Connected Vehicle Data for Traffic Signal Performance Measures

- 99 arterials
- 840 miles
- 812 signals monitored
- 3 years of data
- 2800 XD segments
- 60B speed records

### Web Application Suite

1. **Corridor Selection**
   - Corridors are listed alphabetically (a) for Travel Time and Travel Delay Monitor. A district selection (b) is used for Arterial Ranking.

2. **Analysis Date Selection**
   - Before (red) and after (green) dates displayed on a calendar.

3. **Time Selection**
   - Arterial Ranking allows selection of specific hour ranges (a) while Travel Time defaults for the integration of timing plan data (b). Travel Delay Monitor displays the hours within the date selection in the output figures.

### Travel Time Comparison Tool

The travel time comparison tool compares samples of travel times on any of the corridors during a user-specified before-and-after time range. The performance metric used in this dashboard is the cumulative frequency diagram (CFD) of all estimated travel times within the selected periods, typically shown as two before-and-after curves on a single chart.

### Arterial Ranking Tool

The Arterial Ranking tool ranks the corridors based on the normalized median and interquartile range travel times. Provisions for before/after comparisons are available as well. This application is oriented towards a network level assessment of multiple corridors to identify those with excessive travel times (relative to travel time at the speed limit) and high degrees of travel time unreliability.

### Travel Delay Monitor

The Travel Delay Monitor displays a time-series plot that shows the cumulative miles of a corridor operating under a particular speed, and uses a color gradient to represent the profile of speeds of the corridor at each time instance.

### Case Study with PennDOT

<table>
<thead>
<tr>
<th>Arterial</th>
<th>Weekday</th>
<th>Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>$9,716,000</td>
<td>$2,030,000</td>
</tr>
<tr>
<td>A2</td>
<td>$1,995,000</td>
<td>$378,000</td>
</tr>
<tr>
<td>A3</td>
<td>$8,917,000</td>
<td>$3,370,000</td>
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<tr>
<td>A4</td>
<td>$7,238,000</td>
<td>$1,247,000</td>
</tr>
<tr>
<td>A5</td>
<td>-$904,000</td>
<td>-$2,001,000</td>
</tr>
</tbody>
</table>

**Total Benefits:**

- $32 Million
- $275,000 CO₂ savings
- 10,000 tons CO₂ reduced

5 counties
2184 signals
2800 XD segments
60B speed records

3800 XD segments
3000 speed records
8500 speed records