Aerodynamic Improvements for Vocational Vehicles
Outline

- Aerodynamic Device Potential
- Effectiveness of Aerodynamic Devices on Vocational Vehicles
- US Phase 2 Vocational Aerodynamic Credits
- Next Steps to Gather More Data
- Voluntary Fleet/Truck Participation in Survey
Aerodynamic Device Potential

- Aerodynamic devices shown to reduce GHG emissions in heavy-duty trucks
- ARB Tractor-Trailer Greenhouse Gas and US EPA Phase 2 rules are integrating aerodynamic features into Class 7-8 heavy-duty trucks
- Between 20-25% of new trailers are equipped with skirts today
Aerodynamic Drag Increases at High Speeds

Tractor-Trailer Operating Losses
65,000 lbs GVW

- Power Loss (HP)
- Speed (MPH)

- Blue line: Aero-hp w/Cd=0.625
- Green line: Aero-hp w/Cd=0.50
- Pink line: Tires-hp w/Crr=0.0068

California Environmental Protection Agency
AIR RESOURCES BOARD
Effectiveness of Aerodynamic Devices on Vocational Vehicles

• ARB contracted with National Renewable Energy Laboratory (NREL) to assess emissions benefit of aerodynamic devices on vocational vehicles

• Side skirts, front and rear fairings, and wheel covers were studied
Aerodynamic Devices on Vocational Vehicles Can Cut Fuel Consumption

<table>
<thead>
<tr>
<th>Aerodynamic Device(s)</th>
<th>Fuel Consumption Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Skirts</td>
<td>5.2 - 6.1</td>
</tr>
<tr>
<td>Front Fairing</td>
<td>5 - 6.9</td>
</tr>
<tr>
<td>Side Skirts + Front Fairing</td>
<td>10.3 - 10.4</td>
</tr>
<tr>
<td>Rear Fairing</td>
<td>2.7 - 3.8</td>
</tr>
</tbody>
</table>
US Phase 2 Vocational Aerodynamic Credits

• Based on the ARB/NREL Study
  – US EPA recognized the GHG benefit of aerodynamic devices on vocational box trucks
• US EPA Phase 2 rule offers credits for the use of aerodynamic devices on some vocational box-type trucks
• Only applicable for regional vocational vehicles with a 36 ft total chassis length/frontal area at least 9 m² and 23 ft chassis length/frontal area at least 8 m²
Next Steps

• ARB is working with NREL and UC Irvine to establish a contract to study the characteristics of vocational vehicles and fleets
• Determining which vehicles could benefit from the use of aerodynamic devices
Study Methodology and Aims

• Utilize surveying techniques to study vocational heavy-duty trucks
• Determine characteristics of fleets, types of vocations, vehicle types and driving patterns of vehicles
• Identify vehicles/fleet types that travel at high speeds and could benefit from aerodynamic improvements
Timeline

• In process of establishing interagency agreement with NREL/UCI
• Work with Contractor to build study parameters
• Contractor will begin surveying fleets
• Representative vehicles will be data logged
• Final report will be completed by Early 2018
Voluntary Fleet/Truck Participation

- Staff is looking for fleet participation in a survey of vocational vehicles (ie box trucks)
- Survey will be conducted by contractor and will be used to determine the speed and use of these trucks
- Information will help to craft policies for the potential use of aerodynamic devices
- Vehicles will also be data logged to determine drive cycle information
Staff Contact

Inder Atwal, Air Pollution Specialist
inder.atwal@arb.ca.gov
(916) 445-0281