

CASE STUDY: GREENHOUSE GASES AND CLIMATE CHANGE*

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Abstract

In this module, two case studies provide examples of climate action plans – one for a city (Chicago) and one for an institution (the University of Illinois at Chicago).

1 Introduction

If increased greenhouse gas emissions from human activity are causing climate change, then how do we reduce those emissions? Whether dictated by an international, national, or local regulation or a voluntary agreement, plans are needed to move to a low-carbon economy. In the absence of federal regulation, cities, states, government institutions, and colleges and universities, have all taken climate action initiatives. This case study provides two examples of climate action plans – one for a city (Chicago) and one for an institution (the University of Illinois at Chicago).

2 Chicago's Climate Action Plan

Urban areas produce a lot of waste. In fact, 75 percent of all greenhouse gas emissions are generated in urban areas. Therefore, it is important for cities to develop plans to address environmental issues. The Chicago Climate Action Plan¹ (Chicago CAP) is one such example. The mid-term goal of this plan is a 25 percent reduction in greenhouse gas emissions by 2020 and final goal is 80 percent reduction below 1990 GHG levels by the year 2050.

The Chicago CAP outlines several benefits of a climate action plan. The first would obviously be the reduction of the effects of climate change. Under a higher emissions scenario as per the Intergovernmental Panel on Climate Change² (IPCC), it is predicted that the number of 100 degree Fahrenheit days per year would increase to 31, under the lower emissions scenario it would only be eight. Established by the United Nations Environment Programme³ (UNEP), the IPCC is the leading international body that assesses climate change through the contributions of thousands of scientists.

Second, there is an economic benefit derived from increased efficiencies that reduce energy and water consumption. Third, local governments and agencies have great influence over their city's greenhouse gas emissions and can enhance energy efficiency of buildings through codes and ordinances so they play a key role in climate action at all governmental levels. Finally, reducing our dependence on fossil fuels helps the United States achieve energy independence.

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¹<http://www.chicagoclimateaction.org/>

²<http://www.ipcc.ch/>

³<http://www.unep.org/>

3 Designing a Climate Action Plan

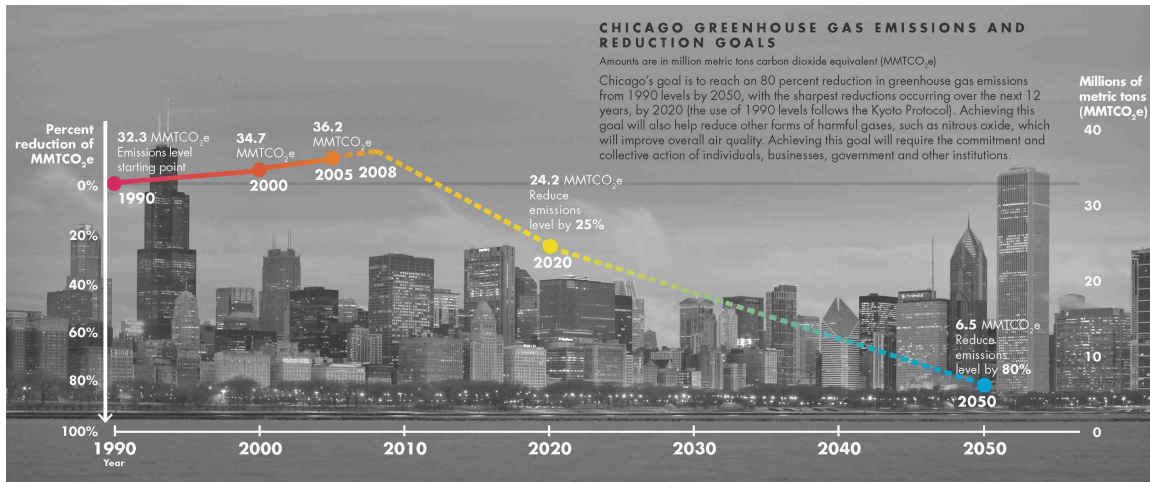


Figure 1: Chicago Greenhouse Gas Emissions and Reduction Goals Figure illustrates the emissions calculated for Chicago through 2005. *Source: City of Chicago, Chicago Climate Action Plan*⁴

A good climate action plan includes reporting of greenhouse gas emissions, as far back as there is data, preferably to 1990. Figure **Chicago Greenhouse Gas Emissions and Reduction Goals** (Figure 1) depicts the emissions calculated for Chicago through 2005. From that point there is an estimate (the dotted line) of a further increase before the reductions become evident and the goals portrayed can be obtained. The plan was released in September 2008 and provides a roadmap of five strategies with 35 actions to reduce greenhouse gas emissions (GHG) and adapt to climate change. The strategies are shown in Table **Alignment of the Chicago and UIC Climate Action Plans** (Table 1). Figure **Sources of the Chicago CAP Emission Reductions by Strategy** (Figure 2) identifies the proportion of emissions reductions from the various strategies.

⁴<http://www.chicagoclimateaction.org/filebin/pdf/finalreport/CCAPREPORTFINALv2.pdf>

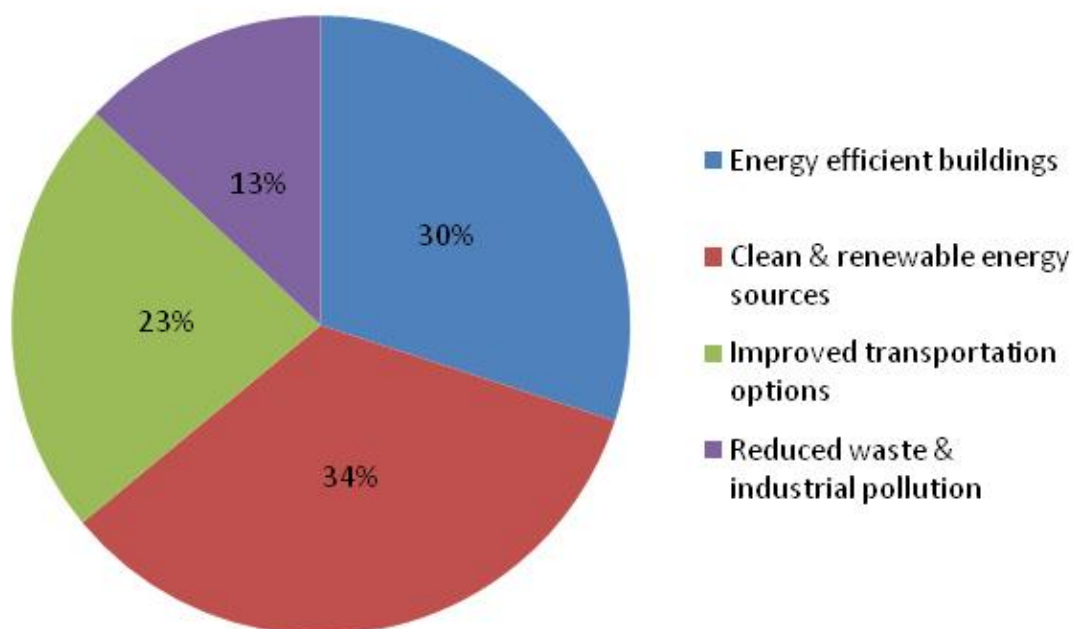


Figure 2: Graph shows the sources of the Chicago CAP emission reductions by strategy. Source: C. Klein-Banai⁵ using data from City of Chicago, *Chicago Climate Action Plan*⁶.

In 2010 CCAP put out a progress report⁷ wherein progress is measured by the many small steps that are being taken to implement the plan. It is not translated exactly to emissions reductions but reports on progress for each step such as the number of residential units that have been retrofitted for energy efficiency, the number of appliances traded in, the increase in the number of rides on public transit, and the amount of water conserved daily.

4 University Climate Action Plan

Several factors caused a major Chicago university to develop a climate action plan. As part of the American College and University Presidents' Climate Commitment⁸ (ACUPCC), nearly 670 presidents have signed a commitment to inventory their greenhouse gases, publicly report it, and to develop a climate action plan. Part of the Chicago CAP is to engage businesses and organizations within the city in climate action planning. In order to be a better steward of the environment, the University of Illinois at Chicago (UIC) developed a climate action plan⁹. The goals are similar to Chicago's: a 40 percent GHG emissions reduction by 2030 and at least 80 percent by 2050, using a 2004 baseline. The strategies align with those of the city in which the campus resides (see Table **Alignment of the Chicago and UIC Climate Action Plans** (Table 1)). UIC's greenhouse gas reports are also made publically available on the ACUPCC reporting site¹⁰. Figure

⁵http://cnx.org/member_profile/cindykb

⁶<http://www.chicagoclimatereaction.org/filebin/pdf/finalreport/CCAPREPORTFINALv2.pdf>

⁷<http://www.chicagoclimatereaction.org/filebin/pdf/CCAPProgressReportv3.pdf>

⁸<http://www.presidentsclimatecommitment.org/>

⁹<http://www.uic.edu/sustainability/climateactionplan/>

¹⁰<http://rs.acupcc.org/>

UIC’s Projected Emissions Reductions (Figure 3) displays UIC’s calculated emissions inventory (in red) and then the predicted increases for growth if activities continue in a “business as usual (BAU)” approach. The triangular wedges below represent emissions reductions through a variety of strategies, similar to those of the wedge approach¹¹ that Professors Sokolow and Pacala proposed. Those strategies are displayed in Table **Alignment of the Chicago and UIC Climate Action Plans** (Table 1), alongside Chicago’s for comparative purposes.

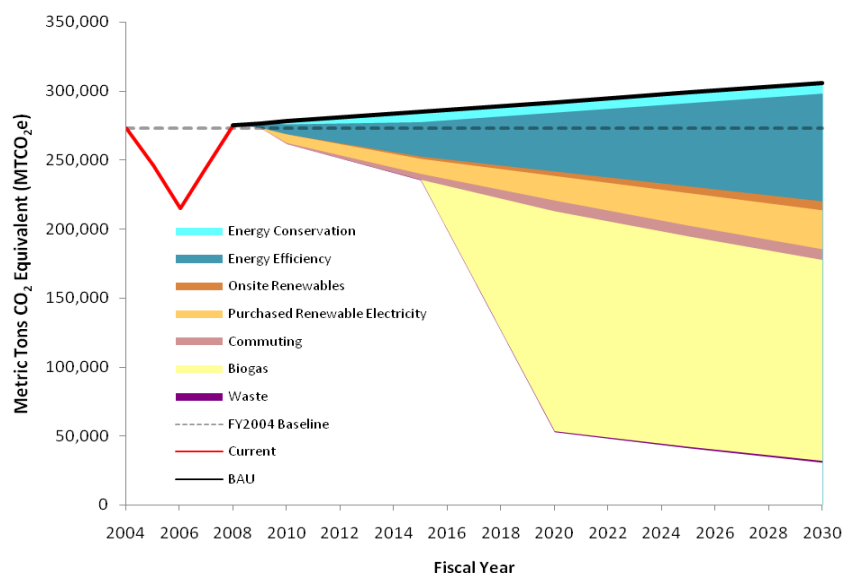


Figure 3: UIC’s Projected Emissions Reductions Projected emissions reductions from 2004 to 2030. Where BAU stands for Business as Usual, what would happen if no action were taken? *Source: UIC Climate Action Plan, figure 6¹².*

The UIC CAP also has major strategy categories that are similar to Chicago’s and within each strategy there are a number of recommended actions. Progress on this plan will be monitored both by reporting emissions at least every two years to the ACUPCC and by tracking individual actions and reporting to the campus community.

CHICAGO CAP	UIC CAP
Energy Efficient Buildings	Energy Efficiency and Conservation
Retrofit commercial and industrial buildings	Retrofit buildings
Retrofit residential buildings	Energy performance contracting
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¹¹<http://www.wri.org/stories/2006/12/wedge-approach-climate-change>

¹²<http://www.uic.edu/sustainability/climateactionplan/drafts/UIC.CAP.FINALdft.pdf>

Trade in appliances	Monitoring and maintenance
Conserve water	Water conservation
Update City energy code	Establish green building standards
Establish new guidelines for renovations	
Cool with trees and green roofs	Green roofs/reflective roofs
Take easy steps	Energy conservation by campus community
Clean & Renewable Energy Sources	Clean and Renewable Energy
Upgrade power plants	Modify power plants
Improve power plant efficiency	Purchase electricity from a renewable electricity provider
Build renewable electricity	Build renewable electricity
Increase distributed generation	
Promote household renewable power	Geothermal heating and cooling
Improved Transportation Options	Improved Transportation Options
Invest more in transit	
Expand transit incentives	Expand transit incentives
Promote transit-oriented development	
Make walking and biking easier	Make walking and biking easier
Car share and car pool	Car sharing/car pool program
Improve fleet efficiency	Continue to improve fleet efficiency
Achieve higher fuel efficiency standards	
Switch to cleaner fuels	
Support intercity rail	Reduce business travel (web conferencing)
Improve freight movement	Anti-Idling regulations/guidelines
Reduced Waste & Industrial Pollution	Recycling and Waste Management
Reduce, reuse and recycle	Establishing recycling goals
Shift to alternative refrigerants	Composting
Capture stormwater on site	Sustainable food purchases & use of biodegradable packaging
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	Collecting and converting vegetable oil
	Develop a user-friendly property management system
	Expand the waste minimization program
	Recycle construction debris
	Purchasing policies
Preparation (Adaptation)	Improved Grounds Operations
Manage heat	Capture stormwater on site
Protect air quality	Use native species
Manage stormwater	Reduce/eliminate irrigation
Implement green urban design	Integrated pest management
Preserve plants and trees	Tree care plan
Pursue innovative cooling	
Engage the public	Education, Research and Public Engagement
Engage businesses	Employment Strategies
Plan for the future	Telecommuting
	Flextime
	Childcare center
	Public Engagement

Table 1: Alignment of the Chicago and UIC Climate Action Plans *Source: C. Klein-Banai using data from Chicago Climate Action Plan and UIC Climate Action Plan*

5 Conclusion

There is no one approach that will effectively reduce greenhouse gas emissions. Climate action plans are helpful tools to represent strategies to reduce emissions. Governmental entities such as nations, states, and cities can develop plans, as can institutions and businesses. It is important that there be an alignment of plans when they intersect, such as a city and a university that resides within it.