



Air Quality and Alternative Fuels – Washington State Transportation Commission

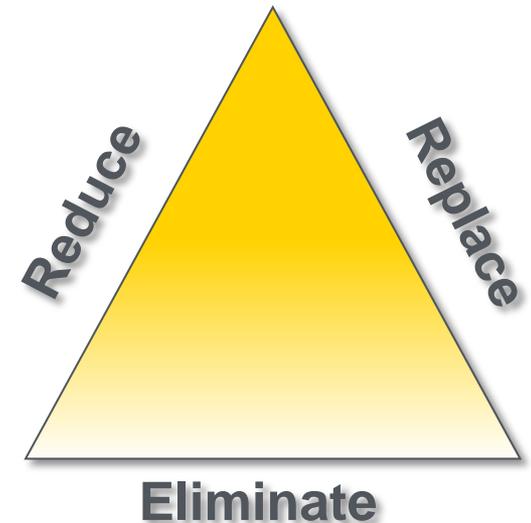
Scott DeWees

Co-Coordinator | Western WA Clean Cities
A program of the Puget Sound Clean Air Agency
wwcleancities.org

Clean Cities Mission

To advance the energy, economic, and environmental security of the U.S. by supporting local decisions to reduce petroleum use in transportation.

- Energy Policy Act of 1992 (EPAAct)
- Provides a framework for businesses and government agencies to work together



- Nearly 100 coalitions in 45 states
- 775,000 AFVs using alternative fuels
- 6,600 fueling stations

Clean Cities Coalitions





A program of:



- Membership based organization
- Founded in 1998 @ the City of Seattle
- Moved to Puget Sound Clean Air Agency in 2009
- Supports the Agency's transportation-emission reduction goals
- Regional air pollution control agency
- Permitting, inspection, and enforcement entity for Washington Clean Air Act
- Covers Snohomish, King, Kitsap, and Pierce Counties

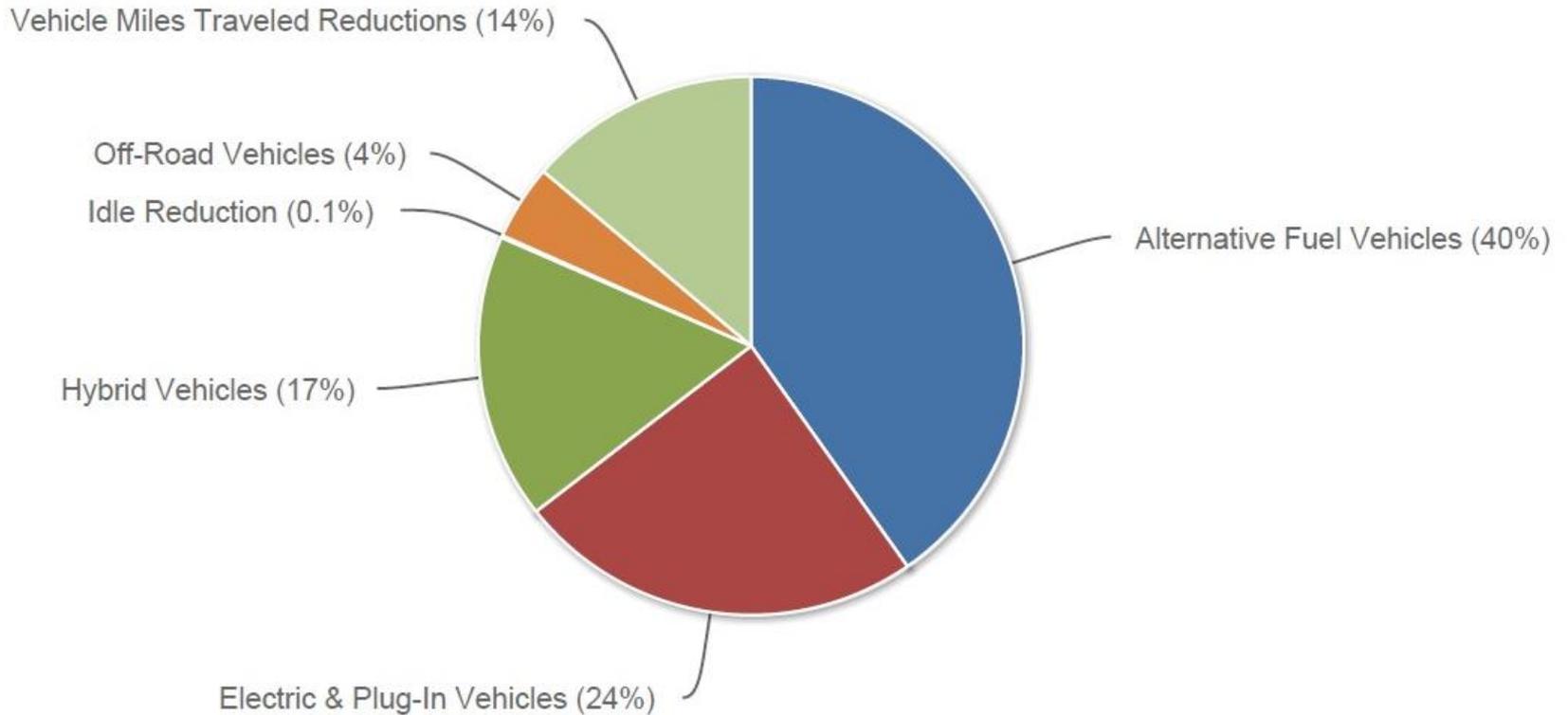
- Fleet and member consultation
- Organize educational and training events
- Advocate for petroleum reduction policies
- Administer project funding
- Connect our region to the national Clean Cities landscape

And more!



2013 Gallons of Gasoline Equivalent Reduced

16,479,760 gallons



2013 Greenhouse Gas Emissions Reduced

93,137 tons



Renewable natural gas for Pierce Transit



SeaTac airport ground support equipment-electrification



EV leases for government agencies



Contributor to Washington State Alternative Fuel Rule-development

EV market viability dependent on weight

Class 1 - 6,000 & Less Minivan Cargo Van SUV Pickup Truck
Class 2 - 6,001 to 10,000 Minivan Cargo Van Full-Size Pickup Step Van
Class 3 - 10,001 to 14,000 Walk-in Box Truck City Delivery Heavy-Duty Pickup
Class 4 - 14,001 to 16,000 Large Walk-in Box Truck City Delivery
Class 5 - 16,001 to 19,500 Bucket Truck Large Walk-in City Delivery
Class 6 - 19,501 to 26,000 Beverage Truck Single-Axle School Bus Rack Truck
Class 7 - 26,001 to 33,000 Refuse Furniture City Transit Bus Truck Tractor
Class 8 - 33,001 & Over Cement Truck Truck Tractor Dump Truck Sleeper

Cost effective

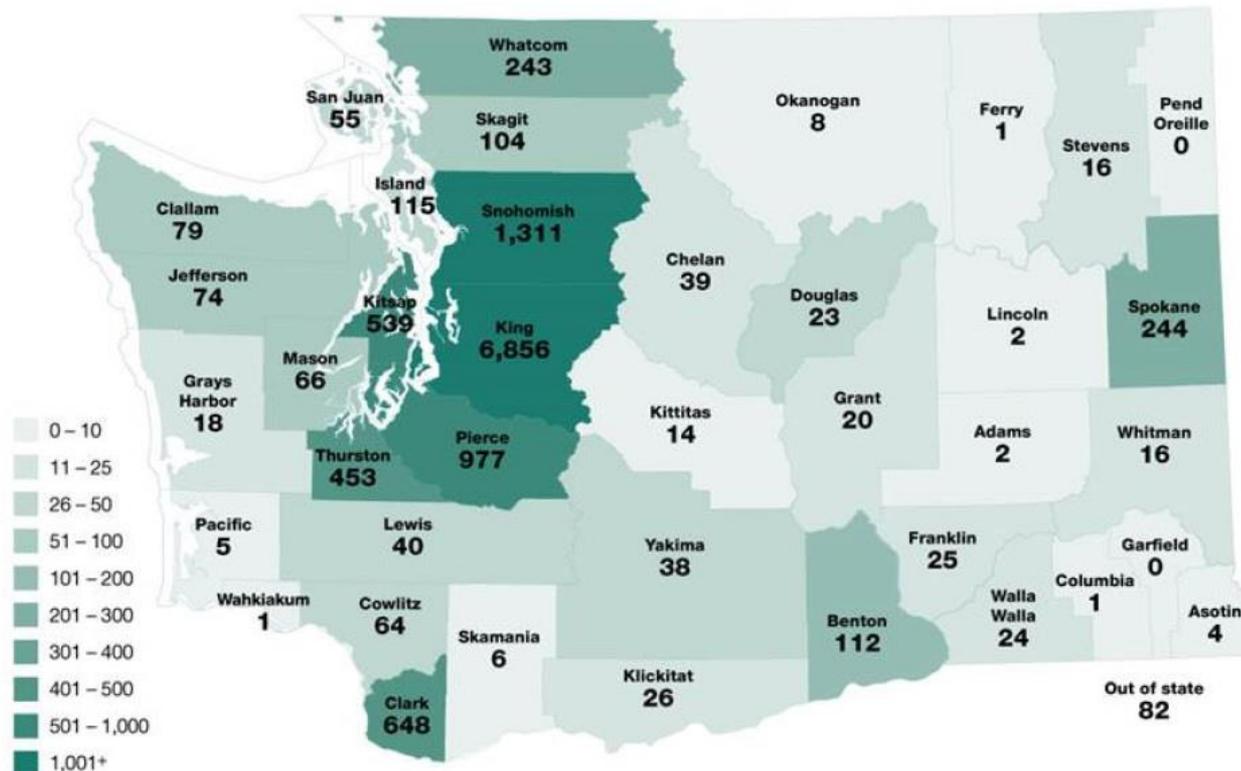


Cost prohibitive*



12,351 Plug In Electric Vehicles Registered in Washington

As of December 31, 2014



Map includes Electric Vehicles (EVs) produced by major automakers since about 2011. It does not include cars that were converted to EVs by their owners, neighborhood EVs or EV models from the 1990's that are still registered in Washington, or motorcycles. WSDOT created this map based on data provided by the Washington State Department of Licensing.

- Light duty and neighborhood electric vehicles: 249
- Off-road: 370
- Medium-heavy: 154 (metro trolley)

Common applications:

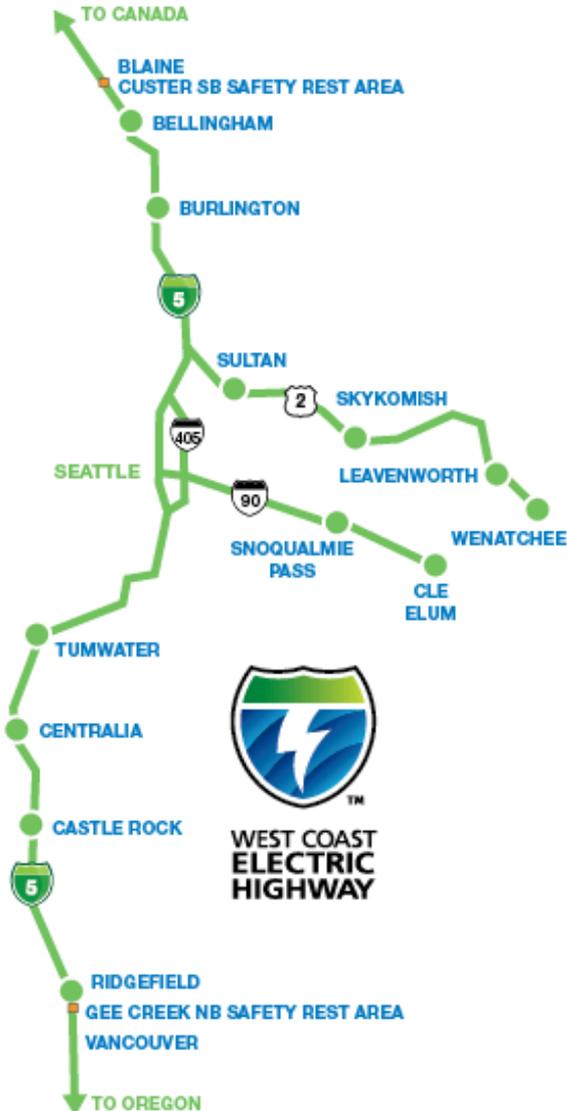
- Parking and code enforcement
- Motor pool vehicles
- Grounds keeping
- Ground support (airport)
- Metro trolleys



West Coast Green Highway

“The multi-state effort aims to promote high-efficiency and cleaner fuel vehicles including Compressed Natural Gas (CNG), Biodiesel, Hydrogen Fuel Cell, and Plug-In Electric Vehicles “





- Great progress with Electric Highway
- Need greater charger density
- Next opportunity: connect regional destinations



- Expand West Coast Green Highway For other alternative fuels?
- Use of public-private partnership for participation in additional infrastructure

Working together for clean air

Overview of Transportation-Emission Impacts in Puget Sound



Many Different Types of Pollutants

- Fine Particles
- Nitrogen Dioxide
- Ozone (Smog)
- Sulfur Dioxide
- Carbon Monoxide
- Lead
- Air Toxics (like benzene)



**Has Federal Limits in
the Clean Air Act**

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Sources: Trucks vs Cars

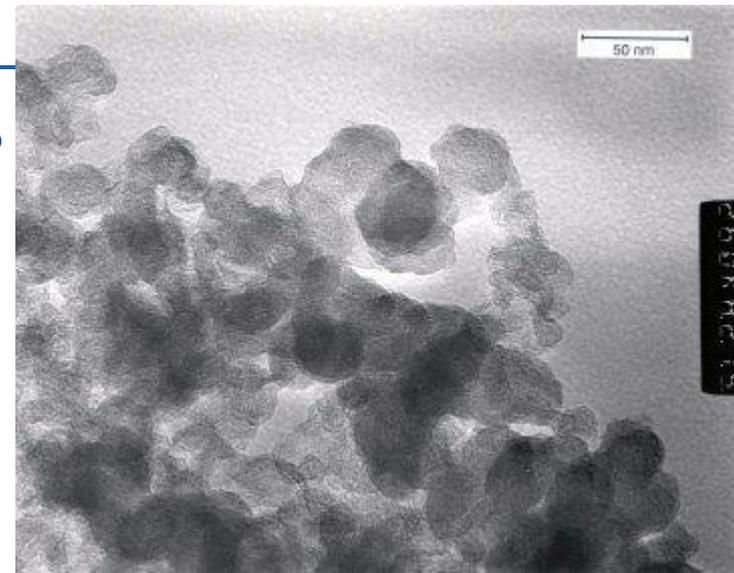


- Diesel particulate
- Nitrogen dioxide
- Air toxics
- PAHs

- Nitrogen dioxide
- Air toxics
- Tire, brake wear
- Oil in badly tuned cars

Are all Fine Particles the Same?

- **No**
- **Diesel particles are a smaller percentage of the total, but more toxic**
- **No federal standard specifically for diesel exhaust**



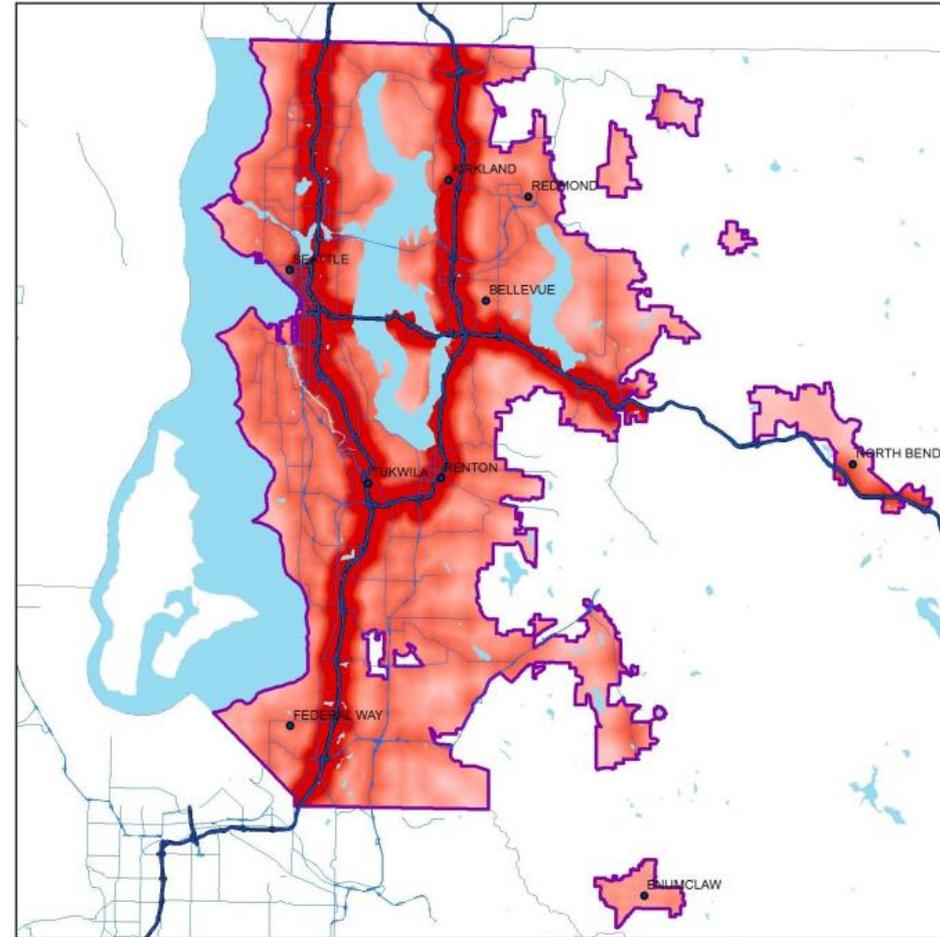
Many Health Effects



- **Reduced lung function**
- **Heart attacks**
- **Strokes**
- **Premature death**
- **Cancer**

New Emphasis on Near Road Exposure

Weighted Road Density, Urban King County



8/27/2012

Low-income and Minorities Generally Closer to Traffic Volume

Weighted Road Density and Percent Residents of Color by Census Tract
Urban King County, 2010 Census

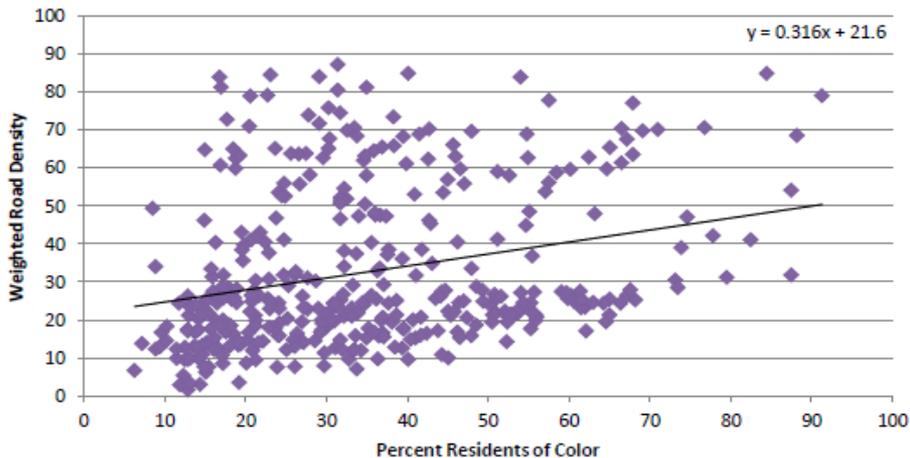


Figure 7. Weighted road density and percent residents of color by census tract, urban King County, 2010 census

Weighted Road Density and Median Household Income by Census Tract
Urban King County, 2010 Census

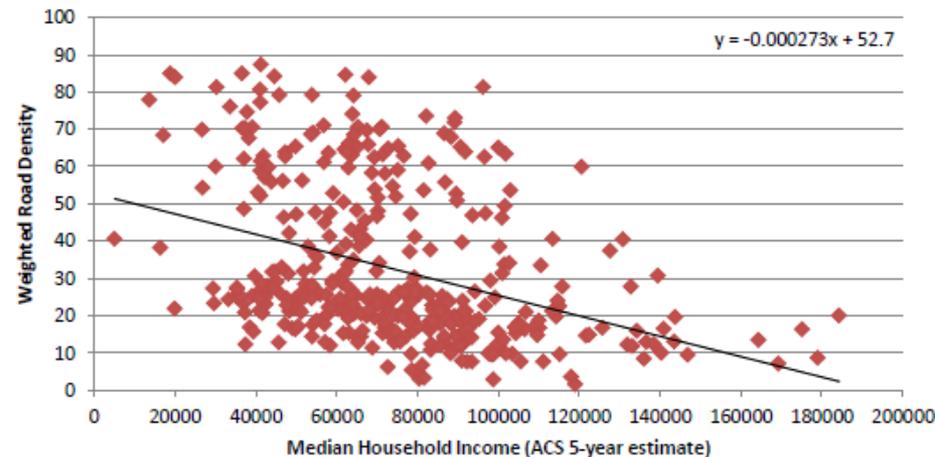


Figure 5. Weighted road density and median household income by census tract, urban King County, 2010 census.

Some Pollutants Are Highly Localized, Others Are Not

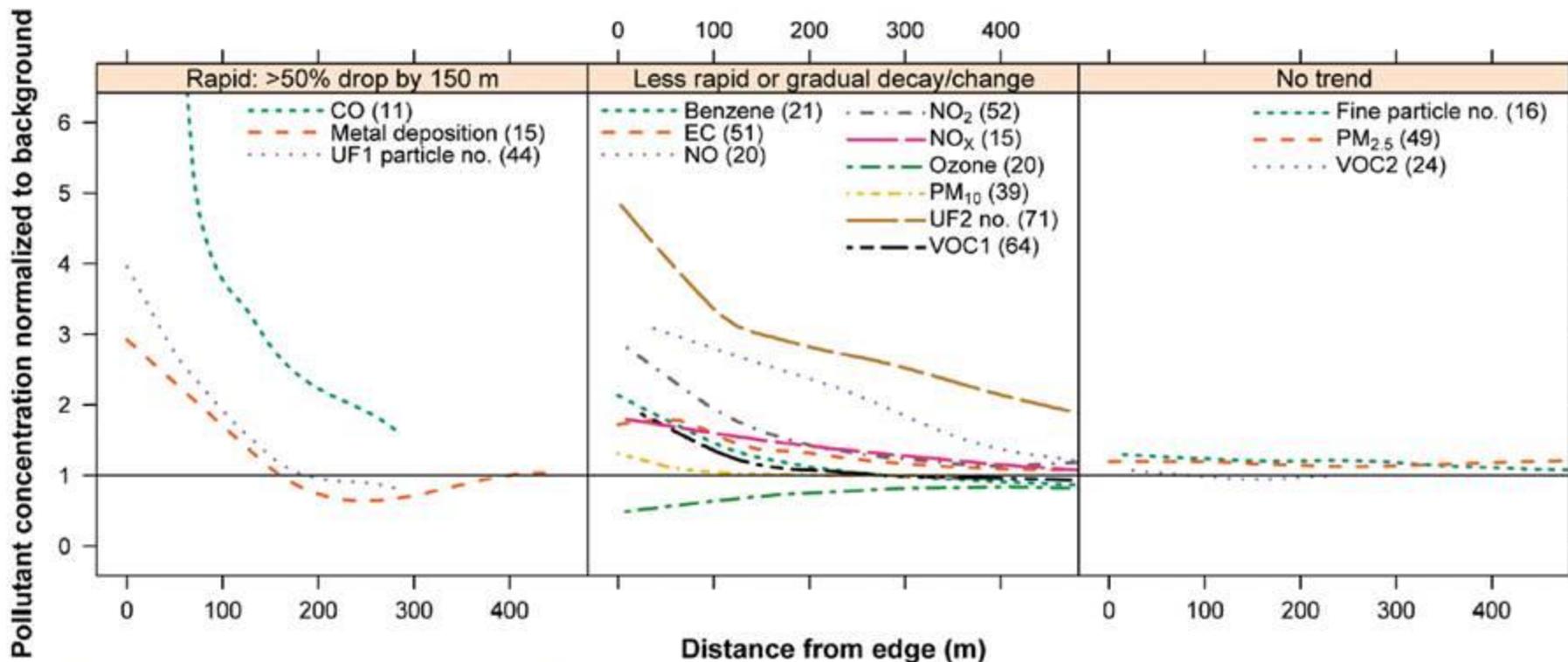
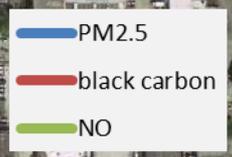
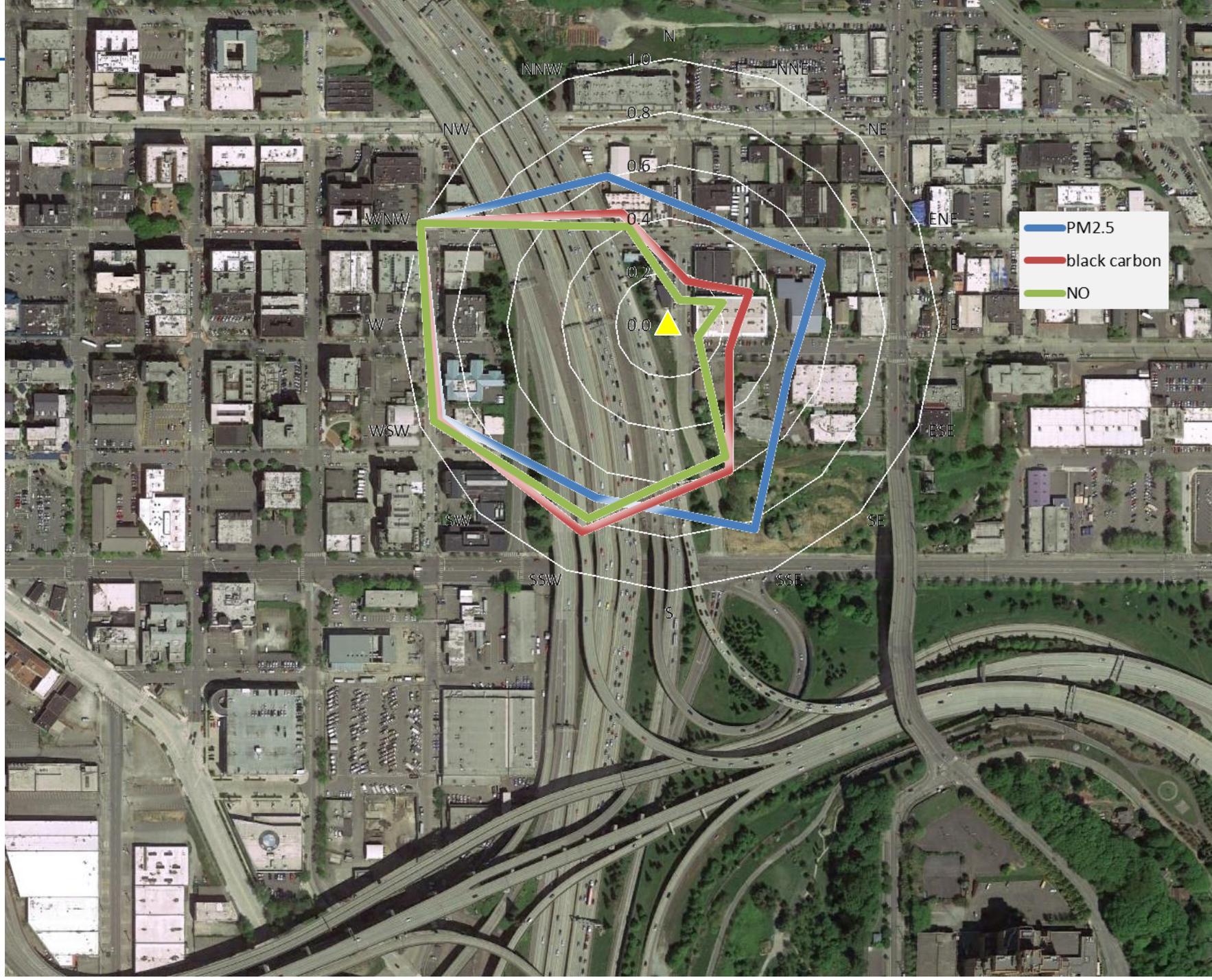
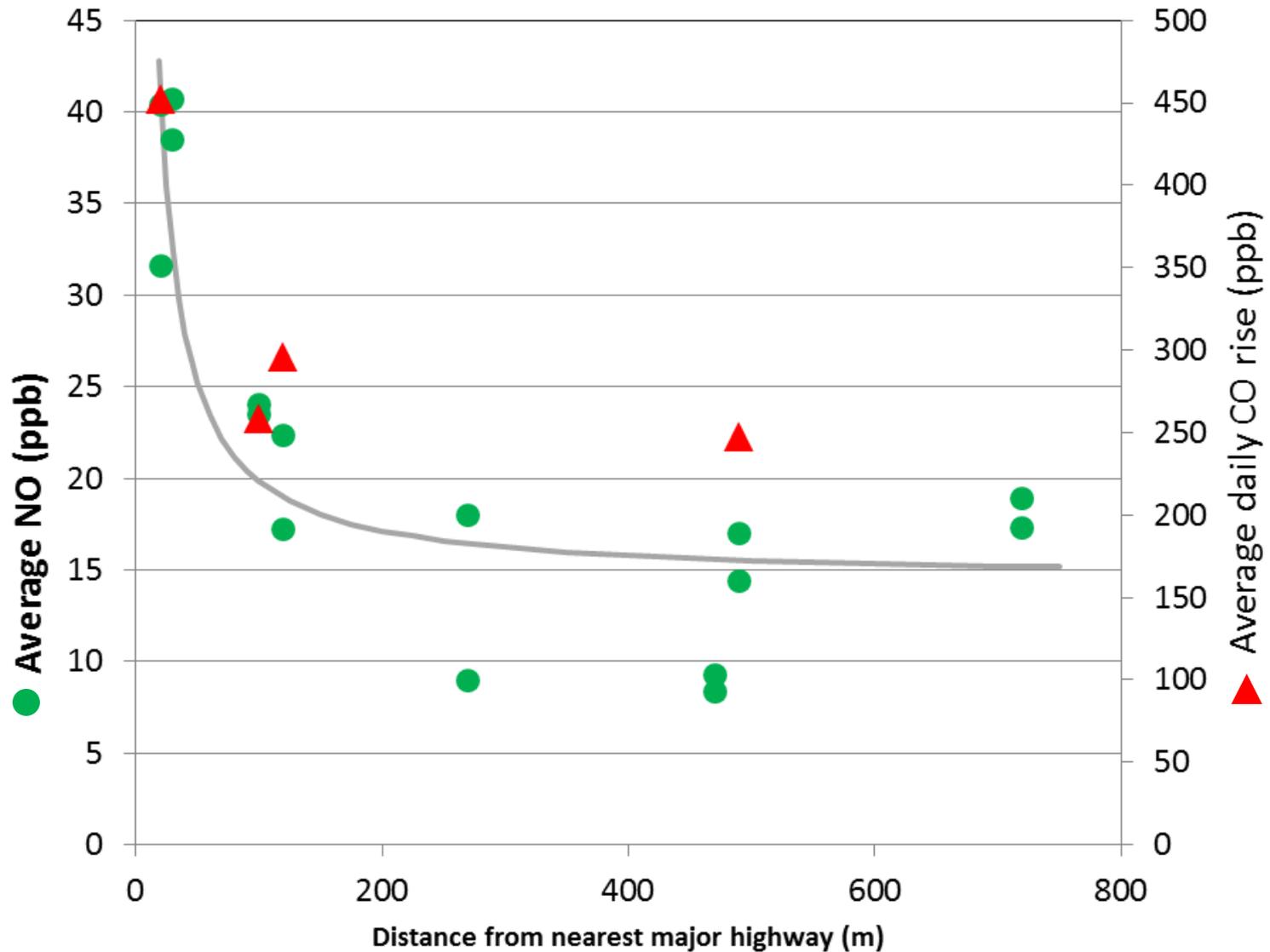


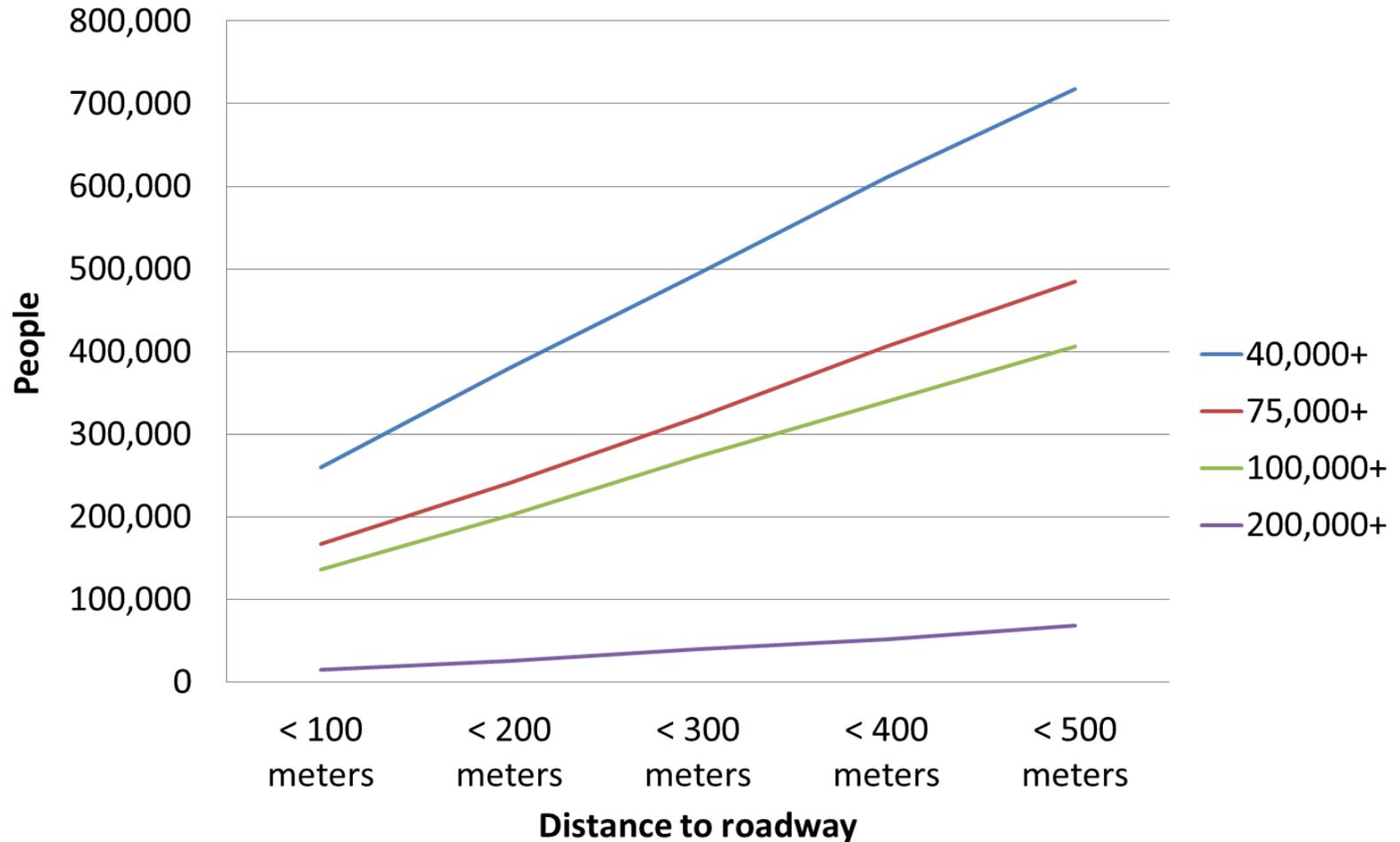
FIGURE 2. Local regression of background normalized concentrations on distance. The horizontal line indicates background concentration. A loess smoother ($\alpha = 0.75$, degree = 1) is fitted to each pollutant which is placed into one of three groups. The regression sample size, n , is given in parentheses after each pollutant.



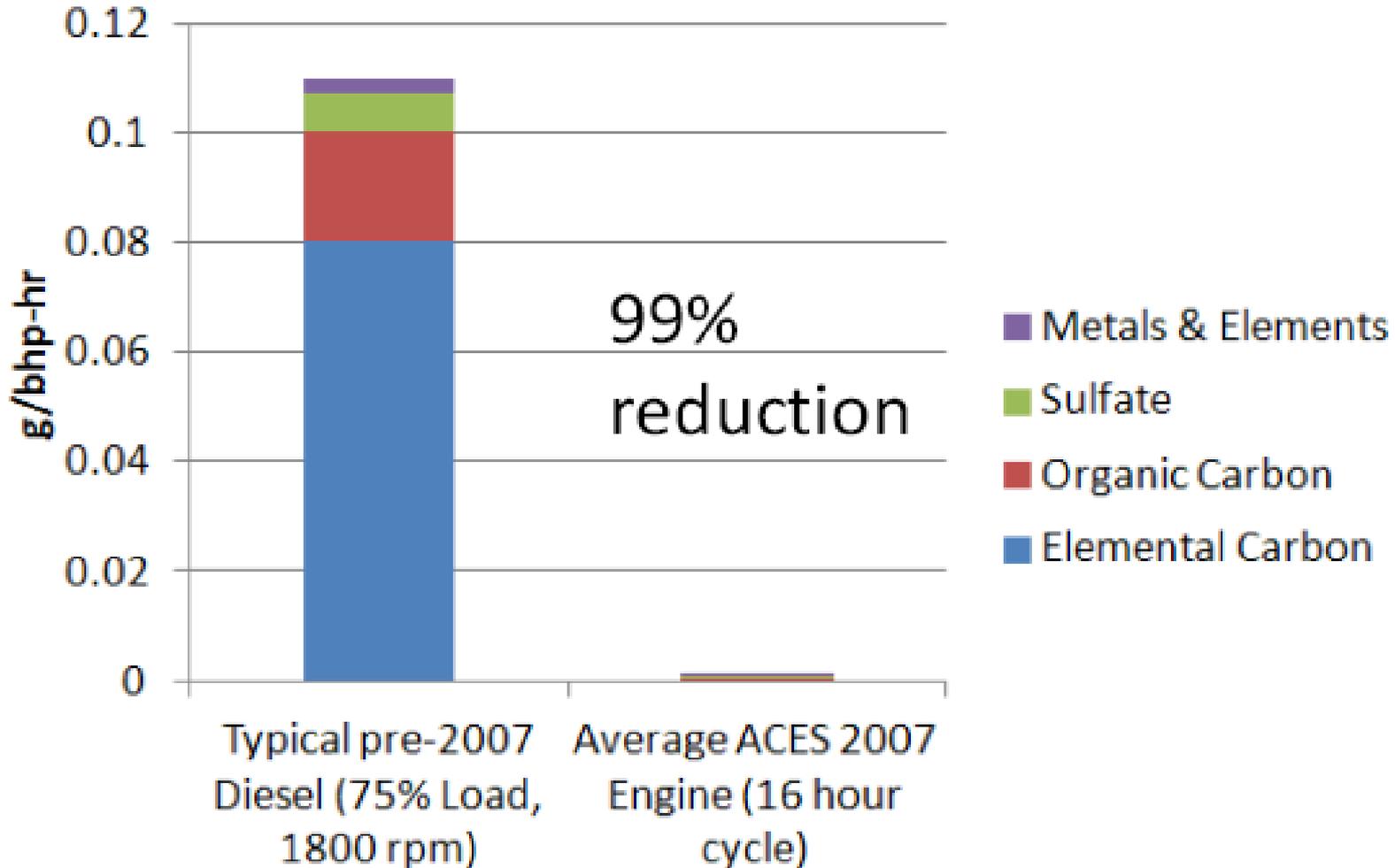
Pollution vs Distance to Major Traffic



Roadway distance to people with various traffic volumes in Puget Sound

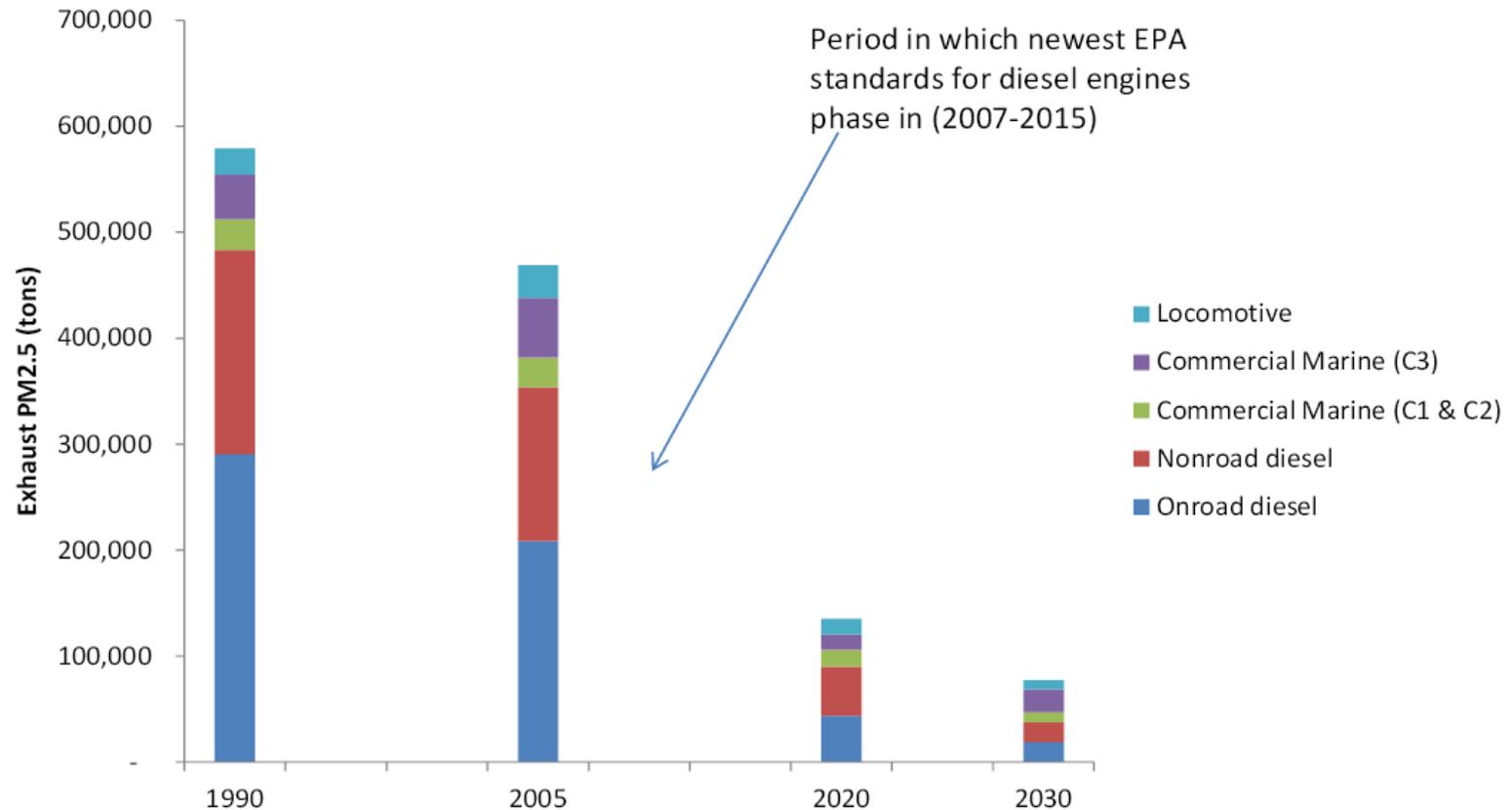


New Technology Improvements



New Technology Improvements

Diesel PM_{2.5} Emission Trends



Latest HEI Publication

- **Newest diesel trucks show no lung cancer in mice**

HEI

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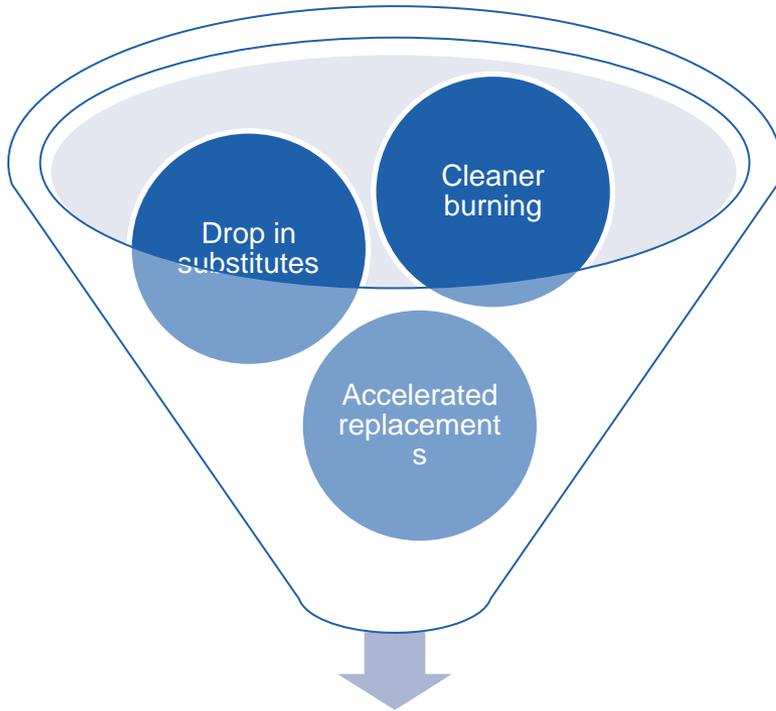
FOR RELEASE TUESDAY, JANUARY 27, 2015

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STUDY OF LIFETIME ANIMAL EXPOSURE TO NEW TECHNOLOGY DIESEL ENGINE EXHAUST FINDS NO LUNG CANCER

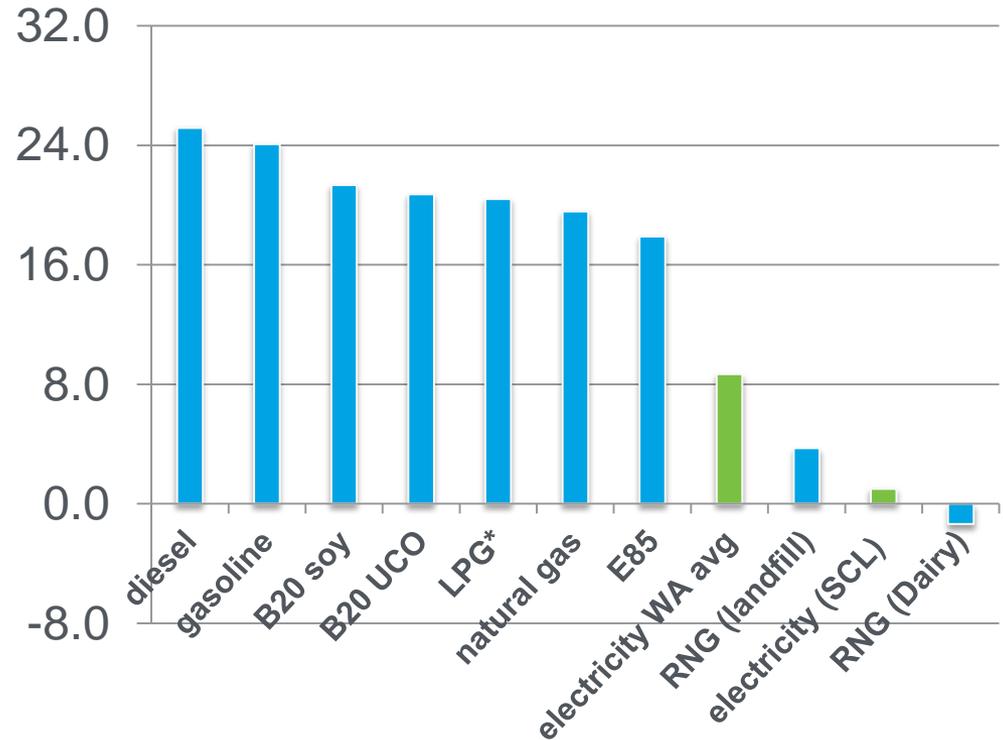
(Boston, January 27, 2015) The first study to conduct a comprehensive evaluation of lifetime exposure to new technology diesel exhaust (NTDE) has found no evidence of carcinogenic lung tumors. The Advanced Collaborative Emissions Study (ACES), issued today by the Health Effects Institute (HEI)¹ also confirmed that the concentrations of particulate matter and toxic air pollutants emitted from NTDE are more than 90% lower than emissions from traditional older diesel engines (TDE).

How Do Alternative Fuels Impact Air Pollution?



Criteria pollutant and greenhouse gas reductions!

Well-To-Wheel GHG Emissions (lbs/GGE)



Emissions rates : Greet 1 (2013), CAGREET for propane, EIA & City of Seattle for electricity



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