Why are we doing this?

To better understand small-scale differences in urban air quality

Availability of newer sensor technology to monitor air quality

The Minnesota Legislature provided funding*

Cost-saving in the long run

LCCMR: Legislative-Citizen Commission on Minnesota’s Resources
Why Minneapolis and St. Paul?

Disparities in air pollution-related health impacts in the metro area

• Rates of hospitalizations & emergency department visits

• Rates of asthma

• Populations with lower income

• People of color

Asthma rates for children living in the Twin Cities metro are 67% higher than for children living in Greater Minnesota.
Our current monitoring system gives us a regional look at how Minnesota compares to other states.
The new sensors - AQMESH

Quick install
Little maintenance
Solar-powered
**What are we monitoring?**

**Fine particles (PM $2.5$)**

A mix of solid particles and liquid droplets in the air – 30x smaller than a human hair

**Ground-level Ozone**

When chemicals and other pollutants mix with sunlight and heat – aka “smog”

- Nitrogen oxides ($\text{NO}_x$)
  - NO2 and NO
- Sulfur dioxide ($\text{SO}_2$)
- Carbon monoxide (CO)
- Temperature
- Relative Humidity
Project Updates

• Phase I collocation all sensors – Fall/Spring 2017-18 – 50 pods
• Community meetings R1 in study area – Fall 2017
• Finalize locations in St. Paul – Fall 2018
• Finalize locations in Minneapolis - Winter 2019
• All sites deployed – Spring/Summer 2019 – 44 pods, 264 sensors
• Community meetings R2 in study area – Fall 2019
Site averages for CO & SO₂ (2019)

Site Names
Site averages for ozone concentrations (2019)
Site averages for Particulate matter(2019)
### Summary

#### Pollutant Minimum Maximum

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO (ppb)</td>
<td>260</td>
<td>420</td>
</tr>
<tr>
<td>NO (ppb)</td>
<td>1.3</td>
<td>61</td>
</tr>
<tr>
<td>NO₂ (ppb)</td>
<td>8.6</td>
<td>60</td>
</tr>
<tr>
<td>O₃ (ppb)</td>
<td>0.5</td>
<td>315</td>
</tr>
<tr>
<td>SO₂ (ppb)</td>
<td>-1.3</td>
<td>9.2</td>
</tr>
<tr>
<td>PM₂.5 (µg/m³)</td>
<td>0.6</td>
<td>7.6</td>
</tr>
<tr>
<td>PM₁₀ (µg/m³)</td>
<td>2</td>
<td>11</td>
</tr>
</tbody>
</table>

#### Pollutant NAAQS Standard

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>NAAQS Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO (ppb)</td>
<td>35,000 (1 Hr)</td>
</tr>
<tr>
<td>NO (ppb)</td>
<td>----</td>
</tr>
<tr>
<td>NO₂ (ppb)</td>
<td>100 (1Hr)</td>
</tr>
<tr>
<td>O₃ (ppb)</td>
<td>70 (8Hr)</td>
</tr>
<tr>
<td>SO₂</td>
<td>75 (1 Hr)</td>
</tr>
<tr>
<td>PM₂.5 (µg/m³)</td>
<td>35 (24 Hr)</td>
</tr>
<tr>
<td>PM₁₀ (µg/m³)</td>
<td>150 (24 Hr)</td>
</tr>
</tbody>
</table>

12/27/2019 www.pca.state.mn.us/urbanair
Data will inform air quality concerns
Partners and Collaborators

• City of Minneapolis
• Saint Paul School District
• Minnesota State University, Mankato
• Xcel Energy
• AQMESH
• Minnesota Department of Health
• LCCMR
Thank you!

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www.pca.state.mn.us/urbanair