Climate Adaptation & Transportation: Identifying Information & Assistance Needs

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Chicago Climate Action Plan Adaptation Evolution

FIVE STRATEGIES:
- Energy Efficient Buildings
- Renewable Energy Sources
- Improved Transportation Options
- Reduce Waste and Pollution
- Adaptation

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

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.
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