Climate Adaptation & Transportation: Identifying Information & Assistance Needs

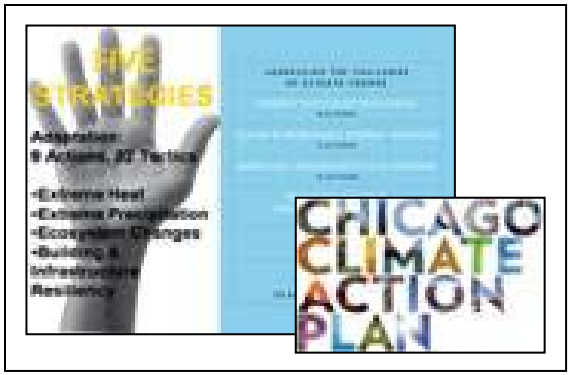
Karl Peet
Strategic Planning & Policy
Chicago Transit Authority

CHICAGO CLIMATE ACTION PLAN

cta

DRAFT

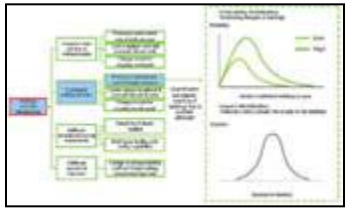
Chicago Climate Action Plan Adaptation Evolution

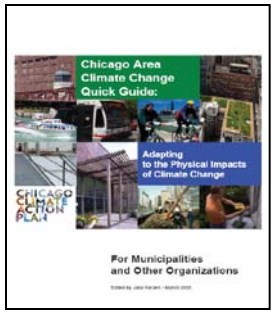


FIVE STRATEGIES:

- **Energy Efficient Buildings**
- **Renewable Energy Sources**
- **Improved Transportation Options**
- **Reduce Waste and Pollution**
- **Adaptation**

2007	2008	2009	2010	2011-
• **Assess economic risk:** Project City cost of no action at -$2.54B in high-emissions • Prioritize actions by risk & timing	• **Create 5 impacts working groups:** 21 departments & agencies create 39 "Tactics" for 5 groups	• **Create CCAP department work plans:** Departments commit to adaptation actions through work plans	• **Define adaptation targets:** Form Adaptation Advisory Group to provide guidance and oversight	• **Strategic project implementation:** Use risk indicators to target projects people, natural environment, and built environment.





CHICAGO CLIMATE ACTION PLAN

cta

DRAFT

CTA Projected and Observed Climate Impacts

- **Temperature:** The number of ***100-plus degree days*** could increase from the current two to as many as 31 days annually; increases in extreme temperature fluctuations are projected.
  - *July 2011*: Heat caused ***rail buckling*** on the CTA Red Line between Cermak-Chinatown and Sox-35th, causing trains to run single track in a designated slow zone
  - *July 2010*: Four southbound lanes of Lake Shore Drive (US Route 41) were closed for seven hours due to heat-caused ***pavement buckling***.

- **Precipitation:** Projections of ***20% more precipitation*** in the winter/spring could lead to more intense rain and snow storms and increased flooding:
  - *February 2011*: ***Heavy snowfall*** causes service suspension for the Pink and Yellow Lines due to blowing and drifting snow on tracks at grade level.
  - *September 2008*: Blue Line flooded near Des Plaines River due to ***heavy rains***; service suspended between Rosemont and O'Hare International Airport.

- **Combined Impacts:** Projected impacts with increases in both temperature and precipitation include ***greater volatility in electrical grid*** and compromised customer convenience:
  - *June 2011*: Yellow and Purple Line service suspended after storm with ***high winds*** and heavy rainfall caused power outages.
  - *Ongoing*: ***Power outages*** at rail stations affect revenue, safety, and customer communication (e.g. Bus and Train Tracker) and elevator access.

CTA Issues and Research Needs

Key Issues and Research Questions

- **Bus/Rail Right-of-Way Flooding**
  - What is the projected change in frequency/intensity of storm events in ***current*** CTA flood-vulnerable locations?
  - What transit assets and locations are ***projected*** to become more vulnerable due to future climate change impacts?

- **Rail Traction Power Reliability**
  - How will CTA's ***existing*** traction power infrastructure be affected by projected temperature/precipitation changes?
  - Will projected demand on the regional grid ***increase*** risk of disruptions/necessitate additional redundancies?

- **Customer Experience and Transit Ridership**
  - How can CTA customers be better protected at transit stations/stops under ***present*** temperature and precipitation extremes?
  - What long-term measures are needed to ***sustain*** transit ridership and enhance transit's mitigation potential?

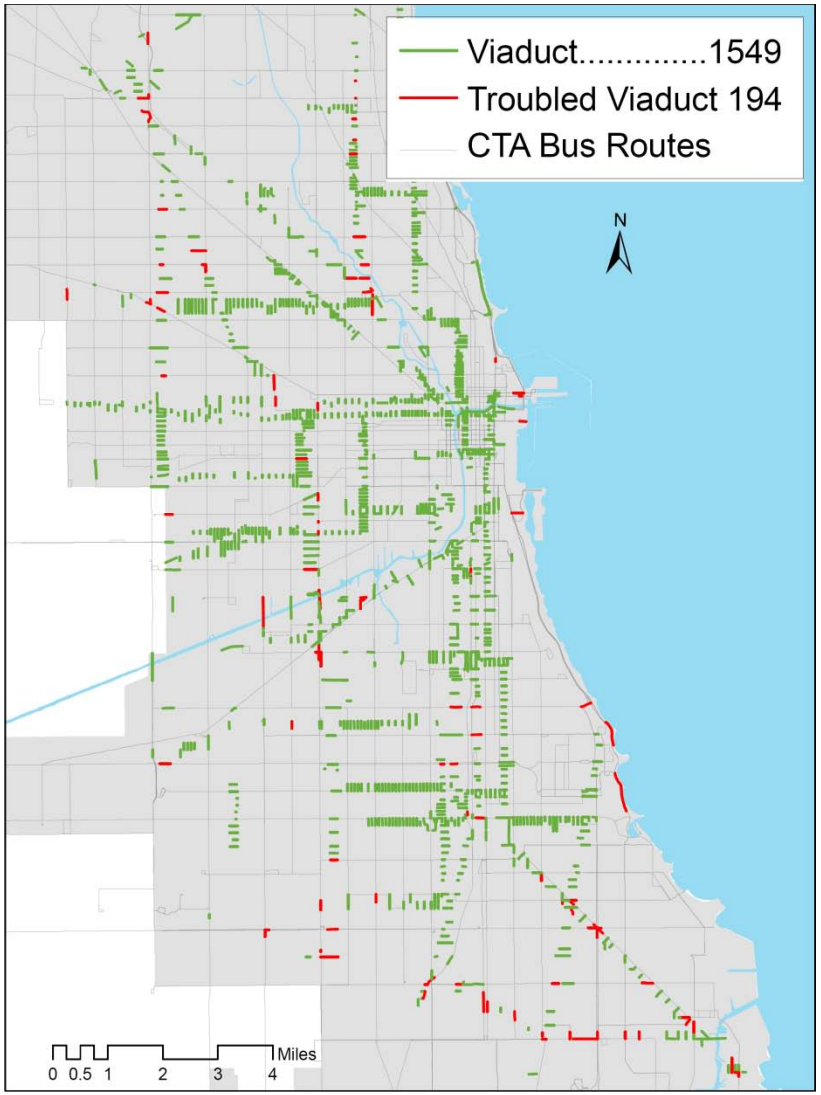
CTA Issues and Research Needs

Bus/Rail Right-of-Way Flooding

CTA bus service is vulnerable to Chicago's 1500+ railway viaducts, more than 10% "troubled" by frequent flooding.

A comprehensive analysis of bus/rail ROW vulnerabilities would enable CTA to define more cost-effective approaches.

Research needs: Resources to analyze and generate additional maps/layers



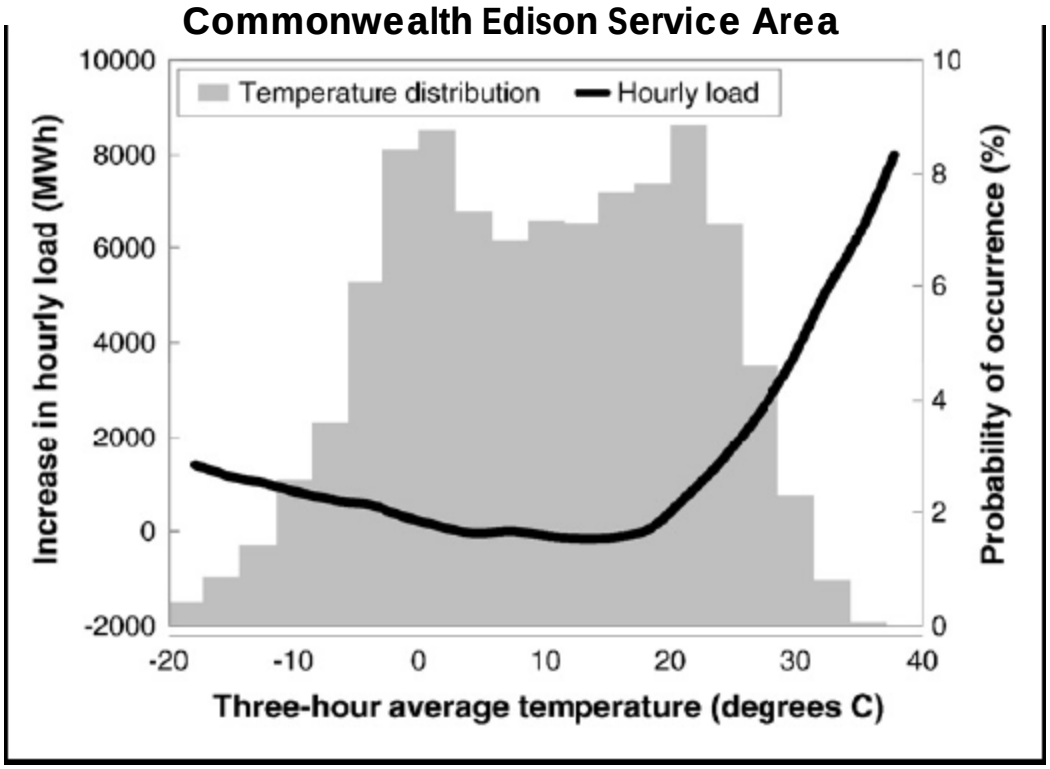
CTA Issues and Research Needs

Rail Traction Power Reliability

CCAP research reveals a drastic increase in electricity load at high temperatures; this distribution is projected to shift right over time.

A preliminary CTA analysis estimates that a 5 F temperature increase could increase heat-related rail failure rates by 5-10%

Research Needs: Reliability projections for CTA substations/ regional power infrastructure



DRAFT

CTA Issues and Information Needs

Customer Experience and Transit Ridership

Weather Condition	Bus Ridership Impact (Weekday)		Rail Ridership Impact (Weekday)	
	Low	***High***	***Low***	***High***
Temperature (one degree increase)	+400	+700	+300	+500
Rain (one inch increase)	-16,000	-22,000	-5,000	-8,000
Wind (one mph increase)	-800	-1,300	Negligible	Negligible
Fog (moderate)	Not significant	Not significant	+8,000	+10,000

Recent research shows vulnerability of CTA bus/rail ridership to changing weather conditions, reveals sensitivity by mode/period.

Research Needs: Extend from *observed* to *projected* ridership impacts; define capital/operating strategies to sustain ridership.

Climate Adaptation & Transportation: Identifying Information & Assistance Needs

Karl Peet
Strategic Planning & Policy
Chicago Transit Authority