Chicago, IL Uses Green Infrastructure to Reduce Extreme Heat

In 1995, Chicago experienced an extreme heat event that led to the deaths of several hundred people over the course of five days. Recognizing climate change will affect extreme heat events among many other weather events, Chicago decided to conduct a vulnerability assessment to better understand the threat. Chicago conducted a vulnerability assessment that projected future expected temperatures and estimated the magnitude of threat to future heat related mortality. In anticipation of these future threats, Chicago adopted a comprehensive Climate Change Action Plan. The city's first priority under the Chicago Climate Action Plan: Adaptation Strategy Report is to adapt to extreme heat events.

<https://epa.gov/sites/production/files/styles/medium/public/2016-04/green_roof.jpg>

Chicago City Hall's Green Roof.

Chicago's approach assessed vulnerability to extreme heat and promoted resiliency and adaptation actions to reduce climate risk. Specifically, Chicago is promoting resiliency through emergency response procedures, specifically including it as a specific criterion within the county's (Cook County) Hazard Mitigation Plan and identifying that its Extreme Weather Operations Plans have scalability to deal with projected changes.

In order to adapt to future extreme heat events, Chicago is identifying urban heat areas ('heat islands') of concern and then adopting heat island reduction strategies through a variety of municipal programs including: building codes and green infrastructure projects. These green infrastructure strategies provide Chicago with mutual benefits including increasing extreme heat emergency preparedness and improving stormwater management for extreme precipitation events.

- Chicago Climate Action Plan <https://www.chicago.gov/city/en/progs/env/climateaction.html>
- Hazard Mitigation Plan <https://www.cookcountyemergencymanagement.org/reducing-risk/2019-hazard-mitigation-plan-update>

How did they do it?	Applicable EPA Tools

Conducted vulnerability assessment of future risk from climate exacerbated extreme heat events • Chicago's Climate Action Plan Impacts Report projected the future climate under varying emissions scenarios to identify expected future temperatures, note this analysis projected that by 2050, Chicago could be seeing extreme heat events equivalent to the 1995 heat wave up to twice per decade.	Use CDC's Assessing Health Vulnerability to Climate Change to identify the communities most at risk and adopt ad strategies that target extreme heat vulnerabilities. Assessing Health Vulnerability to Climate Change (PDF) <https://stacks.cdc.gov/view/cdc/24906#:~:text=this%20document%20provides%20a%20suggested,factors%20(e.g.%2c%20socioeconomic%20> (24 pp, 4.3 MB) ** (This is a non-EPA resource from the Centers for Disease Control and Prevention.)*

• Chicago developed an algorithm which analyzed past and future climate changes and residents' ability to acclimate to anticipated future changes. This analysis allowed for an estimation of future risk for heat-related mortality. • Chicago simulated an extreme heat event, using data from the 2003 European heat wave, to better understand the impact on the city.	

Chicago Targeted Efforts to Reduce the Urban Heat Island • Chicago identified urban heat island "hot spots" to target with heat reduction strategies such as green infrastructure, reflective roofing, and rooftop gardens. • The city required new flat roofs meet EPA Energy Star Cool Roof Standards, supported commercial green roofs with a Tax Increment Financed Improvement Fund, and promoted reflective roofing. • The city provided incentives for the adoption of green infrastructure through an expedited "Green Permit Process" and provided grants for small projects.	EPA's Urban Heat Island Strategies and EPA Energy Star Cool Roof Standards can be targeted to reduce the urban h island and adapt to future conditions. Urban Heat Island Strategies <https://epa.gov/heatislands> EPA Energy Star Cool Roof Standards <https://epa.gov/heatislands/using-cool-roofs-reduce-heat-islands>

Promoted Adaptation Actions that Would Provide Co-Benefits • Chicago incorporated heat island reduction strategies - such as green or cool roofs, cool pavements, or increased vegetation and trees - into long-term planning efforts to help lower urban temperatures as well as provide substantive benefits for other programs, including stormwater management.	EPA's Green Infrastructure Modeling Tools <https://epa.gov/green-infrastructure/green-infrastructure-modeling-tools>

Similar Cases and More Information

To see how Chicago has modified their Heat Emergency Response Programs to reduce deaths from extreme heat events, view Chicago Heat Emergency Response. To view another region's example of extreme heat adaptation planning view Minnesota Heat Health, or the NYC Heat Plan. Chicago implemented green infrastructure projects that would provide both heat reduction and stormwater management benefits, for another example of how adaptation strategies can promote mutual benefits view Salt Lake City Air Quality.

- Chicago, IL Adapts to Improve Extreme Heat Preparedness <https://epa.gov/arc-x/chicago-il-adapts-improve-extreme-heat-preparedness>
- Minnesota Assesses Climate Risk to Public Health <https://epa.gov/arc-x/minnesota-assesses-climate-risk-public-health>
- New York City Adapts To Deal with Projected Increase of Heat Waves <https://epa.gov/arc-x/new-york-city-assesses-extreme-heat-climate-risk>
- Salt Lake City, Utah Adapts to Improve Air Quality Through Smart Growth <https://epa.gov/arc-x/salt-lake-city-utah-adapts-improve-air-quality-through-smart-growth>

References

The following links exit the site

- Chicago Climate Action Plan (PDF) <https://www.chicago.gov/content/dam/city/progs/env/ccap/ccap.pdf> (60 pp, 11 MB)
- Sustainable Chicago (PDF) <https://www.cityofchicago.org/content/dam/city/progs/env/sustainablechicago2015.pdf> (40 pp, 11 MB)
- Climate Change and Chicago: Projections and Potential Impacts - Executive Summary (PDF) <https://www.chicago.gov/content/dam/city/progs/env/ccap/chicago_climate_impacts_report_executive_summary.pdf> (22 pp, 2.5 MB)
- Climate Change and Chicago: Projections and Potential Impacts - Health (PDF) <https://www.chicago.gov/content/dam/city/progs/env/ccap/chicago_climate_impacts_report_chapter_4_health.pdf> (32 pp, 613 K)
- Overview of the Green Permit Program <https://www.chicago.gov/city/en/depts/bldgs/provdrs/permits/svcs/green-permits.html>
- Engaging Chicago's Diverse Communities in the Chicago Climate Action Plan (PDF) <https://www.fieldmuseum.org/sites/default/files/doe%20roseland%20report%20final_1.pdf> (35 pp, 14 MB)

<https://epa.gov/arc-x/forms/contact-us-about-climate-change-adaptation-resource-center>

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EPA Contacts & State Websites <https://epa.gov/arc-x/epa-regional-climate-adaptation-contacts-state-websites>

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