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

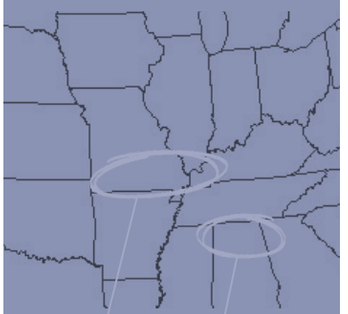
Aggressive action will reduce greenhouse gas emissions in the future. We must also take action by adapting to changes that are already happening and preparing for changes ahead. The previous sections have outlined mitigation strategies—key elements of the plan to reduce the likelihood of adverse conditions. 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.



Low emissions scenario

High emissions scenario

KEY FACTS:

SMART IDEAS THAT ARE BEING IMPLEMENTED NOW.

Chicago is already preparing for the changes ahead by :

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

LEADING BY EXAMPLE: RANCHO VERDE

Photographer: Robert R. Gigliotti, Hqprints.net

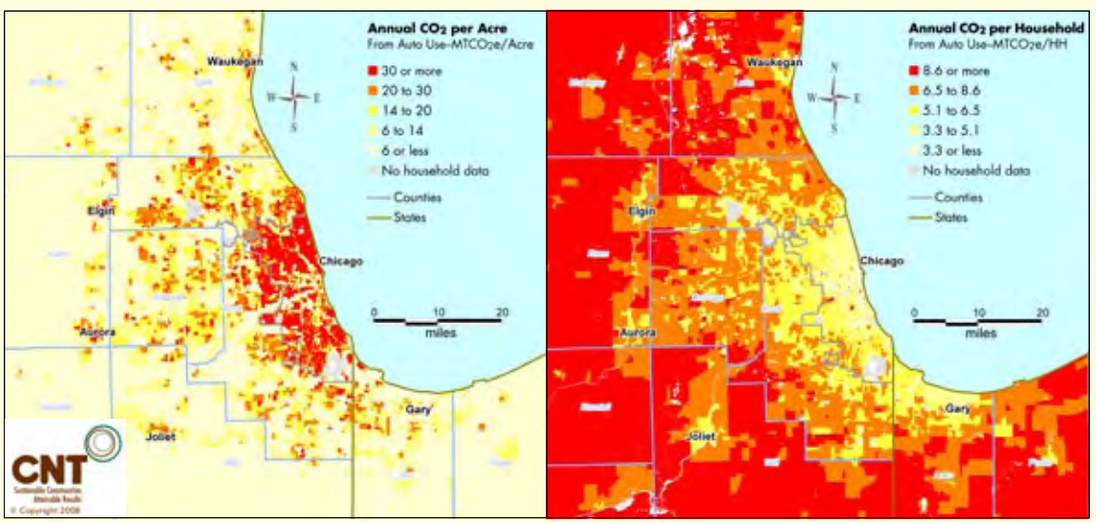
The principals of Christy Webber Landscapes formed Chicago GreenWorks to construct Rancho Verde, a 12-acre eco-industrial park, on the West Side of Chicago. The entire Rancho Verde site was designed to have an innovative, comprehensive stormwater management system. A green roof and two cisterns divert 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.

LEADING BY EXAMPLE: THU VO

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."

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 CO_2 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.

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 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.

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