Today’s Agenda

• Presentation (50 min)
  • AQAP Status Report (10 min)
  • Summary of Air Quality Modeling Results (15 min)
  • Initial New Measures to Further Improve Air Quality (25 min)

• Roundtable Discussion on New Measures (75 min)

• Report Out (25 min)

• Next Steps
Presentation: AQAP Status Report

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - Summary of Air Quality Modeling Results (15 min)
  - Initial New Measures to Further Improve Air Quality (25 min)
- Roundtable Discussion on New Measures (75 min)
- Report Out (25 min)
- Next Steps
AQAP Participation Framework

Sept – Dec 2012
- Air quality analysis
- Health risk assessment
- New measures
- Review draft findings and recommendations

October 10th New Measure Workshop

Air Quality Webinar Sept 25th; Health Risk Assessment Webinar Nov 13th
AQAP 2012/2013 Outlook

Jan-June

Technical Webinar – Early Action Plan

Summer

Workshop

Early Action Plan

Sept - Oct

Technical Webinar – Air Quality Assessment September 25th

Workshop – New Measures October 10th

Nov-Dec

Technical Webinar – Health Risk Assessment November 13th

Draft AQAP Air Quality/Health Risk Technical Report presented to Gateway Cities EC, TC

Final AQAP presented to EC, TC

March 2013
Presentation: Summary of Air Quality Modeling Results

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - Summary of Air Quality Modeling Results (15 min)
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Overview of the Air Quality Modeling Process

DONE Modeling Protocol
DONE Emission Inventory Development
DONE Air Quality Modeling and Evaluation
ONGOING Health Risk Assessment
ONGOING Additional Measures

AQMD’s Air Quality Management Plan (AQMP) informed selection of initial new measures.
Air Quality Modeling Approach

- GCCOG includes 27 cities in S.E. LA county.
- AQAP covers all cities plus regions of unincorporated LA county.
- The AQ analysis includes a 5km buffer from GC boundary.
Air Quality Modeling Approach, cont.

- **DONE** Develop 2009 and 2035 emissions inventory using:
  - South Coast AQMD data
  - Traffic volumes for GC region as projected in I-710 EIR
  - Adjustments to account for recent (2007-2012) regulations

- **DONE** Perform modeling of air pollution concentration for:
  - 2009 (current conditions)
  - 2035 alt 6b (I-710 construction completed)

- **ONGOING** Perform health risk assessment
  - Health impacts of 2035 air pollution
  - Cancer health risk
  - Non-cancer chronic and acute health risk
  - PM2.5 Morbidity and mortality
  - Completed in Nov 2012
Pollutants of Concern

AQ/HRA results identify following air pollutants of greatest concern

1. Fine Particulate Matter (PM2.5)
   • Linked to aggravated asthma, chronic bronchitis, heart attacks
2. Diesel Particulate Matter (DPM)
   • Human carcinogen when inhaled
   • MATES-III (2005) 70% of the incremental cancer risk associated with air pollution
3. Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC’s)
   • Component of ground-level ozone (smog)
   • Also contributes to particulate matter formation
4. Other Air Toxics (hazardous air pollutants)
   • Not regulated under the Clean Air Act
   • Can cause adverse health effects
Preliminary AQ/HRA Results – PM2.5
PM2.5 Improves from 2009 to 2035

By 2035 below current NAAQS (15 µg/m³) but some areas remain above CAAQS (12 µg/m³)

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
Gateway Cities Average Contribution to PM$_{2.5}$

- Average PM$_{2.5}$ air concentration decreases 21%.

AQAP AQ/HRA results shown here are preliminary and reflect ongoing work. Results in the final AQ/HRA report may be different.
2035 PM2.5 Average Concentration Contribution in Gateway Cities (ug/m³)

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
Preliminary AQ/HRA Results – DPM
• DPM contributes to cancer risk.
• Unlike PM2.5, no state or federal standards for DPM.

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
• Average DPM air concentration decreases 79% by 2035.
• 63% of DPM is from diesel on-road vehicles (primarily trucks)
• 2005 MATES-III DPM Basin Wide Cancer Risk: 998 per million
• 2009 DPM GC Cancer risk: 1,210 per million.
• Gateway Cities Average 2035 DPM Risk: 300 per million (> 4x reduction)

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
Incremental cancer incidence per million people. Based on preliminary HRA results.

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
Preliminary AQ/HRA Results – Other Air Toxics
• Pollutant concentrations are weighted by toxicity to calculate cancer risk.
• Primary driver for cancer risk is DPM.
• Top three pollutants (DPM, Chromium, Arsenic) = 90% of risk.
• HRA underway to further analyze health impacts.
2035 Gateway Cities Average Incremental Cancer Risk Contributors by Source Category

- On-road vehicles (freeway & non-freeway) are 56% of cancer risk.
- 92% of point source risk is due to arsenic.
- HRA underway to further analyze health impacts.

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
2035 Additional Cancer Risk in Gateway Cities By Source Category – All Pollutants

Incremental cancer incidence per million people. Based on preliminary HRA results. Includes cancer risk from DPM, Chromium-6, Arsenic, Benzene, 1-3 Butadiene, Formaldehyde.

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
Air Pollution Cancer Risk: Average and Range Nationwide Comparison

AQAP Analysis of GC Region*:

- Gateway Cities: 2035
- Gateway Cities: 2009

National Air Toxics Assessment 2005**:

- Los Angeles (Los Angeles Co)
- Oakland (Alameda Co)
- San Francisco (San Francisco Co)
- Philadelphia (Philadelphia Co)
- Dallas (Dallas Co)
- Atlanta (Fulton Co)
- Boston (Suffolk Co)
- Chicago (Cook Co)
- Houston (Harris Co)
- District of Columbia
- New York (5 boroughs)

Cancer Risk per Million

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000

*AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.

**Values based on NATA estimated concentrations of DPM, chromium-6, arsenic, benzene, 1,3-butadiene, and formaldehyde (primary and secondary), combined with OEHHA cancer risk factors
Presentation: Initial New Measures to Further Improve Air Quality

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - AQAP Air Quality Modeling Results for 2035 (15 min)
  - Initial New Measures to Further Improve Air Quality (25 min)
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Purpose of New Measures

Primary goal: identify new measures that will continue to improve air quality and health within the Gateway Cities by 2035.

Considerations:

• Strategies could be implemented by any party.
  • Local cities, regional agencies, private industry, etc.
• Strategies should be evaluated based on local (Gateway Cities) AQ benefits rather than regional benefits.
• Strategies could apply to all sources – mobile, point, area, etc.
Role of the Gateway Cities

Gateway Cities has a supporting role in many new measures:

• Seek funding for mitigation projects
• Facilitate and coordinate projects throughout the sub-region
• Educate member cities, stakeholders, and community members
• Regulate emission sources under local control
• Encourage local cities to implement early action projects
• Advocate with air quality organizations (AQMD, ARB, EPA)
• Continue to monitor air quality improvements
• Advocate for additional air quality monitoring stations.

Most measures implemented by third parties.

• Regional, state, and federal agencies
• Private industry
• Other stakeholders (e.g., ports)

Many measures require new technology and funding.
Initial Goals of New Measures for additional AQ improvements by 2035

1) Further reduce PM2.5
   • PM2.5 has morbidity and mortality effects
   • Concentrations may exceed future EPA standards in a few locations (depending on the new standard that is chosen)

2) Further reduce DPM
   • Greatest contributor to air pollution cancer risk

3) Further reduce NOx
   • NOx contributes to ozone, the region’s greatest air quality challenge
   • NOx contributes to secondary PM2.5.

4) Further reduce other cancer-causing pollutants
   • Issues with chromium, arsenic, butadiene in certain hot-spots

Goals to be further reviewed after completion of HRA
Goal 1: Further Reduce PM2.5

- PM2.5 contributes to health impacts – cardiopulmonary
- By 2025, average PM2.5 air concentration will decrease 21%
- Approximately half of PM2.5 is secondary particulates – not directly emitted
- But... by reducing NOx, secondary PM will be reduced (co-benefit)
### PM2.5 Primary Emission Sources in 2035

#### Primary PM2.5 Emissions in GCCOG

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Sources (other than road dust)</td>
<td>15,864</td>
<td>57.7%</td>
</tr>
<tr>
<td>Entrained Road Dust</td>
<td>3,394</td>
<td>12.3%</td>
</tr>
<tr>
<td>On-road Vehicles</td>
<td>3,176</td>
<td>11.6%</td>
</tr>
<tr>
<td>Watercraft</td>
<td>1,831</td>
<td>6.7%</td>
</tr>
<tr>
<td>Point Sources</td>
<td>1,715</td>
<td>6.2%</td>
</tr>
<tr>
<td>Off-Road Other</td>
<td>925</td>
<td>3.4%</td>
</tr>
<tr>
<td>Aircraft</td>
<td>348</td>
<td>1.3%</td>
</tr>
<tr>
<td>Rail Lines</td>
<td>203</td>
<td>0.7%</td>
</tr>
<tr>
<td>Airport GSE</td>
<td>14</td>
<td>0.05%</td>
</tr>
<tr>
<td>Railyards</td>
<td>12</td>
<td>0.04%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27,482</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

#### Components of Area Sources

<table>
<thead>
<tr>
<th>Area Source component</th>
<th>Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking - commercial charbroiling (45.6%)</td>
<td>8,297</td>
<td>52.3%</td>
</tr>
<tr>
<td>and unspecified (6.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential wood combustion - fireplaces (9.0%)</td>
<td>1,875</td>
<td>11.8%</td>
</tr>
<tr>
<td>and wood stoves (2.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building construction and demolition</td>
<td>1,768</td>
<td>11.1%</td>
</tr>
<tr>
<td>Wood and paper - other</td>
<td>1,469</td>
<td>9.3%</td>
</tr>
<tr>
<td>Residential natural gas combustion - space</td>
<td>1,043</td>
<td>6.6%</td>
</tr>
<tr>
<td>heaters (2.6%), water heaters (2.5%),</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unspecified (0.9%), cooking (0.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial natural gas combustion - unspecified</td>
<td>330</td>
<td>2.1%</td>
</tr>
<tr>
<td>(2.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste burning</td>
<td>203</td>
<td>1.3%</td>
</tr>
<tr>
<td>Road dust &amp; construction/demo dust</td>
<td>109</td>
<td>0.7%</td>
</tr>
<tr>
<td>Other</td>
<td>771</td>
<td>4.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,864</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

- PM2.5 causes mortality and morbidity (to be calculated in HRA)
- 58% of primary PM2.5 is from area sources, of which half is from charbroiling
- Mobile source PM2.5 is 23% of total
- Approx. 50% of PM2.5 is primary (directly emitted), while 50% is secondary (formed in the atmosphere from other chemicals)
  - Secondary PM to be addressed through NOx reduction.

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PM2.5 Control Measures – Area Sources

(Potential advocacy role for GCCOG)

Area Source Reduction Measures

A1. Reduce emissions from char-broiling
   • Require new and/or existing medium to large volume restaurants with under-fired charbroilers to install control devices meeting a minimum efficiency requirement

A2. Reduce emissions from wood combustion (fireplaces & stoves)
   • Implement Oregon standards for fireplaces and wood stoves: If selling or purchasing a home with a woodstove or fireplace insert, must ensure the woodstove is certified prior to sale of the home

A3. Reduce emissions from wood combustion (area sources)
   • Increase the number of no-burn days
   • Expand No-burn during episodic days by reducing mandatory wood burning curtailment forecast threshold from 35 ug/m3 to 30 ug/m3

A4. Reduce emissions from building construction and demolition
   • Best management practices to better control construction/demo dust
Mobile Source Reduction Measures

- A5. Reduce Automobile VMT through TDM (transit, bike/ped, rideshare, etc.)
- A6. Improve traffic flow and mobility through TSM (freeway mobility, signal timing, traveler information, etc.) and congestion relief
- A7. Accelerate zero and near-zero emission vehicle adoption for LDVs
- Reduce Truck, Watercraft, Other PM2.5
  See DPM measures

Entrained Road Dust

- A8. Expand street sweeping
- A9. Require installation of pipe-grid trackout-control device to reduce mud/dirt trackout from unpaved truck exit routes
- A10. Near construction sites, all streets shall be swept once a day if visible soil materials are carried to adjacent streets
- A11. For construction sites, install wheel washers and wash trucks and equipment leaving the site

(Potential advocacy role for GCCOG)

<table>
<thead>
<tr>
<th>Mobile Source</th>
<th>Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-Duty Vehicles*</td>
<td>2,540</td>
<td>39%</td>
</tr>
<tr>
<td>Watercraft</td>
<td>1,831</td>
<td>28%</td>
</tr>
<tr>
<td>Off-Road Other</td>
<td>925</td>
<td>14%</td>
</tr>
<tr>
<td>Heavy-Duty Trucks</td>
<td>635</td>
<td>10%</td>
</tr>
<tr>
<td>Aircraft</td>
<td>348</td>
<td>5%</td>
</tr>
<tr>
<td>Rail Lines</td>
<td>203</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,482</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

* Nearly 90% of LDV PM2.5 is from tire & brake wear

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Goal 2: Further Reduce DPM

- DPM contributes to cancer risk
- Average DPM air concentration decreases 79% by 2035
- 63% of DPM is from diesel on-road vehicles (primarily trucks)
Incremental Air Pollution Cancer Risks in 2035

Incremental Cancer Risk in GCCOG by Pollutant

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Incremental Cancer Risk per million</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPM</td>
<td>301</td>
<td>70%</td>
</tr>
<tr>
<td>Chromium-6</td>
<td>48</td>
<td>11%</td>
</tr>
<tr>
<td>Arsenic</td>
<td>39</td>
<td>9%</td>
</tr>
<tr>
<td>1,3-Butadiene</td>
<td>17</td>
<td>4%</td>
</tr>
<tr>
<td>Benzene</td>
<td>15</td>
<td>4%</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>10</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>440</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Components of DPM Cancer Risk

<table>
<thead>
<tr>
<th>Source Type</th>
<th>DPM Cancer Risk per million</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Duty Trucks</td>
<td>189</td>
<td>63%</td>
</tr>
<tr>
<td>Rail Lines</td>
<td>37</td>
<td>12%</td>
</tr>
<tr>
<td>Other Off-Road</td>
<td>31</td>
<td>10%</td>
</tr>
<tr>
<td>Watercraft</td>
<td>22</td>
<td>7%</td>
</tr>
<tr>
<td>Point Sources</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>Area Sources</td>
<td>8</td>
<td>3%</td>
</tr>
<tr>
<td>Railyards</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Light-duty Vehicles</td>
<td>0.4</td>
<td>0%</td>
</tr>
<tr>
<td>Airports</td>
<td>0.2</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>300</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

- DPM accounts for 70% of incremental cancer risk.
- 63% of DPM is from onroad sources, almost exclusively heavy trucks.
- Off-road mobile sources (rail, watercraft, etc.) account for 30% of DPM.
- The biggest opportunity to reduce DPM is with trucks, followed by other mobile sources.

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DPM Control Measures – On-Road Vehicles

(Potential advocacy role for GCCOG)

Truck Reduction Measures

B1. Advocate for economic incentives, regulations, and implementation for zero emission port trucks, and collaborate with other agencies

B2. Advocate for economic incentives for low emission trucks in Gateway Cities communities: electric, LNG, CNG, etc.

B3. Continue local government purchase of alternative-fuel HDVs (refuse trucks, other heavy vehicles)

B4. Invest in alternative fuel infrastructure for trucks (primarily natural gas or electric charging)

B5. Implement a heavy-duty truck inspection and maintenance (I&M) program

B6. Enhanced anti-idling enforcement & regulation

B7. Outreach and education to encourage proper truck engine maintenance

B8. Improve mobility & goods movement efficiencies

B9. Early action projects: anti-idling, warehouses, truck technology

B10. Analyze DPM hot-spots for focused measures that would most benefit these areas
DPM Control Measures – Other Mobile Sources

(Potential advocacy role for GCCOG)

<table>
<thead>
<tr>
<th>Source Type</th>
<th>Incremental DPM Cancer Risk per million</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy-Duty Trucks</td>
<td>189</td>
<td>63%</td>
</tr>
<tr>
<td>Rail Lines</td>
<td>37</td>
<td>12%</td>
</tr>
<tr>
<td>Other Off-Road</td>
<td>31</td>
<td>10%</td>
</tr>
<tr>
<td>Watercraft</td>
<td>22</td>
<td>7%</td>
</tr>
<tr>
<td>Point Sources</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>Area Sources</td>
<td>8</td>
<td>3%</td>
</tr>
<tr>
<td>Railyard</td>
<td>3</td>
<td>1%</td>
</tr>
<tr>
<td>Light-Duty Vehicles</td>
<td>0.4</td>
<td>0%</td>
</tr>
<tr>
<td>Airport</td>
<td>0.2</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100%</td>
</tr>
</tbody>
</table>

Rail Lines
- B11. Accelerate introduction of Tier 4 passenger and freight locomotives (near to mid-term)
- B12. Electrify the rail system (long-term)
- B13. Promote advanced battery technology locomotives (long-term)

Off-Road Other
- B14. Require low-emission equipment for public construction contracts
- B15. Best management practices for construction sites (e.g., construction equipment idling limits, equipment maintenance)
- B16. Alt fuels (electric, LNG, CNG) for port cargo handling equipment

Watercraft
- B17. Expand use of shore power
- B18. Advanced Maritime Emission Control System (AMECS) to reduce vessel emissions at berth
- B19. Repower, replace port harbor craft to cleaner engines
- B20. Electric dredges

Railyards
- B21. Reduce locomotive idling at railyards
- B22. Increased use of low-emission railyard equipment

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Goal 3: Further Reduce NOx

- Average NOx emissions decreases 65% by 2035
- Primary categories are Other Off-Road and On-Road vehicles (freeway and non-freeway)
- Other Off-Road primarily construction equipment
## NOx Emission Sources in 2035

### NOx Emissions in GCCOG

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>NOx Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watercraft</td>
<td>35,545</td>
<td>27.1%</td>
</tr>
<tr>
<td>Off-Road Other</td>
<td>25,550</td>
<td>19.5%</td>
</tr>
<tr>
<td>On-road Vehicles</td>
<td>23,144</td>
<td>17.6%</td>
</tr>
<tr>
<td>Area Sources</td>
<td>17,472</td>
<td>13.3%</td>
</tr>
<tr>
<td>Aircraft</td>
<td>13,756</td>
<td>10.5%</td>
</tr>
<tr>
<td>Rail Lines</td>
<td>12,075</td>
<td>9.2%</td>
</tr>
<tr>
<td>Point Sources</td>
<td>2,343</td>
<td>1.8%</td>
</tr>
<tr>
<td>Airport GSE</td>
<td>833</td>
<td>0.6%</td>
</tr>
<tr>
<td>Railyards</td>
<td>451</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>131,169</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Components of Watercraft NOx

<table>
<thead>
<tr>
<th>Watercraft component</th>
<th>NOx Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ships (ocean-going vessels)</td>
<td>22,608</td>
<td>75%</td>
</tr>
<tr>
<td><strong>At-berth</strong></td>
<td><strong>13,587</strong></td>
<td><strong>38%</strong></td>
</tr>
<tr>
<td>Maneuvering in-port</td>
<td>9,021</td>
<td>25%</td>
</tr>
<tr>
<td><strong>In-transit (within modeling boundary)</strong></td>
<td><strong>3,905</strong></td>
<td><strong>11%</strong></td>
</tr>
<tr>
<td>Harborcraft</td>
<td>5,848</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Commercial boats</strong></td>
<td><strong>4,809</strong></td>
<td><strong>14%</strong></td>
</tr>
<tr>
<td><strong>Tugboats (maneuvering)</strong></td>
<td><strong>1,039</strong></td>
<td><strong>3%</strong></td>
</tr>
<tr>
<td>recreational boats</td>
<td>2,421</td>
<td>7%</td>
</tr>
<tr>
<td>Port operations</td>
<td>760</td>
<td>2%</td>
</tr>
<tr>
<td>Dredging</td>
<td>3.1</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>35,545</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Components of Off-Road Other NOx

<table>
<thead>
<tr>
<th>Off-Road Other component</th>
<th>NOx Emissions (kg/day)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Refrigeration Units (TRUs)</td>
<td>7,154</td>
<td>28%</td>
</tr>
<tr>
<td>Construction Equip</td>
<td>5,621</td>
<td>22%</td>
</tr>
<tr>
<td>Industrial Natural Gas Equip</td>
<td>2,555</td>
<td>10%</td>
</tr>
<tr>
<td>Lawn and Garden</td>
<td>2,555</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>7,665</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25,550</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

73% of onroad emissions from HDVs, 27% from LDVs

52% of area emission is Residential natural gas combustion (space heaters, water heaters, cooking, etc.)

AQAP AQ/HRA results shown here are preliminary and reflect on-going work. Results in the final AQ/HRA report may be different.
NOx Control Measures

(Potential advocacy role for GCCOG)

Watercraft
C1. Continue Vessel Speed Reduction program
C2. Install clean engine technologies
(NOx will also be reduced as a co-benefit of DPM and PM_{2.5} measures.)

Transportation Refrigeration Units
C3. Replace with low/zero emission alternatives

Construction Equipment
C4. Advocate for low/zero emission equipment (electrified, natural gas)
(NOx will also be reduced as a co-benefit of DPM and PM_{2.5} measures.)
NOx Control Measures

(Potential advocacy role for GCCOG)

On-Road Vehicles (cars and trucks)
C5. Advocate for zero and near-zero emission vehicles.
(NOx will also be reduced as a co-benefit of DPM and PM2.5 measures.)

Area Sources
C6. Require low NOx burners for commercial space heaters
C7. Reduce NOx from commercial heaters
(NOx will also be reduced as a co-benefit of DPM and PM2.5 measures.)
Goal 4: Further Reduce Other Cancer-Causing Pollutants

- On-road vehicles (freeway & non-freeway) account for 56% of incremental air pollution cancer risk.
- 14% of incremental air pollution cancer risk is from point sources (mostly due to arsenic).
- HRA underway to further analyze health impacts.
### Incremental Cancer Risk in GCCOG by Pollutant

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>DPM</th>
<th>Chromium-6</th>
<th>Arsenic</th>
<th>1-3 Butadiene</th>
<th>Benzene</th>
<th>Formaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental cancer risk per million</td>
<td>301</td>
<td>48</td>
<td>39</td>
<td>17</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Percent</td>
<td>70%</td>
<td>11%</td>
<td>9%</td>
<td>4%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Preliminary Sources for Cancer Causing Pollutants

<table>
<thead>
<tr>
<th>Source</th>
<th>DPM</th>
<th>Chromium-6</th>
<th>Arsenic</th>
<th>1-3 Butadiene</th>
<th>Benzene</th>
<th>Formaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onroad</td>
<td>38%</td>
<td>57%</td>
<td>0%</td>
<td>6%</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Offroad</td>
<td>48%</td>
<td>0%</td>
<td>7%</td>
<td>67%</td>
<td>63%</td>
<td>67%</td>
</tr>
<tr>
<td>Trains</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Watercraft</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>10%</td>
<td>16%</td>
<td>10%</td>
</tr>
<tr>
<td>Aircraft</td>
<td>0%</td>
<td>0%</td>
<td>7%</td>
<td>25%</td>
<td>8%</td>
<td>36%</td>
</tr>
<tr>
<td>Other Offroad</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>32%</td>
<td>38%</td>
<td>21%</td>
</tr>
<tr>
<td>Point</td>
<td>11%</td>
<td>43%</td>
<td>92%</td>
<td>26%</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td>Area</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>11%</td>
<td>14%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Non-DPM cancer pollutants are from a variety of sources:

- Chromium-6: 57% on-road (tire and brake wear), 43% point sources (electroplating)
- Arsenic: 92% from point sources (largest source: glass manufacturing)
- Benzene, Butadiene, Formaldehyde: ~67% from off-road sources
  - “other offroad” primarily gasoline lawn & garden, commercial equipment, and construction.

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Non-DPM HAP reduction strategies

(Potential advocacy role for GCCOG)

**Chromium+6**

D1. Reduce automobile VMT
D2. Encourage alternative coating materials for spray coating operations
D3. Encourage alternative materials; E.g., trivalent chromium for some applications for chromium electroplating operations or chromic acid anodizing operations
D4. Increase stringency of Rule 1469 (applies to chromium electroplating operations and chromic acid anodizing operations)

**Reducing Butadiene & Benzene through VOC reductions - Other Off-road Equipment**

D5. Lawn and garden equipment exchange program for the public
D6. Gov’t lawn maintenance contracts for clean lawn and garden equipment
D7. Reduce fugitive emissions by applying leak detection and repair programs to areas currently not covered by existing rules (e.g., harbor vessels and oil drilling operations)

*Co-benefit: reducing VOCs will also reduce secondary PM2.5.*
Non-DPM HAP reduction strategies (cont.)

(Potential advocacy role for GCCOG)

Reducing Butadiene & Benzene through VOC reductions – Aircraft

D8. Reduce holding times for all jet aircraft
D9. Re-directing the exhaust from pre-flight run-up tests
D10. Limiting traffic for “large commuter” (>41,000 lb) aircraft
D11. Increase the width of the blast fence

*Co-benefit: reducing VOCs will also reduce secondary PM2.5*

Reducing Arsenic from Point Sources

D12. Reduce arsenic emissions from glass manufacturing
D13. Require location of sensitive receptors further away from major sources.
Air Quality Co-Benefits:

Overlap with Sustainable Communities Strategy (SCS)
Sustainable Communities Strategy to reduce GHGs

- SCAG region target: reduce per capita GHGs from cars and light trucks by 13% in 2035, primarily through reducing VMT
- GCCOG also prepared a sub-regional SCS to identify strategies for achieving this goal
- Focus: land use, transportation system improvements, travel demand management
### GCCOG SCS strategies to reduce GHGs

<table>
<thead>
<tr>
<th>Strategy</th>
<th>2035 reductions, lbs GHG per person per day</th>
<th>% reduction in daily GHG per person (from 2005 emissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Improvements</td>
<td>0.7</td>
<td>4.22%</td>
</tr>
<tr>
<td>Transportation Demand Management</td>
<td>0.007</td>
<td>0.04%</td>
</tr>
<tr>
<td>Land Use</td>
<td>0.49</td>
<td>2.97%</td>
</tr>
<tr>
<td>Regional Transportation Projects</td>
<td>1.17</td>
<td>7.07%</td>
</tr>
<tr>
<td>Interactive Effects</td>
<td>0.12</td>
<td>0.72%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2.48</strong></td>
<td><strong>15.02%</strong></td>
</tr>
</tbody>
</table>

COG strategies exceed the SCAG per capita GHG reduction target of -13% in 2035.
Transportation Projects in GCCOG

- I-5 improvements
- I-710 Improvements
- 91/605/405 congestion hot-spots
- I-110 toll lane

21 projects identified in total...
AQAP Goals:

- **PM2.5 Reduction**
  Focus on area source, road dust, cars & light trucks

- **DPM Reduction**
  Focus on heavy trucks, rail, off-road

- **NOx Reduction**
  Focus on watercraft, off-road, area sources

- **Other HAPs Reduction**
  Focus on off-road, point sources

SCS Benefits

Strategies focus on cars, light trucks

SCS strategies will primarily contribute to PM2.5 reduction goals.
Roundtable Discussion on New Measures

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - Summary of Air Quality Modeling Results (15 min)
  - Initial New Measures to Further Improve Air Quality (25 min)
- Roundtable Discussion on New Measures (75 min)
- Report Out (25 min)
- Next Steps
Roundtable Discussion on New Measures

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - Summary of Air Quality Modeling Results (15 min)
  - Initial New Measures to Further Improve Air Quality (25 min)
- Roundtable Discussion on New Measures (75 min)
- Report Out (25 min)
- Next Steps
• **Roundtable Discussion on New Measures (75 min)**

1. Review Initial List of potential New Measures.
2. Identify other New Measures.
3. Work together to change or refine the New Measure as needed.
4. Identify the role of the Gateway Cities (*or who the key advocates would be*) for each New Measure Recommendation.
5. **Rank Measures**
   1. Top Priority for New Measure Analysis
   2. Secondary Priority for New Measure Analysis if resources permit
   3. This New Measure does not require an analysis
Reporting Out a Summary of Roundtable Discussions

• Presentation (50 min)
  • AQAP Status Report (10 min)
  • Summary of Air Quality Modeling Results (15 min)
  • Initial New Measures to Further Improve Air Quality (25 min)
• Roundtable Discussion on New Measures (75 min)
• Report Out (25 min)
• Next Steps
Next Steps

- Presentation (50 min)
  - AQAP Status Report (10 min)
  - Summary of Air Quality Modeling Results (15 min)
  - Initial New Measures to Further Improve Air Quality (25 min)
- Roundtable Discussion on New Measures (75 min)
- Report Out (25 min)
- Next Steps
Next Steps

• Refine list of initial new measures
• Define additional new measures, in terms of:
  • Affected sources, Penetration, Timing
• Analyze initial new measures, in terms of:
  • Emissions impacts, Costs, Jurisdictional control, Implementation mechanisms and barriers
• Update initial new measures based on findings of HRA
• Set strategies for GCCOG.
• Incorporate findings into final Plan

HRA results and finalized New Measures list to be presented at upcoming EC meeting (to be scheduled)