



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.