



**OPPOSITION GROUPS (PARTIAL LIST)**  
 Natural Resources Defense Council  
 Glassell Park Improvement Association, Land Use Committee  
 Far North Glendale Homeowners Association  
 Town Council of Crescenta Valley  
 Glendale Homeowners Coordinating Council  
 LA RED, El Sereno  
**Green Scissors 2010 Report Groups**  
 Friends of the Earth  
 Taxpayers for Common Sense  
 Environment America  
 Public Citizen

**INJUNCTION PLAINTIFFS**  
 City of South Pasadena  
 Sierra Club  
 National Trust for Historic Preservation  
 California Preservation Foundation  
 Los Angeles Conservancy  
 Pasadena Heritage  
 South Pasadena Preservation Foundation  
 South Pasadena Unified School District

**LOS ANGELES NEIGHBORHOOD COUNCILS**  
 Arroyo Seco  
 Cypress Park  
 Eagle Rock  
 El Sereno  
 Glassell Park  
 Highland Park  
 Lincoln Heights

**CITIES**  
 City of Glendale  
 City of Los Angeles  
 City of La Canada Flintridge  
 City of South Pasadena

Post Office Box 51124,  
 Pasadena,  
 California 91115  
 626 799.0044

**NO 710 ACTION COMMITTEE:**

**SCOPING COMMENTS ON HEALTH AND AIR POLLUTION 710 TUNNELS PROJECT**

Ron Kosinski  
 Deputy Director  
 Division of Environmental Planning  
 Caltrans District 7  
 100 S. Main street, MS 16A  
 Los Angeles, CA 90012

Dear Mr. Kosinski,

RE: SR-710 Environmental Impact Report/ Scoping Request.

**We are requesting a "hot spot analysis" for the following types of locations related to all the corridors under consideration for the proposed 710 tunnels project:**

- Schools
- Daycare center
- Hospitals
- Convalescent centers
- Senior centers
- Parks and recreation centers and athletic fields
- Residential areas

**These listed locations should be designated as "sensitive receptor community sites."**

**The Hot Spot analysis and modeling analysis should include harmful products e.g.,:**

Particulate matter PM to include all sized particles including ultrafine particles (<100nm) and nano particles (<50 nm), carbon black (organic carbon and elemental carbon), and degradation of road products and tires and brake linings and diesel catalyst decay products (including but not limited to metal particulate emissions, strontium, and a variety of organic compounds)

- Nitrogen oxides (NO<sub>x</sub>) and nitrogen dioxide (NO<sub>2</sub>)
- Ozone
- Carbon monoxide (CO)

**We are also requesting "Health Impact Assessments and Health Risk Assessments" at the above named sites.**

In addition to the specified sensitive receptor community sites, the hot spot analysis should also include analyses of the **tunnels themselves** with investigation of concentrations of all the above pollutants at peak traffic hours with congestion modeling, within the tunnels, at the portals and at ventilation shafts. Information about the ventilation shaft air cleaning should be provided consistent with the highest level of available technology and its cost. The modeling should include port truck traffic and be based on the current percentage of fossil fuel dependent vehicles. Time in tunnel at congestion speeds should be modeled for individuals who use the tunnel for regular commuting. Models should be created to look at what might happen at community sites if the traffic chooses to use the surface streets instead of the toll tunnel, which has been seen at various sites around the world.

The hot spot analysis should seek **peak** values for all measurements so as not to underestimate the effect on human health. The impact of various temperatures and day and night changes and local wind patterns should be included in model analyses.

Discussion:

Air pollution in our region is significantly influenced by fossil fuel emissions from transportation. Human health is significantly impacted by the air pollutants produced by fossil fuel combustion regionally and locally. Key pollutants that are recognized as having adverse health effects include particulate matter (PM) of various sizes with increasing concerns about ultrafine particles and carbon black, ozone (O<sub>3</sub>), Nitrous Oxide (NO<sub>x</sub>), and Nitrogen Dioxide (NO<sub>2</sub>) as well as acid and organic vapors.

Health studies of air traffic pollution have shown an association with increased cancer risk, increased cardiovascular events and death, and lung inflammation with worsening of asthma and lung function.

Children are particularly sensitive to regional and local air pollution, leading to permanently decreased lung function and increased incidence of or worsening of asthma.

Children in more polluted communities are almost 5 times as likely to have clinically abnormally lung function compared to those in less polluted communities. As alarming as this is, the greatest effect of pollution-related deficits may occur later in life, since reduced lung function is a strong risk factor for complications and death during adulthood.(NEJM Sept 9, 2004 vol 351: 1057-67 Gauderman)

Inability to get enough exercise because of poor air quality and asthma attacks can impair quality of life, and increase the risk of obesity and associated health problems. Later, societal health care costs could be significantly adversely impacted.

Proximity to a freeway or busy roadway increases many health risks. Wind can be a factor how far the pollution is distributed, up to 1.5 miles in some scientific literature.

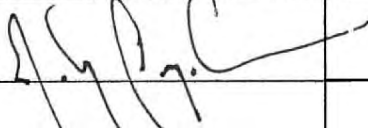
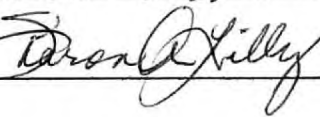
Diesel emissions, predominantly from trucks, are major contributors to air pollution. Proximity to truck diesel traffic increases health risks. Diesel particulate emissions are labeled as cancer causing toxic air contaminants. The particles may penetrate deeply into lung and vascular tissues and stay there for a long time. Diesel particulate is responsible for 70% of total cancer risk from all toxic air pollution according to AQMD. Diesel gaseous compounds are also hazardous.

We are very concerned about the project proposal and the health impacts of increased truck and other highway traffic in our neighborhoods. We want livable, healthy neighborhoods, not more freeways.

No 710 ACTION COMMITTEE MEMBERS SUPPORTING THIS REQUEST:

NAME	ADDRESS	DATE	EMAIL
Carol Teutsch			
CLARICE KWAPP			
Wayna Kato			
William D. Sherman		4/2/11	
Richard D. Schneider		4/14/11	
SAM BURGESS		4/2/11	
Harvey A. Knapp		4/2/11	
JANICE Scott		4/2/11	
SUSAN BOLAN		4/2/11	
SHERILL STUBBS		4/2/11	
TRISHA Gossett			
Elise Kalfayan		4/2/11	
MARY ANN PARADA		4/2/11	

No 710 ACTION COMMITTEE MEMBERS SUPPORTING THIS REQUEST:

NAME	ADDRESS	DATE	EMAIL
Don Ford			
Odom Stamps		4/2/11	
		4/2/11 30	
JANET ERVIN		4/2/11	
Jim Miller		4/2/11	
Claire Boppre		4/2/11	
Trisha Gossett		2 4/2	
		4/11/11	

Attachments:

Appendix A: Bibliography of Health/Pollution Impacts links

Appendix B: Outline of Health Concerns for 710 Tunnels Scoping

Appendix C:

<http://departments.oxy.edu/uepi/Global%20Trade%20Executive%20Summary.pdf>

Page 4, Chart on Selected Health and Economic Impacts of Freight in  
Global Trade Impacts: Addressing the Health, Social and Environmental Consequences.....

[http://t4america.org/docs/blueprint\\_summary.pdf](http://t4america.org/docs/blueprint_summary.pdf)

Page 7, National Transportation Objectives and Targets

<http://coalitionforcleanair.org/air-pollution-pollutant.htmI>

<http://coalitionforcieanair.org/air-pollution-10facts.htmI>

<http://coalitionforcleanair.org/our-programs-transportation-facts.htmI>

## **APPENDIX A**

Attached please find an extensive bibliography of health effects from traffic pollution that the community has collected. We have sorted them into a number of different categories for ease of use with their active links. The EIR should actively study All these health concerns and weigh them against the various transportation benefits. The externalities of health impacts of certain projects may significantly diminish any transportation benefits, making certain alternatives unacceptable. Community health and cohesiveness is of critical importance to those in the path of the proposed tunnel. We are demanding a balanced look at the issues, that will stand up to scientific scrutiny and evolving health and transportation policies. Mitigation of health effects can be difficult, prohibitively expensive, or inadequate so we want honest and full disclosure. We are asking for SMART GROWTH and MOBILITY MANAGEMENT. We know the old solutions are not safe and sustainable.

# Health and Pollution Impact

## Official statements from various organizations

[http://acta.org/projects/tech\\_studies/Health\\_Risk\\_Assessment.pdf](http://acta.org/projects/tech_studies/Health_Risk_Assessment.pdf)  
HRA prepared for the Heim Br./SR-47 project

<http://www.aqmd.gov/ceqa/igr/2009/February/feb09.html>  
February 2009 Comment Letters Draft Environmental Impact Reports  
The following letters were written (date sent in parentheses) by the AQMD commenting on the air quality analysis. PDF files require the use of a reader.

<http://www.aqmd.gov/ceqa/igr/2009/February/EISEIRI-710.pdf>  
"Protocol for the Air Quality and Health Risk Assessments (AQ/HRA) for the I-710 Corridor Environmental Impact Report"  
Environmental Impact Statement (EIR/EIS) South Coast Air Quality Management District FEBRUARY 22, 2009

[http://www.greenenvironmentnews.com/feed\\_images/2b08292e-7379-4373-9ba8-0f2324b4f956.pdf](http://www.greenenvironmentnews.com/feed_images/2b08292e-7379-4373-9ba8-0f2324b4f956.pdf)  
Hearing on "Air Pollution Challenges for California's Inland Empire" United States Senate Committee on Environment and Public Works  
Senator Barbara Boxer, Chairman Wednesday, October 10, 2007: San Bernardino CA  
"Air Pollution and Health" - testimony by: W. James Gauderman, Ph.D. Keck School of Medicine

<http://www.ictf-jpa.org/publiccomment/Letters/NaturalResourcesDefenseCouncil-022609.pdf>  
Re: Notice of Preparation / Initial Study - ICTF Project  
Natural Resources Defense Council American Lung Association In California Coalition For A Safe Environment Coalition For Clean Air Communities For Clean Ports East Yard Communities For Environmental Justice Harbor Watts Edc Long Beach Alliance For Children With Asthma San Pedro And Peninsula Homeowner's Coalition February 25, 2009  
Re: 1-710 Project EIR Alternatives  
Barry R. Wallerstein D.Env. South Coast, Air Quality Management District, February 17, 2009, Pgs 9-14

<http://hydra.usc.edu/scehsc/web/Resources/Reports%20and%20Publications/THE%20Impact%20Project%20Report%20-%20June%202009%20FINAL.pdf>  
THE Impact Project Trade, Health, Environment Making the Case for Change  
THE Impact Project June 2009

## Air Pollutants from traffic

<http://www.arb.ca.gov/research/health/healthup/march07.pdf>  
Health Effects Associated With Traffic-Related Air Pollution  
Air Resources Board California Environmental Protection Agency, March 22, 2007

<http://eprints.qut.edu.au/27536/>  
On-road ultrafine particle concentration in the M5 East road tunnel, Sydney, Australia  
Knibbs, Luke D., deDear, Richard, Mengersen, Kerrie, & Morawska, Lidia (2009) On-road ultrafine particle concentration in the M5 East road tunnel, Sydney, Australia. *Atmospheric Environment*, 43(22-23), pp. 3510-3519.

<http://pubs.acs.org/doi/abs/10.1021/es062590s?prevSearch=freeway%2Bpollution&searchHistoryKey=>  
Particle Concentration and Characteristics near a Major Freeway with Heavy-Duty Diesel Traffic  
Leonidas Ntziachristos, Zhi Ning, Michael D. Geller, and Constantinos Sioutas\*  
Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, California 90089  
*Environ. Sci. Technol.*, 2007, 41 (7), pp 2223-2230 DOI: 10.1021/es062590s Publication Date (Web): February 23, 2007  
Copyright © 2007 American Chemical Society

<http://cfpub.epa.gov/ncer/abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/8977/report/0>

Near Roadways Exposure to Urban Air Pollutants Study (NEXUS)

Investigators: Batterman, Stuart A. , Dion, F , Lewis, T , Mukherjee, Bhramar , Robins, Thomas, Institution: University of Michigan - Ann Arbor, EPA Project Officer: Stacey Katz/Gail Robarge,, Project Period: September 1, 2008 through August 31, 2011

[http://www.chaseireland.org/Documents/WHO\\_PM\\_factsheet.pdf](http://www.chaseireland.org/Documents/WHO_PM_factsheet.pdf)

Particulate matter air pollution: how it harms health

World Health Organization Fact sheet EURO/04/05 Berlin, Copenhagen, Rome, 14 April 2005

<http://pubs.acs.org/doi/pdf/10.1021/es00046a019>

<http://www.mendeley.com/research/sources-fine-organic-aerosol-3-road-dust-tire-debris-organometallic-brake-lining-dust-roads-sources-sinks/>

Sources of fine organic aerosol. 3. Road dust, tire debris, and organometallic brake lining dust: roads as sources and sinks

Wolfgang F. Rogge, Lynn M. Hildemann, Monica A. Mazurek, Glen R. Cass, Bernd R. T. Simoneit, *Environ. Sci. Technol.*, 1993, 27 (9), pp 1892-1904, DOI: 10.1021/es00046a019, Publication Date: September 1993

<http://pubs.acs.org/doi/abs/10.1021/es070198o>

Metal Emissions from Brake Linings and Tires: Case Studies of Stockholm, Sweden 1995/1998 and 2005

David S. T. Hjortenkrans,\* Bo G. Bergbäck, and Agneta V. Häggerud, School of Pure and Applied Natural Sciences, University of Kalmar, Sweden, *Environ. Sci. Technol.*, 2007, 41 (15), pp 5224-5230, DOI: 10.1021/es070198o, Publication Date (Web): June 22, 2007, Copyright © 2007 American Chemical Society

<http://pubs.acs.org/doi/full/10.1021/es0618797?prevSearch=freeway%2Bpollution&searchHistoryKey=>

In-Cabin Commuter Exposure to Ultrafine Particles on Los Angeles Freeways

Yifang Zhu, Arantzazu Eiguren-Fernandez, William C. Hinds, and Antonio H. Miguel\*, Department of Environmental Engineering, Texas A&M University-Kingsville *Environ. Sci. Technol.*, 2007, 41 (7), pp 2138-2145 DOI: 10.1021/es0618797 Publication Date (Web): February 27, 2007 Copyright © 2007 American Chemical Society

<http://articles.latimes.com/2010/jan/08/nation/la-na-epa-smog-rules8-2010jan08>

EPA proposes nation's strictest smog limits ever

It wants to toughen the ozone limit adopted in 2008 by cracking down further on vehicles, power plants, factories and landfills. Much of the U.S. could then be in violation of federal regulations.

January 08, 2010 | By Jim Tankersley and Margot Roosevelt

<http://eprints.qut.edu.au/27536/>

On-road ultrafine particle concentration in the M5 East road tunnel, Sydney, Australia

Knibbs, Luke D., deDear, Richard, Mengersen, Kerrie, & Morawska, Lidia (2009) On-road ultrafine particle concentration in the M5 East road tunnel, Sydney, Australia. *Atmospheric Environment*, 43(22-23), pp. 3510-3519.

<http://latimesblogs.latimes.com/greenspace/2009/08/air-pollution-nitrogen-dioxide.html>

Cough! Cough! EPA's new effort to clean the air

LA Times, August 4, 2009 | 3:53 pm

[http://hydra.usc.edu/scehsc/web/Resources/Key\\_Research\\_Studies/4\\_Comparison\\_of\\_daytime\\_and\\_nighttime\\_concentration\\_profiles.pdf](http://hydra.usc.edu/scehsc/web/Resources/Key_Research_Studies/4_Comparison_of_daytime_and_nighttime_concentration_profiles.pdf)

Comparison of Daytime and Nighttime Concentration Profiles and Size Distributions of Ultrafine Particles near a Major Highway

Yi Fang Zhu, Thomas Kuhn, Paul Mayo, and William C. Hinds, Department of Environmental Health Sciences, University of California Los Angeles, 650 Charles E. Young Drive South, Los Angeles, California 90095

<http://www.examiner.com/environmental-policy-in-national/correction-to-story-clean-diesel-arrives-and-exceeds-the-grade>

Correction to Story Clean Diesel Arrives and Exceeds the Grade

December 19th, 2010 By Jon Anderson Environmental Policy Examiner

<http://www.sciencedaily.com/releases/2006/03/060302175906.htm>

Researchers To Scrutinize Megacity Pollution During Mexico City Field Campaign

*ScienceDaily*, materials provided by National Center for Atmospheric Research, (Mar. 3, 2006)



## Miscellaneous

<http://www.who.int/heli/risks/urban/transpdirectory/en/index.html>

Directory of resources on transport, health and environment in developing countries

Health and Environment Linkages Initiative - (HELI), World Health Organization (WHO), United Nations Environment Programme (UNEP)

## Children's Health and air pollution

<http://www.sciencedaily.com/releases/2008/01/080107094944.htm>

Air Pollution Shrinks Fetus Size, Study Suggests

*ScienceDaily*, materials provided by Queensland University of Technology, (Jan. 10, 2008)

<http://www.sciencedaily.com/releases/2008/04/080409114631.htm>

Traffic Exhaust Can Cause Asthma, Allergies And Impaired Respiratory Function In Children

*ScienceDaily*, materials provided by Karolinska Institutet., (Apr. 10, 2008) –

<http://www.sciencedaily.com/releases/2009/06/090625100625.htm>

Tiny Levels Of Carbon Monoxide Damage Fetal Brain

*ScienceDaily*, materials provided by University of California - Los Angeles, (June 26, 2009)

[http://psr-la.org/files/Air\\_Pollution\\_and\\_Birth\\_Weight\\_Among\\_Term\\_Infants\\_in\\_California\\_Parker\\_2005.pdf](http://psr-la.org/files/Air_Pollution_and_Birth_Weight_Among_Term_Infants_in_California_Parker_2005.pdf)

Air Pollution and Birth Weight Among Term Infants in California

Jennifer D. Parker, PhD\*, Tracey J. Woodruff, PhD, MPH, Rupa Basu, PhD, Kenneth C. Schoendorf, PhD, MPH, Published online January 3, 2005, *PEDIATRICS* Vol. 115 No. 1 January 2005, pp. 121-128 (doi:10.1542/peds.2004-0889), \*Office of Analysis and Epidemiology, National Center for Health Statistics, Hyattsville, Maryland\_ National Center for Environmental Economics, US Environmental Protection Agency, Washington, DC

[http://psr-la.org/files/Effect\\_of\\_Air\\_Pollution\\_on\\_Preterm\\_Birth.pdf](http://psr-la.org/files/Effect_of_Air_Pollution_on_Preterm_Birth.pdf)

Effect of Air Pollution on Preterm Birth Among Children Born in Southern California Between 1989 and 1993

Beate Ritz, Fei Yu, Guadalupe Chapa, and Scott Fruin, *Epidemiology* September 2000, Vol. 11 No. 5

[http://psr-la.org/files/Infant\\_Death\\_Syndrome\\_Ritz.pdf](http://psr-la.org/files/Infant_Death_Syndrome_Ritz.pdf)

Ambient Air Pollution and Risk of Birth Defects in Southern California

Beate Ritz, Fei Yu, Scott Fruin, Guadalupe Chapa, Gary M. Shaw, and John A. Harris, *American Journal of Epidemiology*, Copyright © 2002 by the Johns Hopkins Bloomberg School of Public Health, Vol. 155, No. 1, *Printed in U.S.A.*

[http://psr-](http://psr-la.org/files/Birth%20Outcomes_and_Prenatal_Exposure_to_Ozone_Carbon_Monoxide_and_Part particulate_Matter.pdf)

[la.org/files/Birth%20Outcomes\\_and\\_Prenatal\\_Exposure\\_to\\_Ozone\\_Carbon\\_Monoxide\\_and\\_Part particulate\\_Matter.pdf](http://psr-la.org/files/Birth%20Outcomes_and_Prenatal_Exposure_to_Ozone_Carbon_Monoxide_and_Part particulate_Matter.pdf)

Birth Outcomes and Prenatal Exposure to Ozone, Carbon Monoxide, and Particulate Matter: Results from the Children's Health Study

Muhammad T. Salam, Joshua Millstein, Yu-Fen Li, Frederick W. Lurmann, Helene G. Margolis, and Frank D. Gilliland, *Environmental Health Perspectives*, VOLUME 113 | NUMBER 11 | November 2005, Department of Preventive Medicine, University of Southern California, Keck School of Medicine, Los Angeles, California, USA; Sonoma Technology Inc., Petaluma, California, USA; 3Air Resources Board, State of California, Sacramento, California, USA

[http://uscnews.usc.edu/health/stress\\_and\\_pollution\\_up\\_risk\\_for\\_children.html](http://uscnews.usc.edu/health/stress_and_pollution_up_risk_for_children.html)

Stress and Pollution Up Risk for Children

By Meghan Lewit on July 20, 2009 12:24 PM, USC-Led Study Finds Link Between Parental Stress, Air Pollution, and Children's Risk for Developing Asthma July 20, 2009

[http://psr-la.org/files/Traffic\\_Susceptibility\\_and\\_Childhood\\_Asthma\\_McConnell\\_2006.pdf](http://psr-la.org/files/Traffic_Susceptibility_and_Childhood_Asthma_McConnell_2006.pdf)

Traffic, Susceptibility, and Childhood Asthma

Rob McConnell, Kiros Berhane, Ling Yao, Michael Jerrett, Fred Lurmann, Frank Gilliland, Nino Kunzli,

Jim Gauderman, Ed Avol, Duncan Thomas, and John Peter

*Environmental Health Perspectives* • VOLUME 114 | NUMBER 5 | May 2006, Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, California, USA; Sonoma Technology Inc., Petaluma, California, USA

<http://www.sciencedaily.com/releases/2008/04/080415185019.htm>

Air Pollution Affects Respiratory Health In Children With Asthma, Study Shows

A new study reports that inner-city children with asthma may be particularly vulnerable to air pollution at levels below current air quality standards.

*ScienceDaily*, materials provided by NIH/National Institute of Allergy and Infectious Diseases, (Apr. 17, 2008)

<http://www.sciencedaily.com/releases/2008/11/081114081003.htm>

Traffic Pollution Worsens Symptoms In Asthmatic Children

*ScienceDaily*, materials provided by BioMed Central/Respiratory Research, (Nov. 17, 2008)

[http://media.sacbee.com/smedia/2007/01/26/17/lancet\\_gauderman\\_et\\_al\\_traffic1.source.prod\\_affiliate.4.pdf](http://media.sacbee.com/smedia/2007/01/26/17/lancet_gauderman_et_al_traffic1.source.prod_affiliate.4.pdf)

Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

W James Gauderman, Hita Vora, Rob McConnell, Kiros Berhane, Frank Gilliland, Duncan Thomas, Fred Lurmann, Edward Avol, Nino Kunzli, Michael Jerrett, John Peters, *Lancet* 2006; 368: Department of Preventive Medicine, University of Southern California, 1/26/07

<http://www.usc.edu/uscnews/stories/14137.html>

Genes Linked to Increased Asthma Risk

USC-led study finds that certain genetic variations put children who live near a major roadway at a greater risk of developing asthma. By Meghan Lewit, USC News, 08/22/07

<http://www.sciencedaily.com/releases/2007/12/071214094057.htm>

Heavy Traffic Makes Breathing A Burden In Children

*ScienceDaily*, materials provided by American Thoracic Society, (Dec. 17, 2007)

<http://www.scpcs.ucla.edu/news/CHSPolicyBrief.pdf>

Road To An Unhealthy Future For Southern California's Children

Andrea M. Hricko, 2004, University Of Southern California Urban Initiative

<http://www.usc.edu/uscnews/stories/13313.html>

Living Near Highways Can Stunt Lungs

By Jennifer Chan, USC News, 01/25/07

<http://www.sciencedaily.com/releases/2007/01/070125185843.htm>

Living Near A Highway Affects Lung Development In Children, Study Shows

*ScienceDaily*, materials provided by University of Southern California, (Jan. 26, 2007)

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Association between Air Pollution and Lung Function Growth in Southern California Children Results from a Second Cohort

W. James Gauderman, G. Frank Gilliland, Hita Vora, Edward Avol, Daniel Stram, Rob McConnell, Duncan Thomas, Fred Lurmann, Helene G. Margolis, Edward B. Rappaport, Kiros Berhane, and John M. Peters

AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE VOL 166 2002, Department of Preventive Medicine, University of Southern California, Los Angeles; Sonoma Technology Inc., Petaluma; and California Environmental Protection Agency, Sacramento, California,

<http://hydra.usc.edu/scehsc/pdfs/D-1-3%20Healthy%20Air%20Quality%20Solutions%20for%20Schools.pdf>

Healthy Air Quality Solutions for Schools Adapted from "Outdoor Air Air"

By Andrea Hricko Chapter 12 in Safe and Healthy School Environments Frumkin 2006 Oxford University Press

## Local and Regional air quality effects

<http://pubs.acs.org/doi/full/10.1021/es0618797?prevSearch=freeway%2Bpollution&searchHistoryKey=&>

In-Cabin Commuter Exposure to Ultrafine Particles on Los Angeles Freeways

Yifang Zhu, Arantzazu Eiguren-Fernandez, William C. Hinds, and Antonio H. Miguel\*

Department of Environmental Engineering, Texas A&M University-Kingsville *Environ. Sci. Technol.*, 2007, 41 (7), pp 2138-2145

[http://journals.ametsoc.org/doi/abs/10.1175/1520-0450\(1999\)038%3C1049%3ATOAPPT%3E2.O.CO%3B2](http://journals.ametsoc.org/doi/abs/10.1175/1520-0450(1999)038%3C1049%3ATOAPPT%3E2.O.CO%3B2)

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Chen, Jun, Robert Bornstein, Charles G. Lindsey, 1999: *J. Appl. Meteor.*, 38, 1049-1068.

<http://www.psr-la.org/issues/environmental-health/air-pollution-and-goods-movement/>

The Ports of Long Beach and Los Angeles are the single largest source of air pollution in southern California  
Health Impacts of Air Pollution Associated With Goods Movement  
*Physicians for Social Responsibility* - Los Angeles

<http://www.coalitionforcleanair.org/pdf/newsletters/cca-newsletter-winter-2005.pdf>

ARB Adopts Landmark Off-Road Emissions Rules  
27 July 2007

<http://www.coalitionforcleanair.org/pdf/newsletters/cca-newsletter-winter-2005.pdf>

Clearing the Air Winter 2005 The Coalition for Clean Air

<http://newsroom.ucla.edu/portal/ucla/air-pollution-from-freeway-extends-93857.aspx>

Air pollution from freeway extends further than previously thought  
Study finds pollutants 1.5 miles from I-10 during early morning hours  
By Sarah Anderson UCLA June 10, 2009

<http://www.sciencedaily.com/releases/2009/08/090827101241.htm>

Tunnels Concentrate Air Pollution By Up To 1,000 Times  
A toxic cocktail of ultrafine particles is lurking inside road tunnels in concentration levels so high they have the potential to harm drivers and passengers, a new study has found.  
*ScienceDaily*, materials provided by Queensland University of Technology, (Aug. 30, 2009)

[http://aaqr.org/VOL10\\_No1\\_February2010/6\\_AAQR-09-05-IR-0036\\_43-58.pdf](http://aaqr.org/VOL10_No1_February2010/6_AAQR-09-05-IR-0036_43-58.pdf)

Atmospheric Processes Influencing Aerosols Generated by Combustion and the Inference of Their Impact on Public Exposure: A Review  
Heavy and light duty vehicles, are the dominant contributors of ambient particulate matter (PM) in urban environments  
Zhi Ning, Constantinos Sioutas\*, *Department of Civil and Environmental Engineering, University of Southern California, 3620 South Vermont Avenue, Los Angeles, CA 90089, USA* 10: 43-58, 2010, Copyright © Taiwan Association for Aerosol Research, ISSN: 1680-8584 print / 2071-1409 online, doi: 10.4209/aaqr.2009.05.0036, *Received for review, May 25, 2009, Accepted, August 28, 2009*

[http://psr-la.org/files/Bronchitis\\_Air\\_Pollution\\_Sunyer\\_2006.pdf](http://psr-la.org/files/Bronchitis_Air_Pollution_Sunyer_2006.pdf)

Chronic bronchitis and urban air pollution in an international study  
J Sunyer, D Jarvis, T Gotschi, R Garcia-Esteban, B Jacquemin, I Aguilera, U Ackerman, R de Marco, B Forsberg, T Gislason, J Heinrich, D Norbäck, S Villani and, N Kunzli  
*Occup. Environ. Med.* 2006;63;836-843; originally published online 17 Jul 2006;  
doi:10.1136/oem.2006.027995

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A new crop of eco-warriors take to their own streets  
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Rochelle S. Green, Brian Malig, Gayle C. Windham, Laura Fenster, Bart Ostro<sup>1</sup>, Shanna Swan, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Oakland, California, USA, <sup>2</sup> Division of Environmental and Occupational Disease Control, California Department of Public Health, Richmond, California, USA, <sup>3</sup> Department of Obstetrics and Gynecology, University of Rochester School of Medicine and Dentistry, Rochester, New York, USA, Published in [117\(12\): Dec 2009](#)

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The North American Steel Interstate Coalition, Copyright 2010.

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Allen L. Robinson\*, Eric M. Lipsky, Natalie Pekney, Leonard Lucas, David Wynne, Carnegie Mellon University, Pittsburgh, PA. Wolfgang F. Rogge, Anna Bernado-Bricker, Orhan Sevimoglu, Florida International University, Miami, FL. Presented at *AAAR Specialty Conference: Particulate Matter, Supersites Program & Related Studies* February 7-11, 2005, Atlanta GA

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Ambient ultrafine particles provide a strong adjuvant effect in the secondary immune response: implication for traffic-related asthma flares

Ning Li1,\* , Jack R. Harkema2,3,\* , Ryan P. Lewandowski3, Meiying Wang1,2, Lori A. Bramble3, Glenn R. Gookin4, Zhi Ning5, Michael T. Kleinman4, Constantinos Sioutas2,5, and Andre E. Nel1,2, *American Journal of Physiology-Lung Cellular and Molecular Physiology*, Submitted 9 April 2010. accepted in final form 17 June 2010.

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Lilian Calderón-Garcidueñas, Anna C. Solt, Carlos Henríquez-Roldán, Ricardo Torres Jardón, Bryan Nuse, Lou Herritt, Rafael Villarreal-Calderón, Norma Osnaya, Ida Stone, Raquel García, Diane M. Brooks, Angelica González-Maciel, Rafael Reynoso-Robles, Ricardo Delgado-Chávez and William Reed, The Center for Structural and Functional Neurosciences, College of Health Professions and Biomedical Sciences, University of Montana, 32 Campus Drive, 289 Skaggs Bldg., Missoula, MT 59812

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Received: 21/04/08 \*to whom all correspondence should be addressed: v M. POLITIS\* Water and Air Analysis Laboratory, Department of Environment, C. PILINIS University of Aegean, Mytilene, Greece T.D. LEKKAS Accepted: 30/06/08

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Ultrafine particles at three different sampling locations in Taiwan  
Atmospheric ultrafine particles (UPs or  $PM_{0.1}$ ) were investigated at the roadside of Syuefu road in Hsinchu city, in the Syueshan highway tunnel in Taipei and in the NTU Experimental Forest in Nantou, Taiwan  
Sheng-Chieh Chen<sup>a</sup>, Chuen-Jinn Tsai<sup>a</sup>, Charles C.-K. Chou<sup>b</sup>, Gwo-Dong Roam<sup>c</sup>, Sen-Sung Cheng<sup>d</sup> and Ya-Nan Wang<sup>d</sup>  
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Ambient Air Pollution and the Progression of Atherosclerosis in Adults

Nino Künzli<sup>1,2\*</sup>, Michael Jerrett<sup>3</sup>, Raquel Garcia-Esteban<sup>2</sup>, Xavier Basagaña<sup>2</sup>, Bernardo Beckermann<sup>3</sup>, Frank Gilliland<sup>4</sup>, Merce Medina<sup>2</sup>, John Peters<sup>4</sup>, Howard N. Hodis<sup>5</sup>, Wendy J. Mack Swiss Tropical and Public Health Institute (Swiss TPH), Basel, Switzerland, 2 Centre for Research in Environmental Epidemiology CREAL, Barcelona, Spain, 3 Division of Environmental Health Sciences, School of Public Health, University of California, Berkeley, California, United States of America, 4 Department of Preventive Medicine, University of Southern California, Los Angeles, California, United States of America, PLoS ONE February 2010 | Volume 5 | Issue 2 | e9096

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A Cohort Study of Traffic-Related Air Pollution and Mortality in Toronto, Ontario, Canada

Michael Jerrett,<sup>1</sup> Murray M. Finkelstein,<sup>2</sup> Jeffrey R. Brook,<sup>3</sup> M. Altaf Arain,<sup>4</sup> Palvos Kanaroglou,<sup>4</sup> Dave M. Stieb,<sup>5</sup> Nicolas L. Gilbert,<sup>5</sup> Dave Verma,<sup>6</sup> Norm Finkelstein,<sup>4</sup> Kenneth R. Chapman,<sup>7</sup> and Malcolm R. Sears<sup>8</sup>

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By Meghan Lewit *HSC Weekly* 2010-02-26

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EDF March 1, 2010 | Posted by Transportation Team *This post was co-authored by Camille Kustin*

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Appendix A - Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California (PDF) 111 pages

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Coccidioidomycosis Among Workers at an Archeological Site, Northeastern Utah

Lyle R. Petersen; Stacie L. Marshall; Christine Barton-Dickson; Rana A. Hajjeh; Mark D. Lindsley; David W. Warnock; Anil A. Panackal; Joseph B. Shaffer; Maryam B. Haddad; Frederick S. Fisher; David T. Dennis; Juliette Morgan Posted: 04/22/2004; Emerging Infectious Diseases. 2004;10(4) © 2004 Centers for Disease Control and Prevention (CDC)

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Valley Fever

There is no doubt that construction companies contribute significantly to Valley Fever. According to the MayoClinic By ADMIN, Arizona Public Record Search, on December 27, 2010

<http://www.thefreelibrary.com/PROJECT+STIRS+FEARS+OF+VALLEY+FEVER%3b+RESIDENTS+SAY+CONSTRUCTION+MAY..-a083807257>

Project Stirs Fears Of Valley Fever; Residents Say Construction May Spread Harmful Spores  
Byline: Gloria Gonzales Daily News Staff Writer Copyright 1998 Daily News

## **APPENDIX B**

Outline of Health concerns for 710 Tunnel Scoping

# **OUTLINE of health concerns for 710 Tunnels Scoping**

## Tunnel Safety

Traffic accidents--specific dangers of a tunnel accident with fires

Major hazards: earthquakes, floods, terrorist attacks

What will be the typical time in tunnel with current congestion patterns?

Rescue and safety capability within the tunnel; escape routes; handicap escapes

## Tunnel and Health

Monitor pollutants - tunnels concentrate pollutants:

Specify PM including ultrafine, carbon black, ozone, Nitrogen dioxide, NO<sub>2</sub>, CO<sub>2</sub>

Brake and tire lining emissions; tire rubber, fine organic aerosols

Temperature and seasonal impacts/day and night impacts/ wind impacts on pollutants

What are the health effects in a tunnel with stopped traffic? Noise, pollution, psychological

HIA, HRA should cover the following tests and analyses:

Concentrations in proximity to portals and ventilation shafts

Concentrations at sensitive sites including schools, hospitals, residences

Effect on asthma

Effect on lung disease

Possible effect on diabetes, breast cancer

Neurotoxin effect on brain cancers and cognitive dysfunction

Cardiovascular -mortality, cardiovascular events, vascular inflammation, stroke, BP

Miscellaneous: appendicitis, pneumonia

Children:

lung development, asthma, autism, fetal brain development

Women:

Differential effect on women: lungs, premature births, fetal brain development, increased abortion rates

Continuum of effect-no threshold (important for mitigation)

Diesel specific health data

Duration of exposure with regular commuters

Comparison with smoking risk

Distance from freeway/tunnel/ventilation shafts modeling 500 feet up to 1.5 miles

Other health externalities: missed school, missed work, increased health expenses, increased stress/worry

### Tunnel Construction

Workers safety

Dust displacement into air; coccidioidomycosis

Disruption of underground water supplies

### Tunnel finances

Cost estimates don't take into consideration **health externalities**

PPP responsibility to health and communities

Ultimately liability for health impact

### Tunnel Impact on Quality of Life

Alignment with transportation needs and goals to make livable, equitable communities

Alignment with regional climate and air quality goals/guidelines/standards

Alignment with complete roads concepts

Impact on regional air quality

## APPENDIX C

Links:

<http://departments.oxy.edu/uepi/publications/GlobalTrade.pdf>

Page 22 of pdf

[http://t4america.org/docs/blueprint\\_summary.pdf](http://t4america.org/docs/blueprint_summary.pdf)

Page 7 of pdf

<http://www.coalitionforcleanair.org/air-pollution-10facts.html>

<http://www.coalitionforcleanair.org/air-pollution-pollutants.html>

<http://www.coalitionforcleanair.org/our-programs-transportation-facts.html>

# Selected Health, Economic & Community Impacts - Freight Transportation

	Hazard	Where it's found, who is at risk	Illness or condition that the long-term exposure or impact can cause
REGIONAL AIR POLLUTION	Particulate matter	Elevated levels of PM2.5 in the air	Cardiovascular disease, COPD (e.g., emphysema)
	PM and elemental carbon (EC)	In vehicle exhaust; EC is a marker for diesel	Chronic exposure leads to reduction lung function in children
	Ultrafine particles (UFPs)	In vehicle exhaust; considered very toxic	When lab animals breathe UFPs, some end up in the brain; UFPs can cause artery hardening in lab animals
	Nitrogen dioxide -- precursor to ozone	Diesel emissions contains high levels of NO <sub>2</sub>	Increase in school absences is linked to increases in ozone levels
LIVING NEAR TRAFFIC-RELATED AIR POLLUTION	Living close to highways	Children	Increased asthma; exacerbation of asthma (e.g., wheezing) and use of more asthma medication
	Living or going to school near a busy road	Children	More likely to develop new cases of asthma
	Living near busy roads	Pregnant women	More likely to have premature or low birth weight babies or miscarriages, or develop preeclampsia
	Living near a freeway	Adults	Thickening of the artery walls that can lead to heart disease and stroke
	Living within 50 meters of a busy road with more than 15,000 vehicles/day	Women	More likely to develop mild cognitive decline as they age
	Living near busy roadways	Women	More likely to develop new cases of diabetes
	Living near busy roads	Men and women	More likely to develop stroke and new cases of heart disease
HIGH NOISE LEVELS	Community noise pollution	At risk: those living near busy highways, marine terminals, airports, rail yards, and train tracks, and/or construction of the above	Residents near airports and highways show (for adults) an increase in cardiovascular disease and stroke, sleep difficulties and anxiety; and (for children) problems with school behavior and anxiety
	Elevated levels of noise in workplaces	At risk: dock workers, railroad workers and truck drivers	Long term exposure can cause hearing loss, stress and high blood pressure
LABOR ISSUES; WORKER HEALTH AND SAFETY	Contingent employment - e.g., warehouse workers	Workers often hired by agencies as temporary workers with low-pay and no benefits	Stressful, insecure jobs without benefits
	Misclassification as independent contractors rather than employees	Port truck drivers	Lack of basic worker protections, such as hourly wage, overtime, health insurance, unemployment benefits, right to organize - and OSHA protections
	Diesel exhaust	Dock workers, railroad workers, truck drivers and workers at trucking operations	Increase in lung cancer in all three occupations; increase in COPD (e.g., emphysema) among railroad workers
	Heat	Lack of air conditioning in cabs of trucks and locomotives and inside huge distribution centers	If outdoor temperatures are extremely high and there is no relief or mitigation, workers can suffer from heat stress illnesses
	Injuries/fatalities	Some parts of the freight transportation industry are considered "high hazard"	E.g. The 2009-2010 California OSHA highest hazard industry list included warehousing and truck transportation
COMMUNITY IMPACTS	Industrial blight	Empty containers in lots near homes; views of industrial cranes	Decreases home values and quality of life
	Traffic Congestion	Cars must travel with big-rig trucks; expanding number of heavy duty trucks hauling containers; truck driving schools operating in neighborhoods	Stress from congestion; increased commuting time means longer times on the road breathing air pollution in exhaust from cars and trucks
	Cars traveling in same lanes and on same highways	Expanding number of heavy duty trucks hauling	Injuries and fatalities in car-truck accidents.
	24-hour lighting	Lights shine in windows	Difficulty sleeping at night
	Road repairs	Highways, truck routes, residential streets near rail yards, ports and warehouses	High cost to local and state taxpayers to repair the roads and highways from big-rig truck damage
	Eminent domain	Exerts the right of railroads or governments to appropriate private property (e.g., to build a highway)	Community residents can lose their homes



# National Transportation Objectives & Targets



2010-2030

## Objectives

Improve Economic Competitiveness, Transportation System Efficiency and Workforce Development Opportunities

Improve Transportation System Conditions and Connectivity

Promote Energy Efficiency and Achieve Energy Security

Ensure Environmental Protection, Restore Climate Stability and Resolve Persistent Environmental Justice Issues

Ensure Safety for All Transportation Users and Improve Public Health Outcomes

Provide Equal and Equitable Access to Transportation Options in Urban, Suburban and Rural Communities

## Performance Targets

Reduce per capita vehicle miles traveled by 16%

Triple walking, biking and public transportation usage

Reduce transportation-generated carbon dioxide levels by 40%

Reduce delay per capita by 10%

Increase proportion of freight transportation provided by railroad and intermodal services by 20%

Achieve zero percent population exposure to at-risk levels of air pollution

Improve public safety and lower congestion costs by reducing traffic crashes by 50%

Increase share of major highways, regional transit fleets and facilities, and bicycling/pedestrian infrastructure in good state of condition by 20%

Reduce average household combined housing + transportation costs 25% (use 2000 as base year)

Increase by 50% essential destinations accessible within 30 min. by public transit, or 15 min. walk for low-income, senior and disabled populations



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The Coalition for Clean Air is dedicated to restoring clean, healthful air to California by advocating responsible public policy, providing technical and educational expertise, and promoting broad-based community involvement.

## Top 10 facts Californians should know about air pollution and health

1. Breathing air in polluted metropolitan areas such as Los Angeles or Riverside can reduce your life expectancy by 2 to 3 years.
2. Motor vehicles and other air pollution sources that move, such as ships, trucks, trains, buses and even lawnmowers, account for about 90% of the cancer risk in the greater-Los Angeles region – with stationary sources such as power plants and factories accounting for only about 10%.
3. Diesel exhaust from trucks, ships, trains and buses has been declared to contain over 40 substances listed as hazardous air pollutants by the U.S. EPA.
4. When you drive in bumper-to-bumper traffic, pollutants outside can seep into your car, making the air you breathe inside your car up to 10 times more polluted than typical city air.
5. Every day that a ship sits at dock unloading its cargo, it releases an entire ton of smog-forming and toxic pollutants.
6. If you live, work or go to school near freeways, high-traffic roads, seaports, and rail yards, you are generally at greater risk for cancer and decreased lung function, studies show, because these places contain more concentrated levels of air pollution.
7. For your child, toxic air pollution is an even bigger problem, in part because children breathe much more quickly than adults.
8. Asthma is a leading cause of school absenteeism, according to the California Department of Education.
9. Even if you don't smoke cigarettes at all, your lungs or heart may be similarly damaged simply from exposure to ozone and particulate matter. The American Heart Association recently declared, "[Air pollution's] impact on cardiovascular disease ... represents a serious public health problem."
10. Health impacts from diesel pollution exposure, such as premature death, heart disease, asthma and bronchitis, cost some \$22 billion statewide in 2004, not including impacts such as lost work and school days.

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## Pollutants & Health Effects

-- Select Topic or Scroll Down --

### Particulate Matter (PM)

Particulate matter or PM consists of soot and dust particles that are smaller than the diameter of a human hair. There are two classifications for particulate matter, PM10 and PM2.5. All particles smaller than 10 microns in diameter are classified as PM10, or coarse size particles. Fine size particles, or PM2.5, are those particles less than or equal to 2.5 microns in diameter. Particles that are smaller 2.5 microns are smaller than 1/8th the diameter of a human hair. Sources of PM include diesel exhaust, soil dust, tire wear, and soot. These particles penetrate deeply into the lungs and are captured by lung tissue. A major contributor to the PM pollution problem is exhaust from diesel vehicles, which produce 79% of the particulate emissions from mobile sources. The most dangerous aspect of PM pollution from diesel vehicles is the hundreds of different chemicals that are adsorbed to the particle. Exposure to PM pollution has been associated with respiratory and cardiac problems, infections, asthma attacks, lung cancer and decreased life expectancy. The World Health Organization has estimated that 500,000 premature deaths each year may be associated with PM pollution. Fine particulate air pollution (<2.5 microns) is thought to be more dangerous because of its ability to penetrate deeper into lung tissue. A recent study found that even a small increase in PM2.5 can result in a significant increase in mortality. In fact, The American Lung Association believes that PM2.5 represents the most serious threat to our health. Segments of the population that are more susceptible to PM pollution include children, athletes, senior citizens, and people with pre-existing respiratory problems.

### Ozone (O3)

Ozone forms when hydrocarbons combine with nitrogen oxides and chemically react in sunlight. Hydrocarbons and nitrogen oxides are primarily produced by motor vehicles and various industrial practices. Ozone is a highly reactive oxidizing agent that breaks-down organic materials. Ozone is the primary component of smog, which has plagued Los Angeles for many years. A natural phenomenon called an "inversion layer" traps these gases and prevents them from dissipating into the atmosphere. The result is a serious smog problem in the valleys and basins of Southern California. Smog and the related high ozone levels are not just a California problem; Texas City, Texas recorded the highest one-day ozone level in the country for 1999. As populations grow, ozone and smog are becoming problems for large

cities throughout the country. Symptoms of ozone exposure are coughing, shortness of breath, wheezing, fatigue, throat dryness, chest pain, headache and nausea. Ozone has been shown to cause inflammation of lung tissue and reduced lung capacity. Development of asthma, increased lung cancer mortality rates, and accelerated lung aging have all been linked to ozone exposure. Lung damage from long-term exposure to ozone can be permanent, while short-term exposure appears to be reversible. Ozone reduces the respiratory system's ability to fight infection and remove foreign particles such as particulate matter. Segments of the population that are more susceptible to ozone pollution include children, athletes, senior citizens, and people with pre-existing respiratory problems.

### Hydrocarbons

Hydrocarbons are a class of reactive organic gases or ROG, which are formed solely of hydrogen and carbon. Hydrocarbons contribute to the formation of ozone and the resulting smog problem. Carcinogenic forms of hydrocarbons are considered hazardous air pollutants, or air toxics. The incomplete burning of any organic matter such as oil, wood, or rubber produces hydrocarbons. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint. The primary health effect of hydrocarbons results from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement.

### Nitrogen Oxides (NO<sub>x</sub>)

Nitrogen monoxide (NO) and nitrogen dioxide (NO<sub>2</sub>) are the two forms of nitrogen oxide found in the atmosphere. Nitrogen oxides contribute to the formation of ozone, production of particulate matter pollution, and acid deposition. The presence of nitrogen oxides gives smog its brown appearance. Factories, motor vehicles and power plants that burn fossil fuels produce nitrogen oxides. Diesel engines produce a disproportionately large amount of NO<sub>x</sub> when compared to gasoline engines because of their high temperature combustion process. Nitrogen dioxide has been shown to irritate lung tissue, cause bronchitis and pneumonia, and reduce resistance to respiratory infections. The presence of NO<sub>2</sub> in the atmosphere can have synergistic effects with other forms of air pollution. The health effects of ozone are magnified in the presence of nitrogen dioxide. Frequent or long-term exposure to high levels of nitrogen oxides can increase the incidence of acute respiratory illness in children.

### Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless gas that is produced by burning organic matter such as oil, natural gas, fuel, wood, and charcoal. Motor vehicles produce 67% of the man-made CO that is released into the atmosphere. Carbon monoxide displaces oxygen in red blood cells, which reduces the amount of oxygen that human cells need for respiration. Exposure to CO can result in fatigue, angina, reduced visual perception, reduced dexterity, and death. The elderly, young children, and people with pre-existing respiratory conditions are particularly sensitive to carbon monoxide pollution. Carbon monoxide is extremely deadly in an enclosed space, such as a garage or bedroom.

### Sulfur Dioxide (SO<sub>2</sub>)

Sulfur dioxide is a colorless gas produced by motor vehicles, refineries, and power plants that burn fossil fuels. Fossil fuels like coal and oil vary in sulfur concentrations and as a result the amount of sulfur dioxide they produce when burned. A high level of sulfur dioxide in exhaust gas can interfere with emission control mechanisms for other pollutants. Sulfur dioxide reduces respiratory volume, and increases breathing resistance in those exposed, especially asthmatics. Studies have also shown that sulfur dioxide increases nasal airway resistance. Other research has shown that daily mortality rates are consistently associated with sulfur dioxide and ozone levels.

## Air Toxics

Air toxics, which are also known as hazardous air pollutants, are 188 toxic and potentially toxic compounds listed by the Federal Clean Air Act. Air toxics are generally organic chemicals, including some hydrocarbons that are highly evaporative in nature. Sources for air toxics are motor vehicles, chemical plants, paint, and any other operation that uses organic compounds. Benzene, formaldehyde, acetaldehyde, 1,3-butadiene, and acrolein are typical examples of air toxics. Air toxics are pollutants that cause or are suspected of causing cancer in those exposed to them. Cancer is the primary health effect studied due to the low exposure concentrations of these air toxics such as benzene, and formaldehyde. Benzene has been shown to cause aplastic anemia and acute myelogenous leukemia in occupational studies of workers exposed to it. Known health concerns related to aldehydes include cancer, asthma, and respiratory tract irritation. It is also believed that these air toxics have impacts on the reproductive system by causing chromosomal aberrations or mutations. The nature of air toxics still poses many uncertainties about their true health effects. These chemical compounds have many different forms and metabolites as they are broken down, and little is known about how they interact with the body. The health effects of particulate matter from diesel exhaust are thought to be attributable to the many air toxics that are adsorbed to the particles. These small particles penetrate deeply into the lungs, and are the perfect vehicle for delivering air toxics into the body.

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## Transportation Facts

### General

- California population (2003): 36,363,502
- Registered cars and trucks in California: 24 million
- Miles driven every day in California: 825 million
- Miles driven daily by the average driver: 36
- Gallons of fuel burned every day in California: 47 million
- Pounds of pollutants created daily: 5.4 million

### Diesel

- Diesel exhaust is known to cause cancer, asthma, and other respiratory diseases.
- The health risk from diesel exposure is greatest for children and the elderly. The proximity of a child's residence and school to major roads is linked to asthma occurrence.
- Asthma limits children's ability to participate in sports, and is the most common cause of children's absence from school due to hospitalization.
- The State of California decided that there is enough evidence to list the particulate matter in diesel exhaust as a toxic air contaminant.
- Exhaust from heavy-duty diesel engines contains between 100-200 times more small particles than gasoline engine exhaust.
- California's Scientific Review Panel estimates that 16,000 Californians will develop lung cancer over a lifetime of diesel exhaust exposure.
- Only 2 percent of the vehicles on California's roads run on diesel. Yet they account for 31 percent of smog-forming nitrogen oxides, and for 79 percent of particular matter emissions from on-road vehicles.
- Cleaner alternatives to diesel are available, such as liquefied natural gas, compressed natural gas, or propane. Electric or fuel-cell engines are being enhanced to provide future alternatives.

### School Buses

- Children breathe at a rate twice that of adults, and are thus more susceptible to the



- toxicity of airborne diesel particles, vapors and gases.
- Some diesel exhaust causes pollutes the inside of buses when entering the cabin.
- There is a continuing need to replace older, dirtier buses with cleaner, newer buses to reduce children's exposure to vehicle related pollutants.
- The average diesel school bus is 223.5 times more toxic than a new compressed natural gas (CNG) school bus.
- Although a clean school bus powered with compressed natural gas costs about \$30,000 more than a diesel bus, it is cheaper in maintenance.

### Alternative Fuel Vehicles

- Electric vehicles (EV's) are the only true zero-emissions vehicles on the road.
- The only emissions from electric vehicles are from upstream power plants providing electricity.
- Upstream emissions for gasoline vehicles are more than 14 times higher than for electric vehicles.
- Electric vehicles run on electricity provided by on-board batteries, and can be recharged at any of the many recharging stations around the state.
- As of March 2002, there were more than 4,000 electric vehicles on the road in the U.S., most of them in California.
- Hybrid vehicles offer 2-3 times the energy efficiency of a comparable gasoline-only car, and have ranges of about 600 miles on a tank of gas.
- The most widely available hybrid vehicles are the Honda Insight and the Toyota Prius, which have retail prices of about \$20,000. The Ford Escape Hybrid will be launched late summer 2004, at a retail price of around \$27,000.
- Comprehensive data of vehicles' fuel economy and emissions is provided by the Environmental Protection Agency's "Green Vehicle Guide":  
<http://www.epa.gov/greenvehicles>.

### Light Trucks and SUV's

- By federal law, light trucks and SUV's do NOT have to meet the strict emission standards placed on passenger cars.
- Light trucks and SUV's now account to almost half of all auto sales in the United States.
- Many Light Trucks and SUV's run on diesel, which severely increases the danger of lung diseases.
- In average, light trucks and SUV's of the 2004 model year achieve only about 70 percent of the fuel economy of average cars.
- With advanced technology, such as gasoline-electric hybrid motors, auto manufacturers could ensure that SUV's and light trucks meet the same emission standards as cars.

### Ports

- The Ports of Los Angeles and Long Beach are the largest fixed source of air pollution in the South Coast Air Basin. Communities neighboring these ports suffer from some of the highest cancer risk due to air pollution in our region.
- The number of cargo containers entering these ports is expected to as much as quadruple in the next 20 years.
- A container ship that idles at dock emits about as much diesel pollution as a diesel truck traveling 70,000 miles – the approximate distance of three trips around our earth. These ships can produce more than 1 ton of smog-forming compounds during a 24 hour period at the dock.
- Shoreside power allows ships to turnoff their dirty auxiliary engines – virtually eliminating pollution at the dock.
- This technology has been used by the Navy for decades. The technology has also been proven successful for cruise ships and other harbor craft.
- The first container terminal with dockside power capability opened in 2004 as a result of a settlement between the Port of Los Angeles, NRDC, the Coalition for Clean Air and local community groups. A container ship with dockside power capability has already docked twice and ran on electric power.

### Airports

- Los Angeles International Airport is the second largest industrial smog source in the Los Angeles Area.
- Air pollution from airports is exempt from many rules that other industrial polluters must follow.
- Air travel is expected to double within the next two decades. It is the fastest growing mode of travel in the United States.
- One 747 arriving and departing from JFK airport in New York City produces as much smog as a car driven over 5,600 miles, and as much polluting nitrogen oxides as a car driven nearly 26,500 miles.
- Airplanes can save a lot of fuel if they have the ability to move on ground with just one engine running.
- The United States is one of only 3 countries opposing a worldwide standard that would reduce the impact of aircraft emissions in the atmosphere.

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