government, nonprofit and development partners to offer grants and technical assistance, leverage private capital and streamline processes to try to reach this goal.

Low-income families spend up to 20 percent of their income on energy costs. For these families, the energy cost savings are particularly valuable. Programs such as the Energy Savers program, an initiative of the Preservation Compact supported by the John D. and Catherine T. MacArthur Foundation, and the Cook County Community and Economic Development Association (CEDA)

KEY FACTS: WHAT IS RETROFITTING?

Energy retrofits reduce building energy consumption in existing buildings and thereby reduce greenhouse gas emissions. Retrofits can include the building envelope, heating, cooling, hot water, lighting systems and appliances. Technologies include insulation, energy efficient windows, high efficiency boilers and furnaces, programmable thermostats, solar or tankless hot water systems and compact fluorescent bulbs.



KEY FACTS: RETROFITTING RESIDENTIAL BUILDINGS:

A sturdy building stock plus recent development means 80 percent of existing residential buildings will be standing in 2020. The goal: retrofit 6,000 units in 2008 and 2009, to reach 60,000 per year by 2018 with a targeted cumulative total of up to 400,000 units by 2020.

The return on investment for residential energy efficiency improvements ranges from 12.5 percent to 30 percent. This is a higher return than Chicagoans can earn on most other investments.



up to
400,000
2020



Since 2001, the City of Chicago has retrofitted 15 million square feet of municipal buildings, constructed 36 green roofs on public buildings totaling more than 100,000 square feet, retrofitted more than 1,000



traffic lights with light emitting diodes (LEDs), provided more than 580,000 compact fluorescent light bulbs (CFLs) and weatherization materials to residents and weatherized more than 1,000



existing homes through various City departments. All new City buildings are designed and constructed to the LEED (Leadership in Energy and Environmental Design) Silver standard, including seven libraries.



This 20,300-square-foot green roof atop City Hall was commissioned by Mayor Daley and completed in 2001. The garden is home to more than 20,000 herbaceous plants, including 100 wood shrubs,

40 vines and two trees. As the image on the right shows, on a typical 90–95° F day in August, the ambient air temperature above the City Hall Green Roof is 7–10° F cooler than that above the Cook



County side of the building which is covered with blacktop. The project won the American Society of Landscape Architects 2002 Professional Merit Award.

STRATEGY 1. ENERGY EFFICIENT BUILDINGS

Weatherization Program, target these families. The City will continue to support programs for low- and moderate-income families and seek innovative finance models, such as working with the owners of multi-unit apartment buildings to increase energy efficiency and reduce operating costs.

Making appliances work for us

Together, refrigerators and air conditioners make up approximately 30 percent of household electric usage in the United States. Appliance trade-in programs are complicated to organize and, to be effective, require partners in the community. Yet, there are many benefits to swapping out appliances that go beyond energy reduction: newer refrigerators keep food fresher and ensure safety, and new AC units mean more effective cooling and quieter operation. Appliance owners also save modest amounts through their trade-ins—an average of \$65 annually in energy costs—while the city receives the benefit of cleaner air. As part of Chicago's overall efficiency program, the reduction in CO₂e emissions through appliance and light bulb replacement could amount to .28 MMT by 2020. ComEd is starting major new appliance trade-in programs in 2008 that will help reach this goal.

Using water wisely

Getting water to households and businesses uses a great deal of power. Pumping, distributing and heating water takes energy and produces emissions. Consider this: a faucet that runs for five minutes uses about as much energy as a 60-watt light bulb lit for 14 hours. The City's water main replacement effort saves 160 gallons of water per day. When buildings are retrofitted for energy efficiency, they can also be improved for water efficiency, resulting in an additional drop of .04 MMTCO₂e in greenhouse gas emissions.

Streamline resources

Home and building owners alike may find the idea of an energy or water efficiency retrofit daunting. They might be intimidated when imagining a host of separate contractors and tricky technical details. To streamline the processes for residential, commercial and industrial building owners, the City of Chicago will work with a variety of nonprofit agencies, Commonwealth Edison, Peoples Energy, local lending institutions, the State of Illinois Department of Commerce and Economic Opportunity (DCEO) and other businesses to make it easier to access technical help and financing.

Policies that promise change

Monitoring building efficiency and enforcing standards is a major responsibility of City government as spelled out in the Chicago Energy Conservation Code. Simplifying and aligning the Code with the latest international standards could reduce emissions by 1.13 MMTCO₂e. Requiring renovations to existing commercial and residential buildings to meet commonly accepted standards in the green building industry could eliminate .31 MMTCO₂e.

Green roofs, green streets

Chicago, which leads the nation in its support for green roofs, currently has more than 400 green-roof buildings completed or under construction—four million square feet—more than any other U.S. city. Planting vegetation atop buildings can moderate roof temperature, providing shade in hot weather and insulation in colder months, thus reducing energy requirements. The Plan calls for an increase in rooftop gardens to a total of 6,000 citywide by 2020.

Planting more than a million new trees on private and public property is another solution called for in the Plan. Increased vegetation and trees beautify work places and improve real estate values. They improve the quality of life by creating attractive spaces for people to enjoy—all while reducing emissions. These increases in green roofs and trees could net a .17 MMTCO₂e drop.

Small steps, big gains

Many small changes in how motivated individuals use energy can add up to big emissions reductions. It can be as easy as turning off lights and appliances when not needed, dialing down the thermostat at night or turning off the faucet when brushing your teeth. The cost savings for a household of replacing nine incandescent bulbs with compact fluorescent light bulbs (CFLs) is more than \$100 per year. The savings from unplugging all appliances like TVs that use standby settings into powerstrips and turning them off when not in use can be \$23 per year. If half of all city residents took easy, low-cost steps like these—and half of all managers of commercial businesses take similar steps—they would each reduce their emissions by one metric ton of CO₂e, yielding an important .8 MMTCO₂e reduction by 2020.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimatereaction.org.

KEY FACTS: RETROFITTING INDUSTRIAL BUILDINGS PAYS OFF

(Results of Chicago Industrial Rebuild Program for nine companies in four industrial sectors, 220,000 square feet)

Investment:

\$277,000

Annual Cost Savings:

\$100,000

Payback Period:

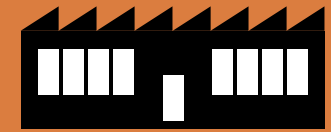
2 years

Rate of Return on Investment:

28 percent

Annual CO₂ Reduction:

1.3 million pounds



KEY FACTS: STREAMLINED ACCESS TO RETROFITS

A streamlined process will provide technical help and access to financing for people who retrofit homes and buildings to boost energy and water efficiency. It also will coordinate appliance trade-in programs. Together these steps will address Chicago's biggest source of greenhouse gas emissions and save Chicagoans money.

Why building retrofits? Existing technologies to improve building envelopes, heating, cooling, hot water and lighting systems can save an average of 30 percent in energy consumption.

Why water efficiency? According to the Environmental Protection Agency, a faucet that runs for five minutes uses about as much energy as running a 60-watt light bulb for 14 hours.

Why appliances? Together, refrigerators and air conditioners account for 30 percent of household electric usage in the United States, a major target for emissions reduction.

LEADING BY EXAMPLE:

ANTHONY NIEC, PORTION PAC



Thanks to the initiative of project engineer Anthony Niec, PortionPac Chemical Corporation is a model of energy efficiency and green building. The company spent more than \$100,000 on its roof to

increase reflectivity and insulation, saving 35 percent on energy bills. Niec has installed controllers on water heaters to help minimize their use and replaced fluorescent lighting with efficient metal-halide

lights. Lots of inside greenery, including 15-foot rubber trees, help keep things cool. Niec (fourth from left) remarks, "It feels like an arboretum."

LEADING BY EXAMPLE:

DAN NEHM



Union carpenter Dan Nehm wanted to rehab his brick three-flat in the Ukrainian Village neighborhood in Chicago to make it more energy-efficient. He sprayed foam

insulation into the ceiling and installed triple-glazed windows to conserve heat. "I hope my efforts have a larger impact of influencing other people to increase their

energy efficiency," says Nehm, who supports the City's plan to enhance its Energy Code.



In 1996, the Shedd Aquarium launched a multi-pronged plan to reduce its emissions. It replaced an ancient boiler with new heating and cooling systems; added a reflective roof made from soy-oil polymer;

switched to motion-activated fluorescent bulbs; and updated its electrical controls. In seven years, the Aquarium cut its energy consumption by nearly 80 percent, saving what is now an average of

\$219,000 each year. For its new office addition, the Shedd is seeking LEED Silver certification. It will install the latest in energy conservation measures, including waterless urinals and LED lighting.



The Chicago Center for Green Technology was the third building in the United States to be designed according to the LEED rating system and uses the highest standards of green technology available. It

was the first municipal building and the first renovation to receive a Platinum rating. The center now offers over 200 green educational programs per year to educate Chicagoans about green building



technologies. In November, 2007, a greatly expanded Resource Library opened, which allows visitors to browse through the latest green technologies in flooring, paint and other products.




STRATEGY 2.

CLEAN & RENEWABLE ENERGY SOURCES

GOAL:

TURN TO CLEANER AND RENEWABLE
ENERGY SOURCES

CO-BENEFITS:  jobs

 improved air quality and health

 adaptation

STRATEGY 2. CLEAN & RENEWABLE ENERGY SOURCES



Electricity use, natural gas use and transportation are the main sources of Chicago's emissions that contribute to climate change.

Actions

1. Upgrade power plants
2. Improve power plant efficiency
3. Build renewable electricity
4. Increase distributed generation
5. Promote household renewable power

For more information, see Chicago 2020 Mitigation and Adaptation Strategies chart on page 50.



To address climate change, the world must require higher efficiency from existing energy sources and move to cleaner power sources. The first section, Energy Efficient Buildings, focused on the need to rethink how we

build and retrofit our homes and businesses. This section focuses on the sources of power—Chicago homes and businesses receive power purchased from the larger regional grid of Midwest plants, which includes nuclear, coal-fired, natural gas-fired and renewable-generation plants. Some of these are a significant source of CO₂ emissions, especially those that use coal. Upgrading or repowering the 21 coal plants in the state of Illinois, including two in Chicago, could yield substantial reductions, Chicago's share of which would be 2.5 MMTCO₂e. Implementation of a national cap and trade system will also help achieve this goal.

As new power plants replace the old ones, it is essential that they be built to high standards for efficient operations. It also is important to improve the efficiency of existing electricity generation plants in the region that supply Chicago's power. These actions together could drop greenhouse gas emissions by another 1.04 MMTCO₂e.

New ways to power the city

Several technologies for renewable energy show significant promise for Chicago and Illinois. Already in Chicago, people live in buildings retrofitted

with solar domestic hot water as well as solar photovoltaics (PV) installed on tops of roofs or in gardens. Chicago is also home to two megawatts of solar generating capacity. Wind power has high potential for Illinois, which has six wind farms up and running and more under construction. Procuring large-scale renewable sources for Chicagoans in order to reduce electricity emissions by 20 percent could replace four coal-fired power plants. Shifting to renewable power sources will net a 3.0 MMTCO₂e reduction in emissions.

Distributed solutions

With technologies improving, small on-site power plants today can often produce energy more efficiently than central power plants. Distributed generation using gas turbines produces about half the annual emissions of a typical coal plant, and avoids the efficiency loss that occurs when electricity is moved long distances over wires. Combined heat and power is an extension of distributed generation that produces electricity and recovers heat in the process. Increasing efficient power generated on-site using distributed generation and combined heat and power could replace more than 2 gigawatt hours of electricity and 81 million terms of natural gas by 2020, resulting in a drop of 1.12 MMTCO₂e.

Household-scale solutions

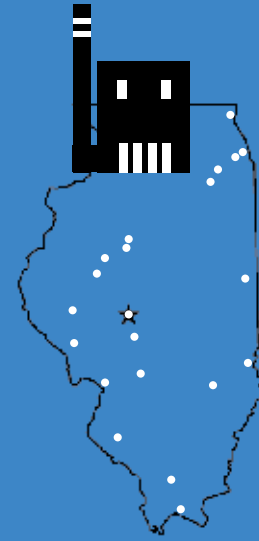
Families, too, can reduce their reliance on the large central power stations of the electrical grid. Instead, they can get part of their energy from small-scale power technologies, such as solar PV panels, solar thermal or wind turbines installed on roofs. If the City and utilities work together to provide incentives such as grants and credits, homeowners can double current household-scale renewable electricity generation. Installing renewable energy technologies in 5 percent of the city's housing stock could reduce greenhouse gas emissions by .28 MMTCO₂e.

Beyond improving our air, switching to renewable energy offers a bonus: job creation. Growth in the manufacture of green energy technology could deliver many more dollars to the Chicago economy.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimatereaction.org.

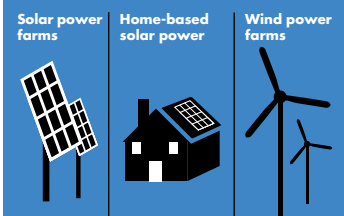
KEY FACTS: REFURBISHING COAL POWER PLANTS WITHIN ILLINOIS.

To address climate change, the world must require higher efficiency from existing energy sources and move to cleaner power sources. Upgrading or repowering the 21 coal plants in the state of Illinois, (see map below) including two in Chicago, could alone yield a reduction of 2.5 MMTCO₂e. Implementation of a cap and trade system will also help achieve this goal.

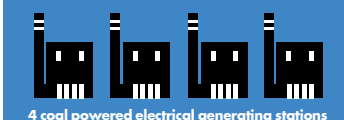


KEY FACTS: CREATING CLEAN & RENEWABLE POWER GENERATION.

Chicago has a growing number of buildings using solar, wind, geothermal and combined heat and power. The goal: large-scale renewable sources reducing electricity emissions by 20 percent, enough to replace four coal-fired power plants.



replaces





Chicago has installed solar PV and solar thermal panels on City buildings and schools and for nonprofit customers; more than 20 percent of the electricity used in City

buildings and 30 percent of that used in Chicago Park District facilities was purchased from green power in 2007. The City also attracted a solar thermal product

manufacturer and used its products to reduce the cost of heating hot water in more than 20 City buildings by 70 percent.

Photography: ComEd/Exelon BSC Audio Visual Services



The City and Commonwealth Edison's Residential Appliance Recycling Program helps retire and recycle inefficient lawn mowers, room air conditioners, refrigerators

and freezers. Together, refrigerators and air conditioners account for approximately 30 percent of electricity usage in the United States.

STRATEGY 2. CLEAN & RENEWABLE ENERGY SOURCES

LEADING BY EXAMPLE:

NEAR NORTH APARTMENTS



Photography: Mercy Lakefront Housing



Nonprofit developers are demonstrating that green building is not just for the wealthy. A project of Mercy Housing Lakefront, Near North Apartments—designed by renowned architect Helmut Jahn—has wind turbines to generate a portion of its own power. A 1,500-gallon rainwater

cistern is used for landscape irrigation; graywater is collected from showers and sinks and is used to flush toilets. Solar thermal panels, donated by the city, supply 30 percent of the energy to heat the building's hot water. A touch screen educates residents about green living.



STRATEGY 3.

IMPROVED TRANSPORTATION OPTIONS

GOAL:

USE A VARIETY OF TRANSPORTATION
MODES—AND CLEANER VEHICLES

CO-BENEFITS:



reduced energy costs



jobs



improved air quality and health



quality of life



Bicycling creates no pollution, offers exercise opportunities and is often the quickest way to travel.

STRATEGY 3. IMPROVED TRANSPORTATION OPTIONS



There is no single remedy, but rather many remedies with many benefits.

Actions

1. Invest more in transit
2. Expand transit incentives
3. Promote transit-oriented development
4. Make walking and biking easier
5. Car share and carpool
6. Improve fleet efficiency
7. Achieve higher fuel efficiency standards
8. Switch to cleaner fuels
9. Support intercity rail
10. Improve freight movement

For more information, see Chicago 2020 Mitigation and Adaptation Strategies chart on page 50.

Every day, Chicagoans travel to a variety of places—they commute to work, drive to the store, go to the doctor, make a trip to the health club, go out for dinner. Currently, 21 percent of the city’s greenhouse gas emissions is produced by cars, trucks, buses and trains. (This inventory excludes emissions from air travel, an approach that mirrors that of most other cities.) To lower emissions, a high-quality transportation system must include a mix of public transit, bicycling, walking, car sharing, energy-efficient vehicles and the development of transit-oriented neighborhoods. Chicagoans have many places to go, and they need a variety of convenient, energy-efficient ways to get there.

Public transit solutions

Chicago has the nation’s second-largest transit system, with an average weekday Chicago Transit Authority (CTA) ridership of 1.6 million rides (approximately one-third by rail and two-thirds by bus). The CTA has 222 miles of track and 144 train stations in the Chicago area. After a serious decline in the 1980s, ridership has made a major rebound; between 1997 and 2007, CTA annual ridership jumped by nearly 55 million rides. Metra, which offers commuter rail in the metropolitan region, is also a key feature in the city’s transit landscape. One-third of Metra stations are in the City of Chicago and 300,000 trips are provided via Metra into the city every day.

The rise in ridership—and our extensive transit system—are excellent starting points for reducing GHG emissions. But to seriously cut emissions, the regional transit system needs further development. Key route extensions and innovative services, such as an integrated bus rapid transit network that spans a number of the city’s arterials, will show more Chicagoans that public transport is an attractive alternative to being stuck in traffic. Thus a prime goal should be to promote infrastructure investment from state and federal government and service improvements that could help boost ridership by up to 30 percent. The City just received \$153.1 million in U.S. Department of Transportation grant funds to reduce traffic congestion. If that 30 percent target is reached, greenhouse gas emissions from transportation could drop by .83 MMTCO₂e (as well as associated air pollution emissions from cars). In addition, Chicagoans could experience better transit service, less congested roads and the huge economic benefit of jobs created to maintain the system, add routes and improve service.

As we work toward these infrastructure improvements, Chicagoans could benefit from improvements such as universal fare cards and innovative payment methods that allow riders to move more easily between CTA, Metra, Pace services and car sharing. Targeted public information campaigns can educate Chicago motorists about the personal savings that come from switching to public transport—as much as \$400 a month when totaling fuel costs, insurance and parking.

Companies can help with employee benefits such as pre-tax transit passes and cash payments to employees who give up the use of employer parking facilities, a measure which can produce a reduction of .03 MMTCO₂e.

Developing communities around a hub

In many neighborhoods, a central piece of the puzzle is the design and development of neighborhoods around a public transport hub. Homes, shops and jobs that are clustered near a transit stop encourage walking and use of transit. Such transit-oriented development alone can reduce emissions in the city by .63 MMTCO₂e by 2020. The City of Chicago and the CTA are embarking on a collaborative process to promote transit-oriented development, which will multiply the benefits of transit improvements

KEY FACTS:

THE CHICAGO AREA DEPENDS DAILY ON PUBLIC TRANSIT.

Chicago has the nation’s second-largest transit system, with an average weekday Chicago Transit Authority ridership of 1.6 million rides (approximately one-third by rail and two-thirds by bus).



1,600,000
CTA rides daily

KEY FACTS:

MOTIVATION TO SWITCH TO PUBLIC TRANSPORTATION.

Huge personal savings come from switching to public transportation—as much as \$400 a month when totaling fuel costs, insurance and parking.



Metra
The way to really fly.



pace



The opening of the Orange Line in 1993 brought rapid transit to the Southwest Side and the line now provides almost 10,000,000 rides each year.



in terms of travel savings, jobs and community development. The City also will collaborate with Metra on transit-oriented development.

Walking, biking and car sharing

If Chicagoans make greater use of public transit and walk and ride bicycles more, they will drive less, achieving more significant long-term emissions reductions. Walking and biking are transportation choices that promote health and emit no greenhouse gases. The City aims to boost walking and bicycle trips to one million a year, doubling the current number. Proposed steps include the implementation of the Bike 2015 Plan and the Chicago Pedestrian Plan, netting a direct .01 MMTCO₂e drop in GHG emissions by 2020. The fringe benefits of these plans are many, including saving many families the cost of a second automobile.

When driving is the best option for a particular trip, there are still opportunities to increase efficiency and reduce vehicle miles traveled (VMT). Car sharing and ridesharing or vanpooling offer alternatives to owning cars that both promote use of transit and lower household costs. Research has shown that people who car share drive less. Depending on how aggressively this option is pursued, CO₂e savings can exceed .5 MMT. With car sharing, transit users and others can have the benefits of a car for occasional trips without the burden of full-time car ownership,

and they can save thousands of dollars per year in car payments, insurance and maintenance costs.

Fueling the future—efficiently

While increased use of transit and more trips on foot and bike promise a major reduction in heat-trapping gases, so do more fuel-efficient vehicles. The City, CTA, businesses and residents can transition to more fuel-efficient vehicles, which could alone contribute a reduction of .21 MMTCO₂e by 2020. Key fleets include buses, garbage trucks, taxis and delivery vehicles. The CTA already has 20 hybrid buses in a pilot program to gauge their all-weather use and is acquiring an additional 150 hybrid buses to help to replace the oldest buses in the CTA fleet. Finally, the City supports the implementation of The Energy Independence and Security Act of 2007, the first statutory increase in fuel economy standards for automobiles since they were first enacted in 1975. The Act specifies a national standard of 35 miles per gallon by 2020, which could reduce GHGs by another .51 MMTCO₂e.

The use of alternative fuels such as biodiesel will also help lower GHG emissions from vehicle exhaust. Gasoline use—and its high emissions—could continue to decrease as a range of even cleaner alternative fuels are developed and brought to the market, including ethanol made from grasses and

STRATEGY 3. IMPROVED TRANSPORTATION OPTIONS



Metra trains and bike lanes play important roles for commuters. Metra provides about 300,000 rides every day. The 18-mile Lakefront Trail along Lake Michigan serves both commuters and recreational cyclists. It is a cornerstone of the City's goal for a 500-mile bikeway network.

agricultural waste. The sustainability of any alternative fuel must be further examined from a life cycle perspective before widespread adoption. Expanding the supply and use of alternative fuels for vehicles in Chicago could net a .68 MMTCO₂e drop in greenhouse gas emissions.

Cleaner transportation is not the exclusive responsibility of the City. As with so many actions, both individuals and businesses can make a significant difference. Companies and other organizations can switch to more efficient fleets; car owners can opt for hybrids or other vehicles that use less gas.

Regional transportation

Regional transportation initiatives have an important role in this plan. They include increasing the efficiency of freight transport, reducing emissions from air travel and increasing market share of intercity rail. Freight, too, can be carried more efficiently. How freight is moved (train, truck, barge, etc.), the route it takes and the time involved in moving it are all factors that need to be addressed. Rail is the most efficient way to move freight, but currently, due to bottlenecks and aging infrastructure, it takes trains the same amount of time to get through Chicago as it takes to get here from Los Angeles. Such complex freight problems will require regional cooperation, but solutions include eliminating bottlenecks and adding rail capacity to encourage switching from truck (higher impact) to rail or barge (lower impact). Of regional and national significance, the innovative CREATE program (Chicago Region Environmental and Transportation Efficiency) will address many of these key issues and has the City's active support. The

potential GHG reductions from these improvements could yield an estimated 1.61 MMTCO₂e per year.

Chicago's airports merit close attention. Like other cities, their emissions are not part of the Chicago baseline calculation. Leading the way for the nation, the O'Hare Modernization Program Sustainable Development Manual includes a number of actions to reduce air transportation emissions, such as high-efficiency aircraft motors and pumps, upgrading of gate facilities and improved traffic control to reduce aircraft idling.

Implementing an intercity high-speed passenger rail plan could yield a .006 MMTCO₂e drop in emissions from lower automobile use in the city of Chicago as well as a much larger emissions drop for the greater Chicago region.

As we shift our transportation practices, we'll see many valuable benefits beyond the drop in emissions. The economy will benefit: most of the dollars Chicagoans spend on fuel leave the region. In contrast, what residents save on lower fuel costs tends to be spent locally. Investment in transit infrastructure will create jobs. Enhanced transit will allow a spectrum of Chicagoans—the young, the old and those with mobility limitations—to get to places more easily. With fewer cars on the road, there will be less congestion and travel times will decrease. Air quality will improve. And the people who walk and ride bikes more often will be healthier.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimateaction.org.



Biking has long been a priority of Mayor Daley, and the City has taken major steps to encourage use of bicycles. Millennium Park offers bike parking, lockers and showers

to riders; the Bicycle Ambassadors Program gets new riders up and riding and promotes safety for all road users. The recommendations in Chicago's Bike 2015 Plan include a

500-mile Bikeway Network; more bicycle-friendly streets; a total of 5,000 new bike racks; and campaigns to promote the safety and health benefits of bike travel.



In 2005, Boeing, headquartered in Chicago, was selected by the U.S. Environmental Protection Agency as one of the "Best Workplaces for Commuters." Boeing offers employees many commuting alternatives, including a telecommuting/virtual office program; a

financial incentive program for using public transportation; and a car- and vanpool program called "Commuter Connection," which allows employees to input information into a participant database to search for a car- or vanpool match. Boeing also offers car- and vanpool

employees prime parking spaces and has an emergency ride program if a participant is unable to get a ride home. Approximately 33 percent of Boeing employees across the United States participate in one or more of these programs.

STRATEGY 3.
IMPROVED
TRANSPORTATION OPTIONS



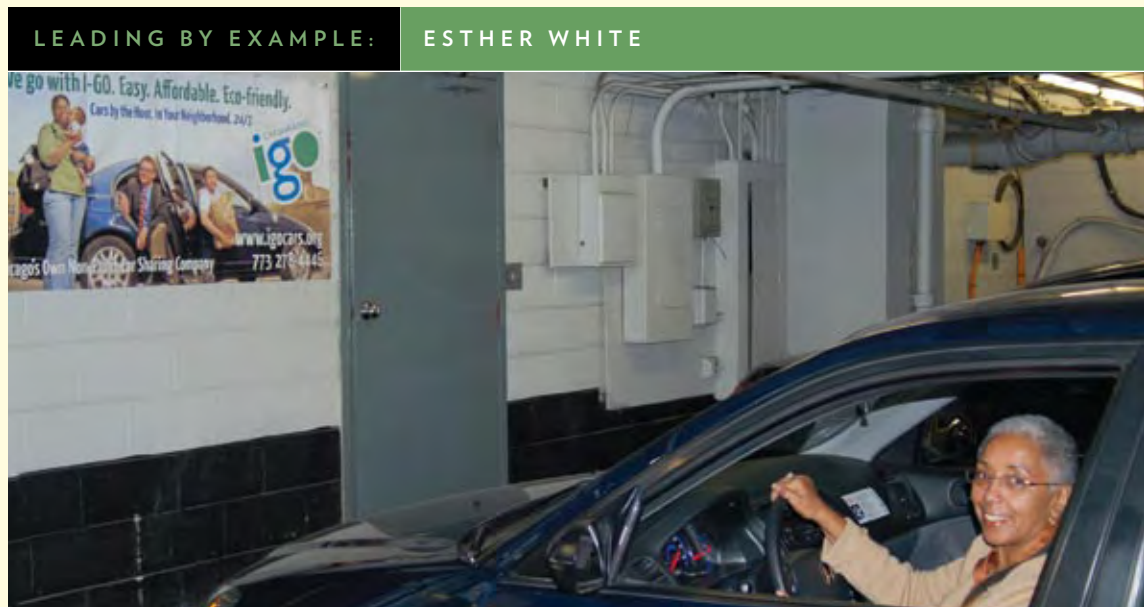
LEADING BY EXAMPLE:

CAMIROS, LTD.

A Chicago-based, 32-year-old urban planning firm, Camiros signed up for the RTA's transit benefit program as soon as it was available. This program allows commuters to use pretax dollars to pay fares on CTA,

Metra, Pace, vanpools and a few specialty services. Camiros staff tell job applicants about the transit benefit during the interview stage because they believe the accessibility of their office in downtown Chicago

is an asset. The firm has made transportation such an easy issue that all 12 employees participate in the transit benefit program, and at least two employees have chosen not to own cars.



LEADING BY EXAMPLE:

ESTHER WHITE

A Hyde Park resident, the 60-year-old White walks or takes the train or bus to her job downtown. For other trips—church on Sundays and neighborhood jaunts with her grandsons—she drives. But she

doesn't own a car. Instead she uses I-Go car sharing, reserving online and paying by the hour for a Honda Civic. Her driving costs total \$80 per month. "There's one car less that's emitting pollution," says White

proudly. "I'm becoming more and more environmentally conscious." For car-share information, visit igocars.org or zipcar.com.

STRATEGY 4.


REDUCED WASTE & INDUSTRIAL POLLUTION

GOAL:

PREVENT, REDUCE, REUSE AND RECYCLE

CO-BENEFITS:  reduced energy costs

 jobs

 improved air quality and health

 water quality



Recycling diverts waste from landfills while providing a supply of materials to local businesses.

STRATEGY 4. REDUCED WASTE & INDUSTRIAL POLLUTION



While we reduce emissions, we must prepare for the changes already happening.

Actions

1. Reduce, reuse and recycle
2. Shift to alternative refrigerants
3. Capture stormwater on-site

For more information, see Chicago 2020 Mitigation and Adaptation Strategies chart on page 50.

Few Chicagoans ever see where the city's waste goes, yet an estimated 3.4 million tons of it (62 percent of the total) winds up in landfills every year. We must reduce the amount of waste sent to landfills. A "Three R" initiative—reduce, reuse and recycle—is one way to achieve this goal. It is essential that both individuals and businesses join in the effort, and there are many opportunities to do so. Companies can reuse their industrial byproducts and can research methods to responsibly dispose of food and landscape waste. Consumers can recycle packaging materials and learn about home composting from programs already in place at the Shedd Aquarium and Garfield Conservatory. The payoff will be significant: a 90 percent reduction in waste trucked to landfills by the year 2020 could net about a .84 MMTCO₂e drop in emissions.

To help individuals recycle, the City will continue to educate residents about recycling and roll out its Blue Cart program across Chicago. Rapid Blue Cart expansion will help reduce the amount of waste produced, while allowing the waste that is produced to be safely returned to nature. Major steps to educate the public about this and other aspects of Chicago's waste reduction initiative are being planned.

The waste reduction strategy also requires that Chicago restructure its methods of garbage pickup and transport. Hauling and disposing of waste releases significant amounts of CO₂, mostly generated by trucks that service residential and

commercial buildings. Currently, building owners in the same area contract with many different private haulers. New approaches are being explored to reduce the emissions from heavy-duty trucks that haul waste.

HFCs: Recovering a potent greenhouse gas

Hydrofluorocarbons (HFCs) are potent greenhouse gases used primarily in air conditioners, refrigerators and freezers. One ton of HFC-134a has the same global warming impact over 100 years as 1,300 tons of CO₂. HFCs produce greenhouse gases when they leak out of refrigerators or air conditioners. The City is developing partnerships to recycle this highly potent gas from discarded appliances. The City will also explore a range of options to entirely phase out the use of HFCs by 2020, netting a drop in greenhouse gas emissions of 1.16 MMTCO₂e. A national or international ban on HFCs would assist in meeting this goal.

Using green infrastructure

By capturing raindrops where they fall, stormwater can be managed using rain gardens, swales, permeable pavement and other low-impact approaches. This practice, called green infrastructure, reduces the amount of storm and waste water that must be treated, and accounts for a .10 MMTCO₂e reduction. In 2007, the City passed a stormwater ordinance that requires large developments to capture the first half-inch of rainfall on-site.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimataction.org.

KEY FACTS:
REDUCING WASTE
REDUCES COSTS
TO BUSINESSES AND
CONSUMERS.

Reduce

$$\begin{aligned} &\text{Amount of waste} \\ &\text{reduced} \\ &\times \\ &\text{Waste} \\ &\text{removal cost} \\ &= \\ &\text{Avoided} \\ &\text{removal costs} \end{aligned}$$

Reuse

$$\begin{aligned} &\text{Amount of supplies} \\ &\text{not purchased} \\ &\times \\ &\text{Unit price} \\ &= \\ &\text{Total avoided} \\ &\text{purchase cost} \end{aligned}$$

Recycle

$$\begin{aligned} &\text{Amount recycled} \\ &\times \\ &\text{Unit price} \\ &= \\ &\text{Annual revenue} \end{aligned}$$



In 2007, the City of Chicago worked with the Chicago Manufacturing Center to launch a Waste to Profit Network, which has diverted 14,000 tons of solid waste from landfills and resulted in new innovative products, such as recycled glass countertops. Through the Network,

which will expand to 100 companies in 2008, unrecyclable plastics from Baxter Healthcare and Sherwin Williams are being reused. Network member Curb Appeals Materials developed a technology to recycle mixed and contaminated plastics into an extrudable building material.

The result? Curb stops made and used by the City and Cook Composites and Polymers in their respective facilities. In addition, a sound wall was made for Sherwin Williams to contain equipment noise from the factory floor.



Vermicomposting—the practice of using worms to turn organic food waste into fertilizer—is a great way to compost in an urban setting. The worm bins can be kept inside and will not smell or attract flies if prepared correctly. Food scraps make up 12 percent of the waste that Americans generate every day. Vermicomposting diverts waste from landfills and creates a rich soil, which can then be used in home gardens.

STRATEGY 4.
REDUCED WASTE &
INDUSTRIAL POLLUTION

LEADING BY EXAMPLE:

TREATING WASTEWATER / MWRD



Wastewater treatment plants operated by the Metropolitan Water Reclamation District (MWRD) in Chicago and nearby in Cook County utilize digester gas to supply one-third of their total energy

utilization, 920 million kilowatt hours in 2006. Digester gas is produced by the fermentation of sewage sludge, a process that turns a waste product into power. MWRD will undertake projects to increase

its utilization of digester gas, 81 percent in 2006, to more than 95 percent, and will begin to utilize solar power in the coming years to offset the purchase of electricity and natural gas.

LEADING BY EXAMPLE:

KATHY REGALDO



As youth program director at Faith in Place, an organization in Chicago's East Garfield Park neighborhood that partners with all religious faiths to promote clean



energy, Kathy Regaldo takes kids on field trips to learn about composting, recycling and sustainable farming. "The children begin to see how our actions leave

a footprint," she says. "We explore our attitudes about how much we consume and the need to recycle garbage. We all need to be more mindful of energy efficiency."



STRATEGY 5.
ADAPTATION

GOAL:
MINIMIZE AND PREPARE FOR THE IMPACT
OF CLIMATE CHANGE

- CO-BENEFITS:**
-  reduced energy costs
 -  jobs
 -  improved air quality and health
 -  water quality
 -  quality of life



The new Spertus Museum on Michigan Avenue features an advanced glass façade that helps control heat and a 6,700 square foot green roof.

STRATEGY 5. ADAPTATION

The benefits of early action will improve quality of life and position Chicago for continued prosperity.

Actions

1. Manage heat
2. Pursue innovative cooling
3. Protect air quality
4. Manage stormwater
5. Implement Green Urban Design
6. Preserve our plants and trees
7. Engage the public
8. Engage businesses
9. Plan for the future

For more information, see Chicago 2020 Mitigation and Adaptation Strategies chart on page 50.

Chicagoans have long prized the city's spacious green parks and tree-shaded streets. In warmer months, when cooling breezes blow off the lake, people flock to the city's ball fields, summer festivals and open-air concerts.

Even the bracing change of seasons is a source of civic pride. Yet as many who have already dedicated themselves to climate issues know, our familiar cycle of weather may soon become a dim memory. The Earth responds slowly to changes in atmospheric gases. For that reason, over the next few decades, we will continue to face the consequences of our heat-trapping gas emissions from decades past.

Impacts: The changes ahead

The most obvious change to come could be hotter summers and more frequent and intense heat waves. Hot days could feel even hotter because of higher humidity. More heat waves will mean more heat-related illness and deterioration in the quality of air we breathe. Higher temperatures will also boost demand for electricity and put stress on power plants. It will cost more to maintain roads and buildings because of increased wear and tear. Landscaping costs will rise, too, as a result of heat stress and a longer blooming season. Costs of both police and fire services could be higher—police receive more calls during heat waves, and hot days could result in more fires and power outages.

Heavy rains and snows could become more frequent in winter and spring. Increased intensity of downpours

will make travel more dangerous, flood basements, pollute bodies of water, damage crops, stress the city's infrastructure and disrupt transportation. During summer, rains may fall more heavily but less frequently, translating to more dry spells as well.

Chicago's native ecosystems could change, too. Chicago's plant hardiness zone has already shifted to that of central Illinois in 1990. If left unchecked, climate changes would make our plant hardiness zone equivalent to that of northern Alabama by the end of the century. Even if greenhouse gas emissions are dramatically reduced, our plant hardiness zone could resemble that of southern Missouri. Tree species like maples and white oak will diminish. Aspens and paper birch trees will become rare or disappear. We may see more southern red oak and sweet gum trees. Native birds and animals will have trouble adapting to our new climate; some will perish, many will migrate to more hospitable climates, if pathways allow them to do so. New plant and insect pests are likely to take hold, some of which will contribute to allergies and disease.

It's important to note, however, that projected impacts to Chicago are much less than other cities, especially those on the coasts. Chicago's geography will protect it from some of the most severe impacts.

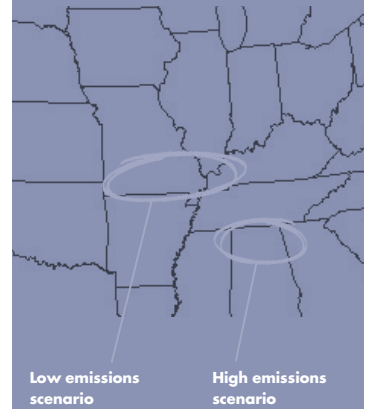
Actions: Our imperatives, now and tomorrow

Aggressive action will reduce greenhouse gas emissions in the future. We must also take action by adapting to changes that are already happening and preparing for changes ahead. The previous sections have outlined mitigation strategies—key elements of the plan to reduce the likelihood of adverse conditions. Adaptation, the courses of action detailed here, will help reduce the impact of the changes that can be expected even if we greatly reduce emissions.

To prepare for the likelihood of more frequent and intense heat waves, the City, hospitals and community organizations will work together to update Chicago's emergency response plan, identifying key populations that are most at risk. Further research into "urban heat islands" may identify additional steps to eliminate these hot spots. A program to attract innovative new ideas for cooling the city will be launched.

KEY FACTS: THE PLANT HARDINESS ZONE IS CHANGING

Chicago's native ecosystems will be affected by shifting climate. Chicago's plant hardiness zone already resembles that of central Illinois just 20 years ago. If left unchecked, climate changes could make our plant hardiness zone feel like that of northern Alabama by the end of the century. Even if greenhouse gas emissions are dramatically reduced, our plant hardiness zone could be that of southern Missouri by the end of the century.



KEY FACTS: SMART IDEAS THAT ARE BEING IMPLEMENTED NOW.

Chicago is already preparing for the changes ahead by:



- > Installing permeable pavements through "green alleys."
- > Planting foliage and trees that can thrive in warmer conditions.
- > Installing residential and commercial rooftop gardens to reduce runoff.
- > Increasing the size of the urban forest canopy providing cooling shade.
- > Reducing flooding through rain barrels and rain gardens.
- > Installing reflective roofs that cool homes and the city.



Photographer: Robert R. Gigliotti, Happrints.net

The principals of Christy Webber Landscapes formed Chicago GreenWorks to construct Rancho Verde, a 12-acre eco-industrial park, on the West Side of Chicago. The entire Rancho Verde site was designed to have an innovative, comprehensive stormwater

management system. A green roof and two cisterns divert stormwater that falls on rooftops. Rainwater that falls on streets is filtered through pervious pavers into the gravel base below. Most of the non-vegetated portions of the site are paved with gravel, which

allows for greater infiltration than concrete. Water that cannot be absorbed by the pervious pavement or raised gravel pads is routed into bioswales and a central rain garden.



Arranging for a mortgage for her new house in Chicago's Irving Park neighborhood, Thu Vo refused to sign the papers unless her husband agreed not to chop down a crab

apple tree. "He's probably not really forgiven me," she says, laughing. "But when I think about my future children, I worry about global warming." Thu recycles her

glass, plastic bottles and bags; she uses public transport whenever she can. If she has to drive she prefers her Triumph motorcycle: "It does less damage to the environment."

STRATEGY 5. ADAPTATION

LEADING BY EXAMPLE:

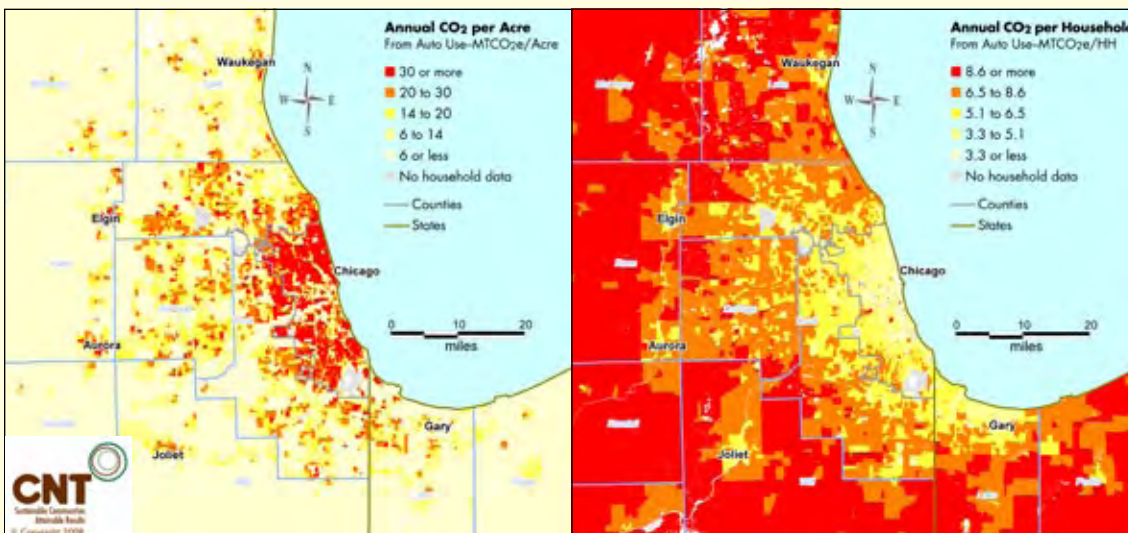
THE CITY OF CHICAGO
URBAN HEAT ISLAND POLICIES



Using advanced satellite images, the City of Chicago created a map that identifies hot spots in the city where urban heat island reduction strategies will have the greatest impact. The tear-shaped red field in this image falls over U.S. Cellular Field on Chicago's South Side. Over the last 15 years, Chicago has

planted more than 500,000 trees. The enforcement of the 1991 Chicago Landscape Ordinance has brought the city 110,000 new trees, including more than 46,000 new street trees—which represent over 8 percent of Chicago's estimated street tree population. In addition, new private buildings are required

to meet reflective roof standards since the adoption of the 2001 Chicago Energy Conservation Code. All of these policies reduce the impact of new development on the urban heat island and prepare the City to respond to areas already experiencing elevated heat.



Traditional View:
City dwellers produce large amounts of GHGs.

Emerging View:
City dwellers produce fewer GHGs per household.

These maps, generated by the Center for Neighborhood Technology, show that people who live in cities produce fewer greenhouse gas emissions from their household transportation demand. Total CO₂ emissions levels from transportation are higher in the city center than the surrounding suburbs and rural areas because there are more people per square mile in urban areas than in rural areas. However, in the city center, the *per household* emissions are lower than in the surrounding areas because city households are closer to stores, parks and schools, reducing the need for extended trips.



Over the past 15 years, more than 500,000 trees have been planted through public-private partnerships. The Plan calls for the planting of more than a million new trees in parks, parkways and private yards by 2020.

is to support our aging water infrastructure with many on-site mechanisms that will help prevent flooding. Individual households also will be encouraged to take their own steps to reduce flooding, such as installing rain barrels and back-up power for sump pumps.

To prepare for changes in Chicago's growing zone, the City, nurseries, developers and other stakeholders will work together to amend the landscape ordinance to accommodate plants that can tolerate the altered climate. The City will work with these partners to publish a new plant-growing list, focusing on plants that can thrive in warmer conditions.

Many of these actions to adapt to climate change serve a dual purpose: They also reduce greenhouse gas emissions. Green roofs, for instance, cool the city as temperatures rise and retain water during storms (adaptation), while they also help increase the energy efficiency of buildings (mitigation). Increasing the size of the Chicago urban forest canopy can provide shade to mitigate the urban heat island effect (adaptation) and reduce energy demand to cool buildings (mitigation). Rain gardens and permeable pavement capture stormwater on-site (adaptation), reducing the amount of stormwater that must be pumped and the energy required to pump it (mitigation).

Planning ahead

The City formed a Green Steering Committee of commissioners to plan for the possibility of extreme heat and precipitation, as well as threats to the city's buildings, infrastructure and ecosystems. The City also plans to work with businesses to analyze their vulnerability to climate change and to help them plan for the future. Partnering with civic and community leaders, the City will ensure that the public has substantive information about the impact of climate change on individual lives and how to respond to these problems.

Even as Chicagoans take these steps to adapt and prepare for changes in weather, it is essential that everyone—individuals, business, faith-based groups and government—also works to reduce greenhouse gas emissions if we hope to preserve the unique quality of life in Chicago.

Hot days also exacerbate smog, which can trigger asthma and other respiratory illnesses. To offset the impact of hotter weather, the City will have to intensify efforts to reduce air pollution emissions from power plants and vehicle emissions, which react with sun to make smog. The climate strategies that target power plants and transportation will help.


Flooding and heavy rains can create havoc with traffic and damage infrastructure. In collaboration with the Metropolitan Water Reclamation District (MWRD), the City will prepare a watershed plan that factors in projected climate changes, the first time these changes will be included in a Chicago regional infrastructure plan. The City will also collaborate with MWRD and other municipal agencies to find ways to use available space—from vacant land to parking lots—to manage stormwater.

Green technologies have great potential to enhance the capacity of our City's water infrastructure to manage flooding. The Green Urban Design (GUD) plan is the result of an 18-month collaboration among City departments, sister agencies, nonprofits and private businesses to use new technologies and design to help manage both flooding and heat. In 2008, the City plans to begin to implement the highest priority steps in the GUD plan. GUD actions include capturing as much rain as possible where it falls using permeable pavement, rooftop gardens and green alleys. Building on a pilot effort, where over 200 alleys were installed with open bottom catch basins, the City's Green Alley Program has installed more than 30 alleys featuring additional elements such as permeable pavement and high albedo concrete; another 30 are planned for 2008. The idea

For more information on Chicago's Climate Action Plan, visit www.chicagoclimateaction.org.

An aerial satellite-style map of the Southeastern United States, showing the Florida peninsula, Georgia, and parts of Alabama and South Carolina. The map is overlaid with a large, dark green leaf graphic that has a central stem and several pairs of rounded leaflets. The text 'REGIONAL, STATE AND NATIONAL SO' is printed in white, bold, sans-serif font across the middle of the image, with 'SO' being significantly larger than the other words.

REGIONAL, STATE AND NATIONAL SO



Success of some of the proposed actions—in particular, transit-oriented development, regional movement of freight, regional mass transit and passenger rail—depends in large part on regional action.

SOLUTIONS

Mayor Daley has long recognized the need for a spirit of cooperation among the Chicago area's municipalities. His vision to unite mayors of the six-county region (Cook, Will, DuPage, Kane, McHenry and Lake counties) ultimately resulted in the Metropolitan Mayors Caucus, which now includes more than 275 mayors. With leadership from Mayor Daley, the Metropolitan Mayors Caucus created the Greenest Region Compact of Metropolitan Chicago, which commits the mayors to work to preserve the region's resources, climate and economic vitality for future generations.

Understanding this shared sense of purpose, the Chicago Climate Task Force commissioned a greenhouse gas emissions inventory for the entire metropolitan area. For each action, the research team computed emissions reductions for the six-county region. Chicago will actively communicate its findings through relationships with the Chicago Metropolitan Agency for Planning, the Metropolitan Mayors Caucus, the Metropolitan Planning Council and Chicago Metropolitan 2020. Chicago will join with leaders of cities throughout the region to achieve its goals.

The City of Chicago will support the development of a well-designed cap and trade policy that cushions the impact on vulnerable households. Chicago was a founding member of, and the first city to join, the Chicago Climate Exchange (CCX), the world's first and North America's only legally binding greenhouse gas emissions allowance trading system. Chicago has met its legally binding commitment to CCX every year that it has been a member. The City will encourage other cities in the region to make this commitment.

Climate planning requires smart decisions and an investment in action from all levels of government. The City of Chicago and many other actors are pursuing climate-friendly federal policies, which are needed to support green jobs, clean transportation fuels, energy efficient power plants, renewable power, freight efficiency and local energy efficiency programs. The City and others also are working with the State on their climate action plan and are ensuring we pursue common policy objectives.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimateaction.org.

Chicago resident George Davie



Chicago workers John McKenna, Ray M. Breault and Chuck Holly



Chicago residents Dr. Stephen Daniels and Helen Cho



Chicago resident Will Erickson



Chicago resident Jessica Brannon



Chicago resident Lorem Deloras



MOVING

Chicago residents David Stribling, Jedavon Justus Dayon Balase Stribling, Christian Justus Dayon Balase Stribling and Rachel Justus Dayon Balase Stribling



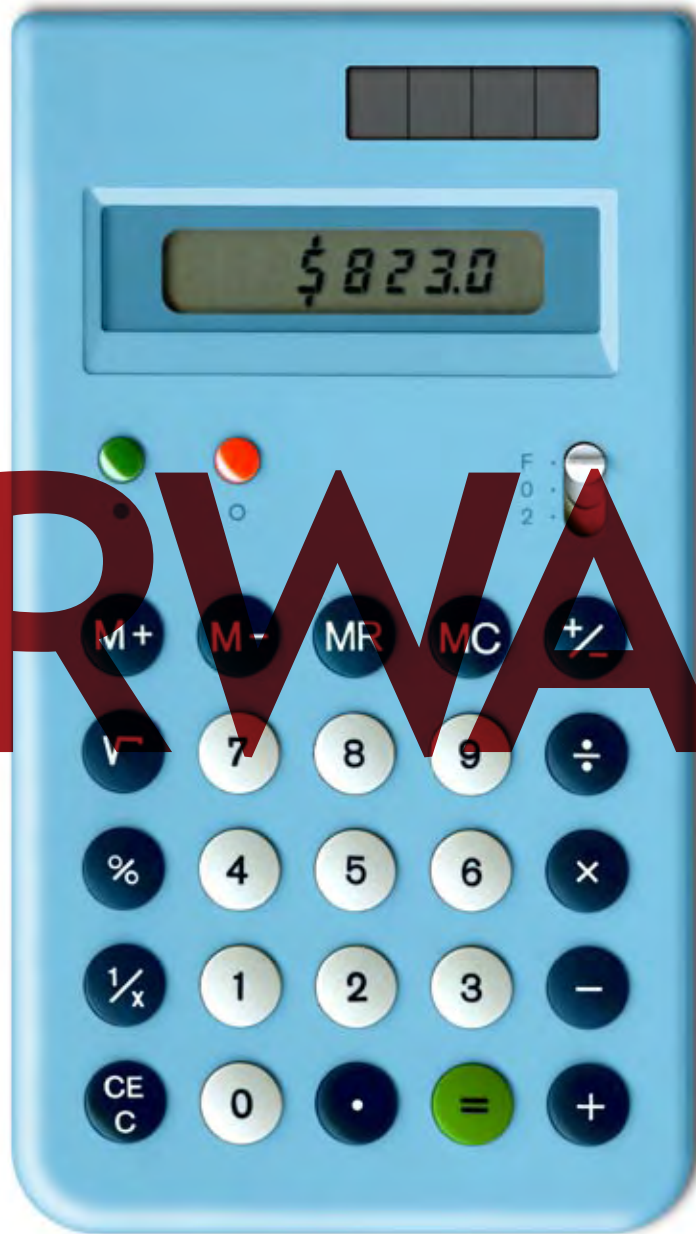
Chicago residents Mr. David and Mrs. Bertha Hawkins



Chicago residents Martha Becerra, Efrain Becerra and Luis Ocampo



Working together in small and large ways, we can benefit Chicago—and inspire cities around the world.



FORWARD

recommended in the Plan, working with businesses and chambers of commerce, engaging community and environmental organizations and providing support and encouragement for partners. Through initiatives such as the Chicago Conservation Corps (Chicago Public School children and individuals), Green Campus Challenge (universities), Green Museum Challenge (cultural institutions), Green Hotel Challenge, Green Office Challenge and Clinton Foundation Programs (business owners) and the streamlined access to retrofits (residential and commercial building owners), the City can focus the myriad energies and talents of those who live and work here to make a better future for all.

But every resident can and must get involved. You are part of the solution if you buy energy-efficient appliances, replace incandescent bulbs with CFLs, keep your HVAC system in top condition, air-dry dishes and use the cold cycle when you do your laundry, take shorter showers and turn off the lights in unoccupied rooms, replace outdoor lights with solar lights, adjust your thermostat to a more moderate temperature and walk or ride your bike more frequently as an alternative to driving. And when you encourage your friends and neighbors to do the same, your contribution is multiplied.

Chicago's history proves that we're unstoppable when we unite and put our minds, hearts and muscles to accomplishing the task at hand. The world needs our solutions. The world needs our leadership. Working together in multiple ways, we can benefit Chicago—and inspire cities around the world.

For more information on Chicago's Climate Action Plan, visit www.chicagoclimateaction.org.

Along with the more extensive information available at www.chicagoclimateaction.org, the Chicago Climate Action Plan identifies a coordinated set of actions that everyone who lives in, works in or visits Chicago can adopt to make a difference in our city and our world. It is a call to action for each of us to be thoughtful, persistent and committed.

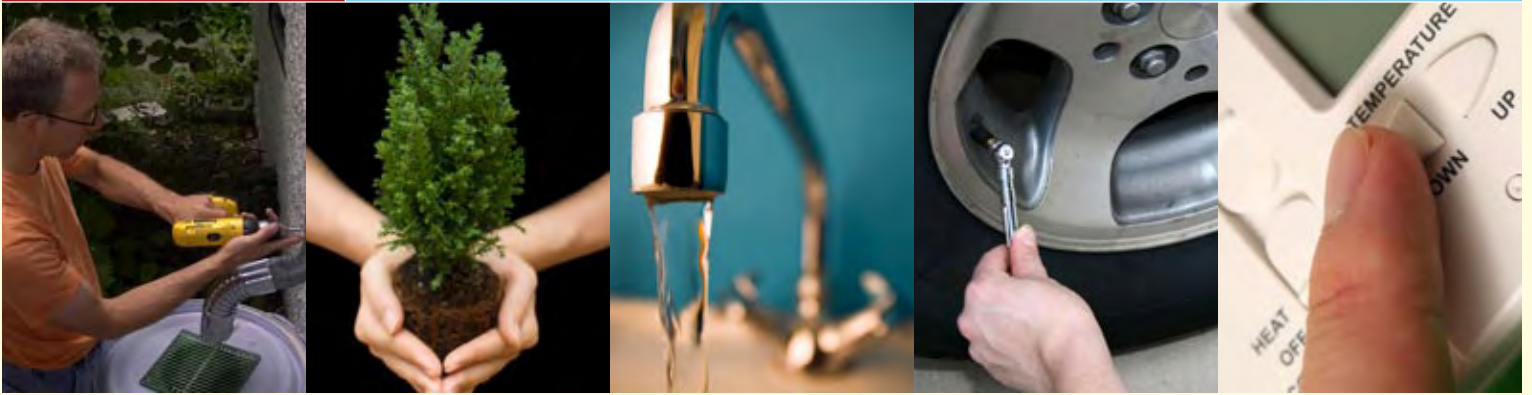
Our analysis shows that most actions in the Plan are cost-effective and will provide net benefits for Chicago. While we recognize that these are aggressive goals, they can be achieved by working together, spending money wisely, accomplishing multiple objectives with existing programs and harnessing new funds from federal, state and local government, along with utilities, foundations and corporations.

As we move forward, each strategy must be continuously assessed and monitored. To help with that process, a Green Ribbon Committee—composed of business and community leaders—has been formed to review performance against our goals and to recommend revisions, adjustments and improvements. On an annual basis, the Committee will release a report and convene a summit to showcase progress to date, identify new technologies and markets, and energize the community.

The City of Chicago is committed to the role it must play—fostering partnerships to carry out each action



In the summer of 2007, the City of Chicago hosted “CoolGlobes: Hot Ideas for a Cooler Planet,” an innovative project that uses the medium of public art to inspire individuals and organizations to take action against global warming. This is just one of many examples of opportunities for every individual to get involved and make a difference in helping to combat climate change.



The success of the Plan also depends on individuals—3 million of them. Each person can make a difference. The following chart describes small steps that, together, can reduce emissions, save money and have a transformative impact in Chicago.

Measure	Cost	CO ₂ e Impact/ Participant (metric tons)	Annual Savings/ Participant or Household
ENERGY EFFICIENT BUILDINGS			
<input type="checkbox"/> Reduce heating temperature by three degrees.*	None	0.522	\$129
<input type="checkbox"/> Increase cooling temperature by three degrees.*	None	0.075	\$13
<input type="checkbox"/> Turn off three 60-watt bulbs for two hours per day.	None	0.080	\$14
<input type="checkbox"/> Save four gallons of water a day, by turning off the water while brushing teeth or reducing shower time by one minute.	None	0.003	\$5
<input type="checkbox"/> Replace nine incandescent bulbs with CFLs.	Low	0.602	\$108
<input type="checkbox"/> Replace home air conditioner filter.	Low	0.083	\$15
<input type="checkbox"/> Plug all appliances that use standby settings (like TV and stereo) into power strips and turn off the power strips when not in use.		0.128	\$23
<input type="checkbox"/> Plant one tree.	Low	0.021	—
CLEAN & RENEWABLE ENERGY SOURCES			
<input type="checkbox"/> Replace outdoor lighting with solar lights.†	Low	0.268	\$48
IMPROVED TRANSPORTATION OPTIONS			
<input type="checkbox"/> Eliminate 10 miles of driving per week.**	None	0.223	\$99
<input type="checkbox"/> Keep car tuned up and tires properly inflated.***	Low	0.799	\$360
REDUCED WASTE & INDUSTRIAL POLLUTION			
<input type="checkbox"/> Add a rain barrel.	Low	0.018	\$8
<input type="checkbox"/> Recycle every Sunday newspaper instead of throwing it in the trash.	Low or None	0.012	—
TOTAL		2.82	\$823

* Based on overall area average heating and air conditioning use. Individual results will vary.

** Based on gas prices as of May 2008.

*** Assumes vehicle driven 12,500 miles annually.

† Assumes replacing a 150-watt bulb for eight hours every night for 365 days with a solar powered light.

For more actions, go to www.chicagoclimateaction.org.

CHICAGO 2020 PROPOSED MITIGATION AND ADAPTATION STRATEGIES

Strategy

Action

Target (Government, Business, Residential)

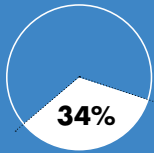
ENERGY EFFICIENT BUILDINGS



30% of Total Chicago GHG Reductions = 4.6 MMTCO₂e

1	Retrofit commercial and industrial buildings	G B R
2	Retrofit residential buildings	G R
3	Trade in appliances	G B R
4	Conserve water	G B R
5	Update City energy code	G B R
6	Establish new guidelines for renovations	G B R
7	Cool with trees and green roofs	G B R
8	Take easy steps	G B R

CLEAN & RENEWABLE ENERGY SOURCES



34% of Total Chicago GHG Reductions = 5.33 MMTCO₂e

9	Upgrade power plants	G B
10	Improve power plant efficiency	G
11	Build renewable electricity	G B R
12	Increase distributed generation	G B
13	Promote household renewable power	G B R

IMPROVED TRANSPORTATION OPTIONS

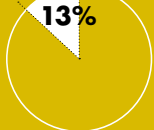


23% of Total Chicago GHG Reductions = 3.61 MMTCO₂e

0.006*

14	Invest more in transit	G B
15	Expand transit incentives	G B
16	Promote transit-oriented development	G B R
17	Make walking and biking easier	G B R
18	Car share and carpool	G B R
19	Improve fleet efficiency	G B R
20	Achieve higher fuel efficiency standards	G B R
21	Switch to cleaner fuels	G B R
22	Support intercity rail	G B
23	Improve freight movement	G B

REDUCED WASTE & INDUSTRIAL POLLUTION



13% of Total Chicago GHG Reductions = 2.03 MMTCO₂e

24	Reduce, reuse and recycle	G B R
25	Shift to alternative refrigerants	G B R
26	Capture stormwater on-site	G B R

Mitigation actions may not add up to 15.1 MMTCO₂e because some activities offset potential savings from others. The reduction number for all the strategies added together, without double-counting, is sufficient to meet a goal of 15.1 MMTCO₂e. These numbers represent the savings if each activity were implemented independently of the others.

Description	MMTCO ₂ e Reduction
Retrofit 50 percent of commercial and industrial building stock, resulting in a 30 percent energy reduction.	1.3
Improve efficiency of 50 percent of residential buildings to achieve a 30 percent reduction in energy used.	1.44
Expand appliance trade-in and lightbulb replacement programs.	0.28
Improve water use efficiency in buildings as part of retrofits.	0.04
Align Chicago's Energy Conservation Code with latest international standards.	1.13
Require all building renovations to meet green standards.	0.31
Increase rooftop gardens to total of 6,000 buildings citywide and plant an estimated 1 million trees.	0.17
Encourage all Chicagoans to take easy steps to reduce their emissions by one metric ton of CO ₂ e per person.	0.8
Upgrade or repower 21 Illinois power plants.	2.5
Raise efficiency standards for new and existing power generators.	1.04
Procure enough renewable energy generation for Chicagoans to reduce electricity emissions by 20 percent	3.0
Increase efficient power generated on-site using distributed generation and combined heat and power.	1.12
Double current household-scale renewable electricity generation.	0.28
Invest in transit improvements and boost Chicago transit system ridership by 30 percent.	0.83
Provide incentives for transit use, such as pre-tax transit passes.	0.03
Encourage development focused on public transit, walking and bicycle use.	0.63
Increase the number of walking and bicycle trips to one million a year.	0.01
Boost car sharing, carpooling and vanpooling.	0.5
Improve the energy efficiency of fleets in Chicago, including buses, taxis and delivery vehicles.	0.21
Advocate for implementation of higher federal fuel efficiency standards.	0.51
Increase the supply and use of sustainable alternative fuels for Chicago vehicles.	0.68
Support intercity high-speed passenger rail plan.	
Foster more efficient freight movement, including support for CREATE.	1.61
Reduce, reuse and recycle 90 percent of the city's waste by 2020.	0.84
Promote use of alternative refrigerants in air conditioners and appliances.	1.16
Manage stormwater with green infrastructure.	0.1

*and a much larger emissions reduction for the greater Chicago region.

ADAPTATION STRATEGIES

Strategy	Action	Description
ADAPTATION	27 Manage heat	Update the heat response plan, focusing on vulnerable populations; complete further research into urban heat island effect and pursue ways to cool hot spots.
	28 Pursue innovative cooling	Launch an effort to seek out innovative ideas for cooling the city and encourage property owners to make green landscape and energy efficiency improvements.
	29 Protect air quality	Intensify efforts to reduce ozone-precursors through mitigation programs that reduce driving and emissions from power plants.
	30 Manage stormwater	Collaborate with the Metropolitan Water Reclamation District on a Chicago watershed plan that factors in climate change and uses vacant land to manage stormwater.
	31 Implement Green Urban Design	Implement key steps in Chicago's Green Urban Design plan to manage heat and flooding. These steps will enable Chicago to capture rain where it falls and reflect away some of the intensity of the sun on hot days.
	32 Preserve our plants and trees	Publish a new plant-growing list that focuses on plants that can thrive in altered climate. Also draft a new landscape ordinance to accommodate plants that can tolerate the altered climate.
	33 Engage the public	Share climate research findings with groups most affected — social service agencies, garden clubs, etc. Help individual households to take their own steps to reduce flooding and manage heat waves, such as installing rain barrels and back-up power for sump pumps and planting shade trees.
	34 Engage businesses	Work with businesses to analyze their vulnerability to climate change and take action.
	35 Plan for the future	Use the Green Steering Committee of City Commissioners to oversee City implementation efforts and the Green Ribbon Committee of business and community leaders to assess how the Plan is being implemented, recommend revisions, report to the Mayor and all Chicagoans on our progress.



THE 2020 CHICAGO CLIMATE ACTION PLAN AT A GLANCE

ACKNOWLEDGEMENTS



The Mayor thanks the hundreds of individuals, funders, businesses and organizations that came together to create this Plan. Special thanks go to the Chicago Climate Task Force, which provided leadership and expertise, and to the following individuals:

Chicago Climate Task Force

Sadhu A. Johnston
*Chief Environmental Officer and
Deputy Chief of Staff to the Mayor
of Chicago, co-chair*

Adele Simmons
*Vice Chair, Chicago
Metropolis 2020 and President,
Global Philanthropy Partnership,
co-chair*

Ellen Alberding
The Joyce Foundation

Michael Berkshire
*Chicago Department of Planning
and Development*

Scott Bernstein
*Center for Neighborhood
Technology*

Timothy H. Brown
Delta Institute

Mary Gade
*United States Environmental
Protection Agency*

Bill Gerwing
BP America

Karen Greenbaum
Nixon Peabody, LLP

Geoffrey Hewings
*Regional Economics Applications
Laboratory, University of Illinois at
Urbana-Champaign*

Karen Hobbs
Chicago Department of Environment

Helen Howes
Exelon

Richard Lanyon
*Metropolitan Water Reclamation
District of Greater Chicago*

Mary Laraia
Aspen Institute

Jack Lavin
*Illinois Department of Commerce
and Economic Opportunity*

Howard Learner
*Environmental Law and
Policy Center*

Kevin Lynch
*International Brotherhood of
Electrical Workers, Local 134*

Suzanne Malec-McKenna
Chicago Department of Environment

Jim Mann
*Illinois Clean Energy Community
Foundation*

Ronald E. Meissen
Baxter International, Inc.

Charles L. Owen
*Institute of Design, Illinois Institute
of Technology*

Raymond T. Pierrehumbert
*Department of the Geophysical
Sciences, University of Chicago*

Patrick Sarb
*Allstate Administration and
Real Estate*

Doug Scott
*Director, Illinois Environmental
Protection Agency*

Rebecca Stanfield
*State Director,
Environment Illinois*

Donald Wuebbles
*Professor and Interim Director,
School of Earth, Society, and
Environment, University of Illinois
at Urbana-Champaign*

Research Advisory Committee

John Larsen
World Resources Institute

Nancy Cole
Union of Concerned Scientists

Russ Fostiak
Fostiak Engineering, LLC

William Moomaw
Tufts Institute of the Environment

Susanne Moser
Institute for the Study of Society and Environment, National Center for Atmospheric Research

Communications Committee

Mary Dempsey
Chicago Public Library, chair

Wendy Abrams
Cool Globes

Clare Butterfield
Faith in Place

Fred Carter
Black Oaks Sustainability Project

Donna Cicinelli
Chicago Department of Environment

Kendal Gladish
Bulletin of the Atomic Scientists

Karen Greenbaum
Nixon Peabody, LLP

Michael Howard
Eden Place

Marilyn Katz
MK Communications

Mary Krinock
Museum of Science and Industry

Peter Kuntz
Chicago Humanities Festival

Larry Merritt
Chicago Department of Environment

David Mosena
Museum of Science and Industry

Colleen Sarna
Sierra Club

Finance Committee

Diane Swonk
Mesirow Financial, chair

Ellen Alberding
The Joyce Foundation

Timothy H. Brown
Delta Institute

Jack Lavin
Illinois Department of Commerce and Economic Opportunity

Ed Miller
Legacy Fund

David Narefsky and Lorraine Tyson
Mayer Brown

Jerry Roper and Michael Mini
Chicagoland Chamber of Commerce

Paula Crown
Crown Family Funds

Richard Sandor
Chicago Climate Exchange

Paul Volpe
City of Chicago, Mayor's Office

Joel Freehling
ShoreBank

Craig Sieben
Sieben Energy Associates

Gary Wood
BOMA Foundation

Climate Impacts and Adaptation Research Team Leaders

Donald Wuebbles
University of Illinois at Urbana-Champaign

Katharine Hayhoe
Texas Tech University, ATMOS Research

Craig Faris
Oliver Wyman

Richard Lewis
MWH

Joyce Coffee
Chicago Department of Environment

Emissions Inventory, Mitigation Research and Economic Benefits Team Leaders

Peter Haas, Jennifer McGraw and Linda Young
CNT

Timothy H. Brown
Delta Institute

Geoffrey Hewings
Regional Economic Applications Laboratory at University of Illinois at Urbana-Champaign

Report Preparation

Lipman Hearne
With assistance from: Edelman and Coleman Brohan Davis

Dozens of City staff representing the following departments and sister agencies also worked to craft the final plan.

City of Chicago and Sister Agencies

Mayor's Office

Environment

Aviation

Budget

Buildings

Fire

Fleet Management

General Services

Housing

Human Services

Innovation and Technology

Law

Office of Emergency Management and Communications

Planning and Development

Police

Procurement Services

Public Building Commission

Public Health

Streets and Sanitation

Transportation

Water Management

Chicago Housing Authority

Chicago Park District

Chicago Public Schools

Chicago Transit Authority

Metropolitan Water Reclamation District of Greater Chicago

Global Philanthropy Partnership

Adele Simmons
President

Julia Parzen
Climate Project Leader

Funding Support

The Clinton Foundation

The Lloyd A. Fry Foundation

The Joyce Foundation

The Grand Victoria Foundation

The Legacy Fund

The Chicago Community Trust

The Nathan Cummings Foundation

The City of Chicago

Illinois Department of Commerce and Economic Opportunity

ACKNOWLEDGEMENTS

Climate Impacts Report

CONVENING LEAD AUTHORS

Katharine Hayhoe
Texas Tech University,
ATMOS Research

Donald Wuebbles
University of Illinois at Urbana-
Champaign

CHAPTER LEAD AUTHORS

Jessica Hellmann
University of Notre Dame (Ecosystems)

Barry Lesht
Argonne National Laboratory (Water)

Knut Nadelhoffer
University of Michigan (Ecosystems)

CONTRIBUTING AUTHORS

Max Aufhammer
University of California at Berkeley
(Energy)

Keith Cherkauer
Purdue University (Water)

Thomas Croley II
NOAA Great Lakes Research Laboratory
(Water)

Scott Greene
University of Oklahoma (Health)

Tracey Holloway
University of Wisconsin–Madison
(Air Quality)

Louis Iverson
United States Forest Service (Ecosystems)

Laurence Kalkstein
University of Miami (Health)

Jintai Lin
University of Illinois at Urbana-
Champaign (Air Quality)

Momcilo Markus
Illinois State Water Survey (Water)

Stephen Matthews
United States Forest Service (Ecosystems)

Norman Miller
Lawrence Berkeley Laboratory (Climate,
Energy)

Jonathan Patz
University of Wisconsin–Madison
(Health)

Matthew Peters
United States Forest Service (Ecosystems)

Anantha Prasad
United States Forest Service (Ecosystems)

Marilyn Ruiz
University of Illinois at Urbana-
Champaign (Health)

Nicole Schlegel
University of California at Berkeley
(Climate)

Scott Sheridan
Kent State University (Health)

Scott Spak
University of Wisconsin–Madison
(Air Quality)

Jeff Van Dorn
ATMOS Research (Climate, Water)

Steve Vavrus
University of Wisconsin–Madison
(Climate, Water)

Lew Ziska
USDA Agricultural Research Service
(Ecosystems)

Economic Impact Analysis of Climate Change for the City of Chicago

Craig Faris
Oliver Wyman Director

Viktor Cicvara
Oliver Wyman Consultant

Mark Robson
Oliver Wyman Consultant

John Rogula
Oliver Wyman Consultant

Sophia Papaefthimiou
Oliver Wyman Consultant

Matthew Taylor
Marsh

Center for Neighborhood Technology Emissions Report

Jennifer McGraw
CNT Climate Change Program Manager

Peter Haas, Ph.D
CNT Analytic Director

Anne Evens
CNT Director, CNT Energy

Linda Young
CNT Research Manager

Matthew Cunningham
CNT Analyst

RESEARCHERS

Albert Benedict

Suzanne Carlson

Harley Cooper

Cindy Copp

Amanda Escobar-Gramigna

Paul Esling

William Eyring

Ben Helphand

Marjorie Isaacson

Larry Kotewa

Emily Metz

Janice Metzger

Rachel Scheu

Anthony Star

Lindy Wordlaw

WRITERS AND EDITORS

Nicole Friedman
Editor

Scott Bernstein

Ruth Klotz-Chamberlin

Nicole Gotthelf

Tim Lang

Emily Metz

Kathrine Nichols

Jill Siegel

Annette Stahelin

Kathryn Tholin

Front cover photography

P in PLAN: Joyce Perbix
McHenry County Conservation District

A in PLAN: Jim Nachel
Conservation Research Institute

Printing

The paper used for this publication is 100 percent post-consumer recycled, rather than virgin fiber, resulting in the following savings:

55.5 trees preserved for the future
160.25 lbs. waterborne waste not created
23,574 gallons wastewater flow saved
2,608 lbs. solid waste not generated
5,136 lbs. net greenhouse gases prevented
39,310,800 BTUs energy not consumed

Savings from the use of emission-free

wind-generated electricity:
2,669 lbs. air emissions not generated

Displaces this amount of fossil fuel:
1 barrel crude oil unused

In other words, the savings from the use of wind-generated electricity are equivalent to not driving 2,891 miles or planting 180 trees.

Printedgreen™ by Consolidated Printing using sustainable practices.



This report provides an overview
of the Chicago Climate Action Plan.
For more information, please visit
www.chicagoclimateaction.org

CHICAGO CLIMATE ACTION PLAN

City of Chicago
30 N. LaSalle Street, Suite 2500
Chicago, Illinois 60602
312-744-7606
www.chicagoclimateaction.org



Richard M. Daley
Mayor

CHICAGO CLIMATE ACTION PLAN