THE “GREAT” RECESSION AND ITS IMPACT ON LIGHT-DUTY VEHICLE EMISSIONS

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Acknowledgments

California Air Resources Board
Contract 12-303
Coordinating Research Council
E-106
National Renewable Energy Laboratory
Jim Sidebottom (CDPHE)

University of Denver
Ian Stedman
Measurements and Equipment

Sites and Measurement Dates

Van Nuys CA – August 2010 (12,963 records)

W. Los Angeles – May 2013 (27,247 records)

Tulsa, OK – October 2013 (21,115 records)

Denver, CO – January 2014 (19,242 records)

DU FEAT

Single Measurement Stdev

NDIR – CO₂

CO ± 4 g/kg
HC ± 4 g/kg
%Opacity ± 0.8%

UV – NO ± 0.4 g/kg
NO₂ ± 0.3 g/kg
NH₃ ± 0.02 g/kg

Speed and Acceleration

License Plate Photo

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New Vehicle Sales and Registration Statistics

• Nationwide new vehicle sales in 2009 were 35% less than 2007 sales
• California new vehicle registrations in 2009 were 45% less than 2007
• 2012 California new vehicle registrations were 18% below 2007 levels

Source: National Automobile Dealers Association
West LA and Van Nuys Fleet Fractions

Fleet Fraction

Model Year


West LA 2013
Van Nuys 2010
West LA Fleet Age Estimates

- **Fit Predicted MY 2006.7**
- **Observed MY 2004.7**
- **Previous Studies MY**

Estimated Fleet Ages:
- 1998: 7.9
- 2001: 7.8
- 2004: 7.8
- 2007: 7.4
- 2010: 7.4
- 2013: 9.1
Where are the West LA Fleet Differences?

![Graph showing age distribution of the fleet from 2008 and 2013.](image)
West LA Measured and Modeled Mean Emissions

Mean g/kg

Emission Species

CO  15  23%

HC x 10  20  10%

NO x 10  25  28%

NH₃ x 10  5  14%

2013 Measured
Modeled (2008)
### West LA, Denver and Tulsa (Measurement – Modeled) Emission Comparison

<table>
<thead>
<tr>
<th>Location</th>
<th>$\Delta g_{\text{CO}}$/kg</th>
<th>$\Delta g_{\text{HC}}$/kg</th>
<th>$\Delta g_{\text{NO}}$/kg</th>
<th>$\Delta g_{\text{NH}_3}$/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>West LA</td>
<td>3.8 ± 0.8</td>
<td>0.2 ± 0.3</td>
<td>0.6 ± 0.1</td>
<td>0.08 ± 0.03</td>
</tr>
<tr>
<td>Denver</td>
<td>3.6 ± 1.1</td>
<td>0.2 ± 0.2</td>
<td>0.9 ± 0.2</td>
<td>0.07 ± 0.03</td>
</tr>
<tr>
<td>Tulsa</td>
<td>2.3 ± 0.5</td>
<td>0.2 ± 0.4</td>
<td>0.4 ± 0.1</td>
<td>0.03 ± 0.01</td>
</tr>
</tbody>
</table>
West LA (2013 Measured – Modeled) Differences

(Measured - Modeled)
3.8 gCO/kg

(Measured - Modeled)
0.08 gNH$_3$/kg

Model Year
Conclusions

• The 2008 – 2010 recession significantly increased on-road light-duty fleet ages in Los Angeles, Tulsa and Denver.

• At the West LA site the age increase in May of 2013 was estimated between 1.7 and 2 years older.

• The West LA fleet emissions remained 10 to 28% higher than likely with historic fleet turnover rates.

• These emissions were predominately contributed by 10 to 20 year old vehicles in the West LA fleet.