



Ensuring Healthy Air

Local Collaborative and Regulatory Options in the Portland Metro Area

June 2018

Prepared for Multnomah County
and City of Portland



Prepared by Good Company and
Eastern Research Group



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Acknowledgments

The authors would especially like to thank the following municipalities, agencies, and community groups for their time and assistance in the development of this report:

- Clackamas County
- Denver Regional Air Quality Council (RAQC)
- Gresham
- Hillsboro
- Metro
- Metro Vancouver, Nonroad Diesel Engine Program (NRDE)
- Milwaukie
- Neighbors for Clean Air
- Northwest Environmental Defense Council (NEDC)
- Oregon Department of Environmental Quality (DEQ)
- Oregon Health Authority (OHA)
- Puget Sound Clean Air Agency (PSCAA)
- Washington County

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Acronyms

ABC	Ambient Benchmark Concentration
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BC	British Columbia
CAA	Clean Air Act
CACC	Cleveland Air Century Campaign
CAO	Cleaner Air Oregon
CARB	California Air Resources Board
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEO	Colorado Energy Office
CEQA	California Environmental Quality Act
CO	Carbon monoxide
CWAPA	Columbia-Willamette Air Pollution Authority
DEQ	(Oregon) Department of Environmental Quality
DERA	Diesel Emissions Reduction Act
DRCOG	Denver Regional Council of Governments
Ecology	Washington Department of Ecology
EJ	Environmental justice (community/ies)
EQC	Environmental Quality Commission
ERG	Eastern Research Group, Inc.
FY	Fiscal year
GEI	Green Energy Institute
HAP	Hazardous air pollutants

hp	Horsepower
ISR	Indirect Source Rules
IT	Information technology
LRAPA	Lane Regional Air Protection Agency
MPAC	Metropolitan Policy Advisory Committee
MPO	(North Front Range) Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standard
NATA	National-scale Air Toxics Assessment
NEDC	Northwest Environmental Defense Council
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NRDE	(Metro Vancouver) Nonroad Diesel Engine (Program)
OHA	Oregon Health Authority
ORS	Oregon Revised Statutes
PAH	Polycyclic aromatic hydrocarbons
PATS	Portland Air Toxics Solutions
PHM	Public Health Modernization
PM	Particulate matter
PM_{2.5}	Particulate matter with aerodynamic diameter of 2.5 micrometers or less
PSCAA	Puget Sound Clean Air Agency
RAQC	(Denver) Regional Air Quality Council
RECLAIM	Regional Clean Air Incentives Market
RCW	Revised Code of Washington
SCAQMD	South Coast Air Quality Management District
ScRAPs	Support Truck Scrappage and Replacements for Air in Puget Sound
SIP	State Implementation Plan

SSCAS	Sea-to-Sky Airshed Clean Air Society
STAR	Strategic Toxic Air Reduction
SWCAA	Southwest Clean Air Agency
USDOE	US Department of Energy
USEPA	US Environmental Protection Agency
USFS	US Forest Service
VW	Volkswagen
WCAA	Washington Clean Air Act
WWCCC	Western Washington Clean Cities Coalition
µm	Micrometer (micron)



1. Executive Summary

FEASIBILITY STUDY OBJECTIVES AND GOALS

Multnomah County and the City of Portland share the goal of achieving clean air for their community members. Air toxics are a serious source of concern for the Portland region. Air toxics are known or suspected to cause serious health problems including cancer, nerve damage, and respiratory irritation, yet there are no federal ambient air quality standards for air toxics. The objective of this feasibility study is to fill the federal regulatory framework gap for air toxics by enabling the discussion among local jurisdictions in the Portland metro area regarding how best to reduce toxic air pollution. Notwithstanding the Cleaner Air Oregon rulemaking, and the potential for nonattainment of the National Ambient Air Quality Standard (NAAQS) for particulate matter (PM) with an aerodynamic diameter of less than or equal to 2.5 micrometers (μm), or PM_{2.5}, this study aims to identify and evaluate a variety of potential options that can be enacted locally to reduce or prevent air toxic emissions from industrial, mobile and area sources. Ensuring equal access to healthy air for all is a specific goal of this study, especially “environmental justice communities” (EJ) which include minority and low-income communities, tribal communities, and other communities traditionally underrepresented in public processes.¹

SUMMARY OF FINDINGS

- The most intense concern is in Multnomah County and the urban core of Portland
- All of the stakeholder agencies in the Tri-County area want to align efforts for woodsmoke, diesel, and industrial pollutants to maintain health and maintain the employment base.
- Only City of Portland and Multnomah County have an interest in regulating and enforcing beyond Oregon Department of Environmental Quality’s (DEQ’s) actions. Most are interested in voluntary efforts. All support DEQ’s authority.
- Both regulatory and collaborative voluntary models have been successful in reducing emissions in other locales. Based on stakeholder input the consultant team studied three programs that are best in class – Puget Sound Clean Air Authority, Denver’s Regional Air Quality Council and Vancouver, British Columbia’s Nonroad Diesel Emission Program.
- City of Portland and Multnomah County have the authority to form a local air quality management district if needed. Options to regulate nonroad diesel emissions may be limited, however, due to Federal and State pre-emption. Most local clean air agencies rely on voluntary programs to address diesel mobile source emissions.
- Regulating cumulative emissions (i.e., emissions that accumulate in one geographic area from multiple sources) through a health-based standard is the emerging best practice but has little precedent to imitate.
- Community monitoring is rapidly being considered and piloted with the increasing availability of new low-cost sensors. Careful education and methods must be used to support good science and provide the level of data quality needed to determine the true level of concern. The increased prevalence and availability of data, however, will likely lead to growing concerns (scientifically justified or not) and demand for action from residents.
- SB1541 – Authorizes a pilot program to confront cumulative emissions from multiple stationary sources and mobile sources but is limited to one location in a 10-year span in the Portland Metro Area.

¹ https://www.oregon.gov/gov/policy/environment/environmental_justice/Pages/default.aspx

- **No New Regulatory Authority**

Other than Portland and Multnomah County, no local agency stakeholder had interest in participating in the creation of a new entity. Multnomah County's stated position is that a local authority would only be warranted if the State fails to act to protect the public from air toxics. If Portland and Multnomah County were to create a new agency, the agency would need to address all air quality concerns, and not focus only on the issues that matter the most given intensity and exposure in their community. Funding demands for programs to address pollutants of concern are significantly less than for a full regulatory authority.

- **Support DEQ with funding to address permitting and enforcement backlog**

City of Portland and Multnomah County should engage DEQ to temporarily fund the catch up of industrial permit writing and enforcement – starting with those facilities in known environmental justice communities.

- **Develop a collaborative multi-agency program for community education and monitoring**

All stakeholder agencies had interest in leveraging their existing program staff and resources to form a uniform deliberate approach to monitoring air quality. DEQ and Oregon Health Authority (OHA) could lead the methodology development and store the data with County health departments and cooperating cities to implement the monitoring and communications. Develop monitoring program with a focus on low income areas and known hotspots. Prioritize efforts starting from locally acute to more widely dispersed exposure to air toxics.

- **Replicate Washington County's and their local city partners (such as City of Hillsboro) woodsmoke regulations and programs**

Multnomah County has already adopted a woodsmoke curtailment program to limit wood burning on days with poor air quality October through February and is exploring a wood-stove change out program for low income households using low-income weatherization dollars and passing an ordinance². Developing parallel ordinances throughout the region and supporting the conversion of wood burning devices to cleaner technologies as well as pursuing funding from the state legislature to support the program roll out and/or more equipment exchanges for households of all income levels. In addition, collaborating on messaging and voluntary curtailment for households who have home heating options other than wood was an area that all jurisdictions expressed interest in pursuing.

- **Continue to expand the diesel engine specifications for public construction, waste haulers and other publicly controlled work**

City of Portland, Multnomah County, the Port of Portland, Metro and other local agencies are already developing specifications to require newer model engines, or engine retrofits on all public construction projects performed for their agencies. Continue to pursue Oregon Department of Transportation and Oregon Department of Administrative Services to make this a statewide requirement. City of Portland and City of Beaverton already require upgraded or new diesel engines in hauling fleets with costs passing through to ratepayers. Work with Metro and other jurisdictions to expand this requirement.

- **Develop a voluntary multi-agency collaborative focused on technology conversion programs for diesel engines.**

The upgrade and replacement of onroad and nonroad diesel equipment may be a financial challenge to many of the owners and operators of the engines. The local agencies should develop a program to both gather grant funds and also to deploy grant funding towards the dirtiest engines that operate in the urban core. Also, specifically prioritize small businesses to help them meet the requirements of new contracting engine specifications for public work to avoid a disparity concern. The program should start with City of Portland and Multnomah County and offer other agencies to join as interested. With financial incentives for replacement, require the destruction of older engines.

² <https://multco.us/multnomah-county/news/board-approves-limiting-wood-burning-worst-air-quality-days>

- **Work with DEQ, the State Legislature and the Environmental Quality Commission to establish nonroad diesel engine registry similar to Vancouver Metro's (British Columbia) Nonroad Diesel Emission program**

Specifically pursue the question of whether or not a graduated fee schedule by horsepower and by engine age can be established to encourage the upgrade and/or eventual retirement of Tier 0 through Tier 2 engines. Explore use of registration program as part of the compliance methodology for diesel engine specification procurement programs.

- **Establish a governing board and an advisory board to set the strategy for mitigation of local air quality concerns**

Establish a body of City of Portland Commissioners and Multnomah County Commissioners that develops the mitigation strategies and outcomes for known urban core air quality concerns for program staff to implement. Establish a methodology for the voluntary or future regulated cumulative emissions mitigation (In cooperation with DEQ) that exceed legally defined health thresholds. The mitigation methodology should be established before monitoring, including community-based monitoring, identifies potential hotspots where emissions may exceed legally defined health thresholds. Any monitoring must be scientifically validated to show a health concern is beyond a health threshold. The governing board should be supported by an advisory board composed of business representatives, human and environmental health professionals, economic development officials and community representatives.



2. Background

Why Air Toxics?

Air toxics come from a variety of sources including cars and trucks, burning wood in fireplaces and woodstoves, businesses and industries, and consumer products such as solvents and pesticides and include diesel exhaust, benzene, polycyclic aromatic hydrocarbons (tar-like by-products from auto exhaust, wood burning, and other sources commonly called PAHs), and metals. Air toxics are known or suspected to cause serious health problems including cancer, nerve damage, and respiratory irritation.

Although the U.S. Environmental Protection Agency (EPA) sets ambient air quality standards for six criteria air pollutants under the National Ambient Air Quality Standards (NAAQS) program, air toxics are not regulated in the same way as criteria pollutants. Sources of both air toxics and criteria pollutants include: point sources such as industrial emitters, area sources such as woodstoves, and mobile sources such as cars and diesel-powered engines.

Under the 1990 federal Clean Air Act Amendments,³ air toxics (i.e., defined as 189 chemicals known as hazardous air pollutants, or HAPs) from point sources are regulated through industry-specific, technology-based standards issued by the EPA. The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations apply to so-called “major” sources and also to some smaller sources known as “area sources.” Despite these regulations, exposure to air toxics in urban areas remains. This is because NESHAPs require less-protective technology standards for area sources. In addition, NESHAPs do not take into account exposure to toxics from mobile sources like passenger vehicles and nonroad diesel equipment, which are separately regulated.

The Portland Air Toxics Solutions (PATs),⁴ conducted by the Oregon Department of Environment Quality (DEQ) and published in 2012, found that “the Portland region has the highest risk [in the state of Oregon] to the population from air toxics due to business and population density.” Moreover, “monitoring studies confirm the presence of air toxics at levels that can cause adverse health effects.” Modeling conducted during this study analyzed the environmental justice impact of air toxics in the region. Environmental justice describes concerns about the fair treatment and meaningful involvement of all people regardless of race, age, gender, national origin, education or income level, in the development, implementation and enforcement of environmental laws, regulations and policies. This environmental justice analysis demonstrated disproportionate impacts from air toxics on minority and low-income populations in the Portland region.

Although the Portland region is currently in attainment for air pollutants that have NAAQS, air toxics do not have specific ambient federal standards, yet they have adverse impacts to the health of the communities. The federal government does have technology-based standards, but those are primarily focused on equipment that is being made currently. Multnomah County and City of Portland believe that all Oregonians have a right to breathe clean air and that this is a reasonable and achievable goal.⁵ The objective of this feasibility study is to fill the regulatory framework gap by enabling the discussion among

³ <https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act#caa90>

⁴ Oregon Department of Environment Quality. *Portland Air Toxics Solutions Committee Report and Recommendations*. Portland, Oregon, April 2012.

⁵ Board of County Commissioners, Multnomah County, Comments on Proposed Cleaner Air Oregon (CAO) Rules, December 21, 2017.

local jurisdictions in the Portland metro area regarding how best to reduce toxic air pollution and ensure healthy air for all people. Specifically, both Multnomah County and the City of Portland are deliberately addressing environmental justice through their compliance efforts toward Title VI of the Civil Rights Act of 1964, the Federal Executive Order #12898 of 1994, and Oregon's ORS 182.545.

Regional Air Quality Background

Regional air quality authorities were common in Oregon before the passage of the Air Quality Act of 1967 and the federal Clean Air Act (CAA) of 1970. For instance, Multnomah County was a member of the Columbia-Willamette Air Pollution Authority (CWAPA), which was formed in 1967. Members of this authority included the City of Portland, Clackamas County, Columbia County, and Washington County. The CWAPA ceased to have authority in 1973 when DEQ assumed their functions.⁷ Currently, there is only one regional air authority in Oregon, the Lane Regional Air Protection Authority (LRAPA). Created in 1968, it continues as a stand-alone air authority serving residents of Lane County. Although rare in Oregon, regional air authorities are common in Washington and California and throughout the United States.

Under DEQ management, and in cooperation with local governments, the Portland region has achieved and maintained compliance with standards for six criteria air pollutants regulated by the U.S. EPA under the NAAQS program. Notably, the region has maintained compliance with ozone and carbon monoxide standards. However, certain areas of the tri-county region have recently approached or exceeded NAAQS for particulate matter (PM) with an aerodynamic diameter of less than or equal to 2.5 micrometers (μm) (PM_{2.5}), with exceedances attributed to winter time wood burning.

In an attempt to address gaps in federal law, the Environmental Quality Commission (EQC), the policy and rulemaking body for DEQ, adopted the Oregon State Air Toxics Program in 2003.⁸ This program consists of four main elements: establishing benchmarks for air toxics, Source Category Rules and Strategies, the Air Toxics Safety Net Program, and the Geographic Program.

PORTLAND AIR TOXICS SOLUTIONS STUDY

As part of the Geographic Program, DEQ created the Portland Air Toxics Solutions (PATs) project to work with the local community to develop air toxics reduction strategies for the Portland region, including portions of Multnomah, Washington and Clackamas Counties. In 2012, DEQ finalized a plan to reduce ambient levels of air toxics below the Ambient Benchmark Concentrations (ABCs) through source-specific reduction strategies. ABCs are ambient levels of a pollutant that would result in a cancer risk of greater or equal to one-in-a-million additional cancer cases based on a lifetime of exposure (70 years). For non-carcinogens, the benchmarks are levels that could be inhaled for a lifetime without any non-cancer health effects (e.g., asthma). ABCs are not regulatory standards and can be considered as “health goals.”

⁶ The City of Portland's activities are described in their 2013 City of Portland Civil Rights Title VI Plan and in City of Portland's 2035 Comprehensive Plan. (See Guiding Principle 2: Human health, Guiding Principle 4: Equity and Policy 2.3 and 2.4). Multnomah County is currently developing a formal Environmental Justice Policy to be completed by the end of 2018. In the interim, the County is following the interpretation from the Board of County Commissioners submitted to DEQ regarding the Cleaner Air Oregon rules that have extensive reference to environmental justice statutes.

⁷ Overview of Key Provisions of ORS 468A: Relating to Regional Air Quality Control Authorities, last updated 3/17/2016.

⁸ Oregon Administrative Rule Chapter 340, Division 246

Of the 19 air toxics included in the PATS study, 14 were found to exceed state-established ABCs. Priority sources of pollutants identified in the study included smoke from residential wood combustion (which contains PM_{2.5} and air toxics such as PAHs) and exhaust from diesel engines (which contains PM_{2.5} and air toxics such as arsenic). The study found that air toxics are present throughout the Portland region, but higher concentrations are found in densely populated neighborhoods, near busy roadways and in areas with higher levels of business and industrial activity.

As part of the PATS study, DEQ conducted an environmental justice analysis of air toxics impacts based upon 2017 modeling and demographic data. The exposures are based upon 2010 residential census data at the block group level. In general, those that experienced the highest impacts from air toxics included the Latino population from residential wood combustion emissions, the Asian population from auto and truck emissions, and the African American population from commercial solvent and fuel use emissions. In addition, all people living below the poverty level are disproportionately affected by toxic air pollution from cars and trucks. Diesel emissions from construction and other nonroad engines also significantly impact minority populations, while industrial and business sources disproportionately impact populations of all people living below the poverty level.⁹

MOSS STUDY

Although the PATS study was groundbreaking for its time, air toxics remain a concern for the Portland region. This issue came into focus when a study conducted by the U.S. Forest Service (USFS) found the presence of heavy metal hotspots that had been identified by PATS monitoring and modeling but had not been attributable to a specific source. The moss study helped to identify sources, using moss samples from across Portland, specifically finding high concentrations of heavy metals in the vicinities of two art glass manufacturers.¹⁰ These findings were verified in February 2016 through air quality monitoring conducted by DEQ where results showed elevated concentrations of cadmium, arsenic and other airborne toxic heavy metals pollution in Portland neighborhoods.

CLEANER AIR OREGON – SENATE BILL 1541

In response to the USFS Moss Study findings and increased public concern, Governor Kate Brown announced the interagency “Cleaner Air Oregon” (CAO) initiative. A central component of this effort is establishing a health-based air emissions standard, as opposed to a technology-based standard, for industry. A health-based standard would likely take into account the toxicity and amount of the emissions, in addition to the proximity of those emissions to people. Current rules only require industrial-emitters to install pollution controls if emissions exceed 10 tons per year of a single pollutant or 25 tons of any two pollutants, with no regard to toxicity, or if there is an applicable federal NESHAP. (Additionally, some state level source categories rules were developed for colored glass manufacturers, Stage II controls for gasoline dispensing facilities, etc.) DEQ and the Oregon Health Authority estimate that the rulemaking process to reform air toxic regulations will finalize rules for Environmental Quality Commission consideration in November 2018.

While the specific rules are in development, SB 1541 directs the EQC and DEQ to recognize when the Best Available Control Technology (BACT) is already being used to control pollution and prohibits further requirements except under certain circumstances. SB 1541 states that DEQ cannot require facil-

⁹ <http://www.oregon.gov/deq/FilterDocs/12aq035patsReport.pdf>

¹⁰ <https://www.fs.fed.us/pnw/research/moss/>

ities found to be employing the Best Available Control Technologies (BACT) to reduce risk, unless risk from their emissions exceed the following thresholds; 4 times the cancer-risk regulatory benchmark and 4 times the non-cancer risk regulatory benchmark.

WOODSMOKE SURVEY

Residential wood burning in fireplaces and woodstoves is a major source of air toxics and PM_{2.5}. A survey conducted in 2014,¹¹ found that, when compared to DEQ's last estimates for residential wood burning in the PATS report, residents of the Portland region burn about 80 percent more wood than previously estimated. "Overall, the five percent of respondents who rely on wood as their primary source of heat burn 51 percent of the wood in the Portland area. Portland wood burners combust 56 percent of wood fuel in higher polluting uncertified devices such as stoves and fireplaces and 44 percent of wood in cleaner certified devices. Similar to other communities in Oregon, uncertified wood stoves, uncertified fireplace inserts, and fireplaces emit the bulk of fine particulate from wood burning in the Portland metro area."¹²

Much of this increase is due to improved accuracy in data for locations of wood burning. Previous estimates were much lower since regional results from a statewide survey were inaccurately allocated to the PATS. This survey also indicated that the effects of residential wood combustion were not limited to rural areas.

DIESEL PROCUREMENT PROJECT

The City of Portland, the Port of Portland, Metro, Multnomah County, and Clackamas County are evaluating the feasibility of a uniform, implementable, and effective clean air construction program applicable to construction contracts that reach a certain dollar threshold. The partnership seeks to create a standard that is easily replicated by other local jurisdictions. Program features would include a best available control technology standard for older diesel engines and data submission and verification protocol.

GARBAGE TRUCK RETROFIT PROJECT

Garbage trucks pass through neighborhood streets on a regular basis, and idle in front of homes. Without pollution controls these engines can be a major source of pollution. The City of Portland and the City of Beaverton have required that franchise haulers retrofit or replace their diesel-powered engines to meet current EPA diesel engine standards. Haulers have been able to build this cost into the rates they charge for trash and recycling collection.

PORTLAND STATE UNIVERSITY (PSU) DIESEL CONSTRUCTION STUDY

USEPA has awarded \$466,276 for this two-year study. PSU, Reed College and DEQ are partnering with Breathe Oregon and local government agencies to determine more precisely what's in diesel exhaust and identify Portland areas that are the most vulnerable to diesel pollution. Per the grant announcement press release:

"...Different diesel engines produce different exhaust formulas, and the resulting air pollution resembles other "black carbon" pollution, such as smoke from wood stoves. Currently it is difficult to distinguish

¹¹ Summary of Results: 2014 Portland Residential Wood Combustion Survey

¹² <http://www.oregon.gov/deq/FilterDocs/WoodburningSurvey.pdf>

between pollution from diesel exhaust and other forms of black carbon pollution. This research aims to break down the many different sources of diesel emissions and identify new ways to monitor and mitigate its health effects.

Portland State University and Reed College will lead the research, working with project partners to identify monitoring locations in two vulnerable neighborhoods and around primary sources of diesel emissions: shipping areas, freight corridors, construction sites, and rail yards.”¹³

LEWIS AND CLARK LAW SCHOOL GREEN ENERGY INSTITUTE – LEGAL STRATEGIES FOR REDUCING HARMFUL DIESEL EMISSIONS IN OREGON

Professor Melissa Powers and staff attorney Amelia Schlusser of the [Lewis & Clark Law School Green Energy Institute \(GEI\)](#) are nearing completion of a study to determine what ways can local agencies and citizens can do to reduce emissions inside the constraints and pathways of the Federal, State and local legal frameworks.

¹³ <http://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=2702>



3. Introduction to the Feasibility Study

Goal & Methodology

GOAL

Multnomah County and the City of Portland share the goal of achieving clean air for all of the residents in their communities. The objective of this feasibility study is to find precedents and means to use local voluntary programs or regulations to reduce air pollution. Of particular interest is how other communities programmatically addressed environmental justice concerns. Notwithstanding the Cleaner Air Oregon rulemaking, and the potential for NAAQS PM_{2.5} nonattainment, this feasibility study aims to identify and evaluate a variety of options that can be enacted locally to reduce or prevent air toxic emissions from industrial, area and mobile sources.

PARTICIPANTS

The consultant team met with representatives from key stakeholder groups, identified by Multnomah County and the City of Portland, including: Metro; Washington County; Clackamas County; the cities of Milwaukie, Hillsboro, and Gresham; DEQ; Oregon Health Authority (OHA); and Neighbors for Clean Air. The consultant interviewed these stakeholders at different points in the study to determine the stakeholders' goals for air quality and their preferred approaches to achieving those goals.

STUDY METHODOLOGY

After initial interviews with stakeholders, the consultant team researched all programs specifically identified by the stakeholders, as well as others that the team discovered. The team generated a menu of potential program elements and whole programs for improving air quality based on a review of 25 existing air quality agencies/programs in North America, with a focus on understanding the role of local government available options for achieving this goal. As part of the research, the research team reviewed 25 air quality programs.

- Puget Sound Clean Air Agency (PSCAA) - Seattle, WA
- Lane Regional Air Protection Agency (LRAPA) - Lane County, OR
- Southwest Clean Air Agency (SWCAA) – WA
- Strategic Toxic Air Reduction (STAR) - Louisville, KY
- California Community Air Protection Program (CARB) - CA
- Portland Air Toxics Solutions (PATs) - Oregon Department of Environmental Quality (ODEQ) - OR
- Regional Clean Air Incentives Market (RECLAIM) - South Coast Air Quality Management District (SCAQMD) - CA
- Breathe Project - Pittsburgh, PA
- Institute for Healthy Air, Water, and Soil - Louisville, KY
- Sea-to-Sky Airshed Clean Air Society (SSCAS) - Canada

- Cleveland Air Century Campaign (CACC) / RESOLVE - Cleveland, OH
- Toxics-Right-to-Know Program - Eugene, OR
- Reducing Community Health Impacts from Freight Facilities (CARB) - CA
- Denver Regional Air Quality Council (RAQC) - Denver, CO
- Non-Road Diesel Emission (NRDE) - Vancouver, BC
- Pittsburgh Regional Clean Cities - PA
- Spokane Regional Clean Air Agency - Spokane, WA
- Wood Smoke Control Program- Klamath County, OR Bay Area Air Quality Management District (BAAQMD) - Bay Area, CA
- Wood Stove Exchange Program - Washington County, OR
- Spokane Regional Clean Air Agency - Spokane, WA
- By-Law Concerning use of Solid Fuel-Burning Devices & Fireplaces - Montreal, Canada
- Google Earth Outreach: Air Quality - CA and PA
- Smart City Air Challenge - USEPA
- Greater Kansas City Chamber of Commerce - MO

Each program was evaluated according to these interests:

- | | |
|------------------------------------|---|
| • Program focus | • Regulatory or non-regulatory approach |
| • Program type | • Control and implementation |
| • Coverage area and population | • Pro-active or reactive to attainment status |
| • Website | • Future air concerns |
| • Catalyst for agency/program | • Monitoring and associated data |
| • Method for improving air quality | • Emissions-based or health-based standards |
| • Type of jurisdiction | • Focus on technology vs. land use change |
| • Agency coordination | |

This list of agencies/programs was then narrowed to three options via stakeholder input and Multnomah County and City of Portland's choice:

Note: Due to the significant quantity of air programs assessed and evaluation areas and the challenges of presenting this data in a manner that is easily shared, the matrix is provided in a single spreadsheet below. If you are reading this document via a pdf reader, please zoom to 800-1200% to properly view the document. If you are reading a hard copy and would like to review the Excel table, please contact the project team.

Table 1 – Summary of National Air Quality Programs

[illegible]

This list of agencies/programs was then narrowed to three options via stakeholder input and Multnomah County and City of Portland's choice:

- 1) A local air control agency – Puget Sound Clean Air Authority (PSCAA)
- 2) A collaborative, non-regulatory agency – Denver Regional Air Quality Commission (RAQC) and
- 3) A nonroad diesel program – Vancouver, British Columbia's Nonroad Diesel Emission program (NRDE).

For each of the three identified options, the consultant team conducted in-depth analysis of the program/agency through researching publicly available information and by interviewing program directors and staff. For each program, the team defined the sources of authority, funding sources, program elements, and governance. The analysis focused on evaluating the effectiveness of those strategies at reducing air toxics and exposure to PM_{2.5} from diesel exhaust and industrial sources. Woodsmoke programs were not specifically investigated because there are many effective programs to replicate, including a successful program in Washington County, Hillsboro, and Beaverton.

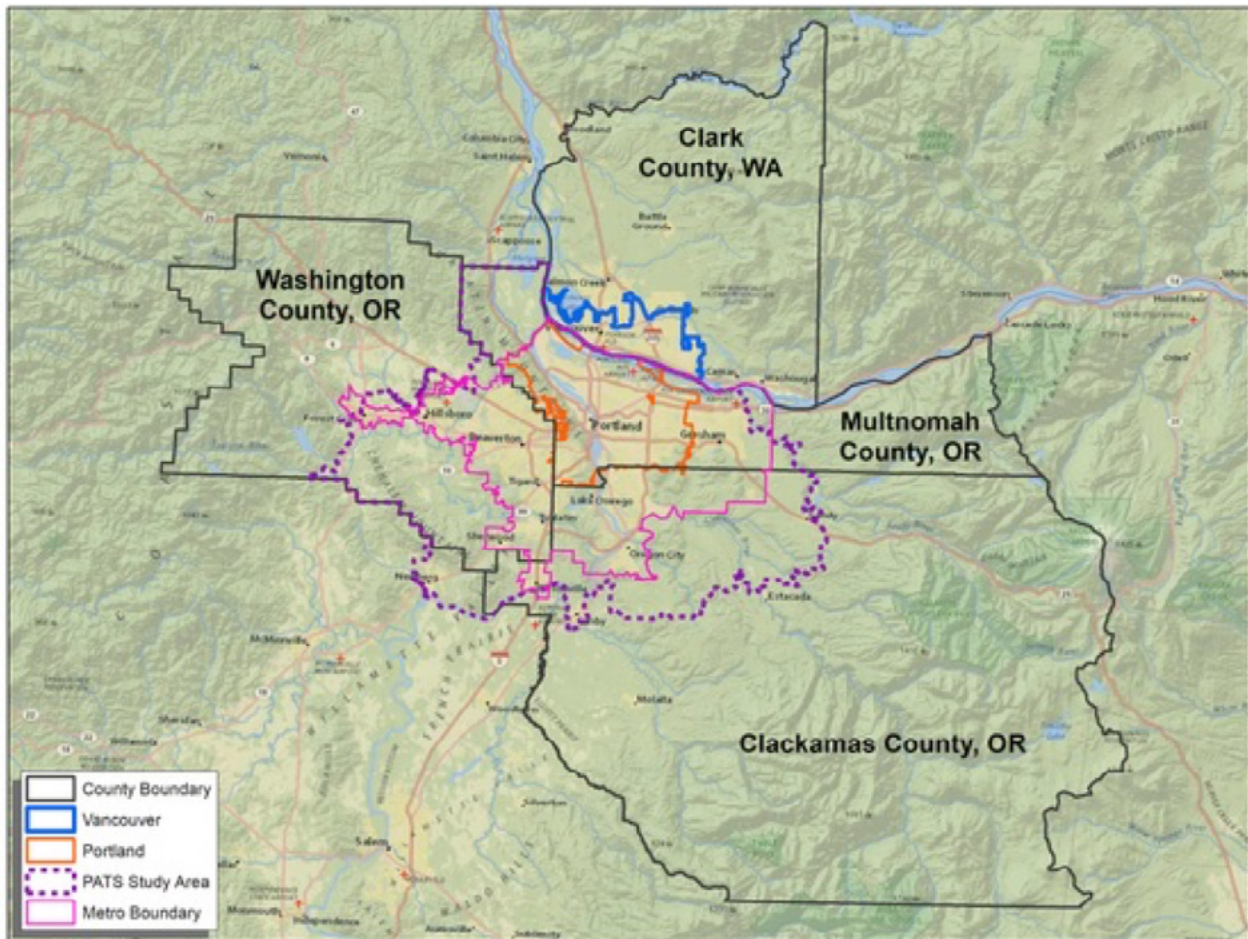
These three options were then presented to the stakeholders to obtain feedback on if the stakeholders had authority and/or the interest in participating in a similar program if replicated in the Portland region. The consultant team made recommendations on best practices and any legal, statutory, political, or other support needed for effective implementation of a similar program in the Portland region. Finally, the team estimated start-up costs, on-going staffing needs, and budget requirements for each identified option.

The consultant team also developed maps of the tri-county area based on the most up-to-date national data to identify where concerns exist (see Section 4). For each of the research phases, the consultant team generated technical memos, which form the foundation of this report. The memos are located in the Appendices to this report.



4. Geographic Analysis

The geographic analysis identifies locations within the Portland metropolitan area where people are believed to have the highest exposures to air toxics. This analysis was conducted using existing health-based air quality evaluations and GIS-based spatial analyses. The area study is shown in Figure 1:



Notes:

- Cancer risks are estimates and may understate or overstate risks.
- Map shows cancer risks estimated for exposure to air pollution. Other risk factors for cancer (e.g., diet, genetics, behavior) are not considered.
- Estimated risks are based on current understanding of air pollution emission sources, and that understanding continues to evolve.
- The cancer risks for some carcinogenic air pollutants are not known.
- See Section 6 of this memo for important limitations in this analysis.

Figure 1 – Boundaries of Geographic Areas of Interest

This evaluation revisits a spatial analysis that was conducted as part of the PATS project that was based on cancer risk estimates published by the U.S. EPA in the 1999 National-Scale Air Toxics Assessment (NATA) performed by consultant team analysts from ERG. However, this evaluation for the feasibility study, also conducted by ERG, differed from the PATS analysis in three important ways:

- ERG's health evaluation of air toxics was based on the 2011 NATA—the most recent NATA data set available (released in December 2015). 2011 NATA data and 1999 NATA data (used in PATS) are not comparable due to methodology changes.
- ERG considered both cancer and non-cancer health outcomes in the spatial analysis; whereas, the PATS spatial analysis was based only on cancer risks.

- ERG conducted a comparative air toxics evaluation for seven distinct geographic areas identified in consultation with Multnomah County and the City of Portland. Those areas include three counties in Oregon (Multnomah, Clackamas, and Washington), one county in Washington (Clark), two municipalities (Portland and Vancouver), and the PATS study area.

Cancer and Non-Cancer Risks

Table 1 summarizes 2011 NATA total cancer risk data for the seven geographical areas of interest in and near Portland, including the areawide “total cancer risk,” as well as the range of census-level “total cancer risk” values. Figure 1 shows the 2011 NATA total cancer risk by census-tract level for the four-county area (i.e., 459 census tracts). The 2011 NATA total cancer risk values for the 459 census tracts are presented in “quintiles” (i.e., 20% groupings) with the highest values shown in red and the lowest values shown in dark green. Table 2 and Figure 2 provide similar information regarding the 2011 NATA respiratory hazard index data.

The areas with the highest risks and hazards in these figures generally fall within the PATS study area. The areas with the highest cancer risk and non-cancer hazard generally align with the more densely populated areas in the City of Portland Urban Core.

DATA LIMITATIONS

There are several important limitations in the data used for the geographic analysis:

1. Quantitative relationships between exposure and human health effects, whether cancer or non-cancer, are not known for all air toxics. The scientific understanding of these relationships continues to evolve. In particular, while 2011 NATA accounts for diesel particulate matter when evaluating non-cancer hazards, ***the 2011 NATA does not include diesel particulate matter for cancer risks. As a result, 2011 NATA does not account for cancer risks attributed to diesel sources. In EPA’s words, this “may be substantial”—especially in areas with a high concentration of diesel-powered engines and equipment such as ports, bus depots, and railyards.*** Specifically, NATA’s ambient concentration outputs include estimated “diesel particulate matter” concentrations at the census tract level. The range of estimated concentrations vary across the three counties of interest in Oregon:
 - Among the 80 census tracts in Clackamas County, NATA’s estimates of tract-wide diesel particulate matter concentrations range from 0.03 µg/m³ to 0.89 µg/m³. The highest estimated concentration occurs at the census tract along the northern edge of the county, where Interstate 205 crosses the county line.
 - Among the 171 census tracts in Multnomah County, NATA’s estimates of tract-wide diesel particulate matter concentrations range from 0.04 µg/m³ to 1.81 µg/m³. The highest estimated concentration occurs at the census tract in downtown Portland with the interchange between Interstate 405 and U.S. Route 26.
 - Among the 104 census tracts in Washington County, NATA’s estimates of tract-wide diesel particulate matter concentrations range from 0.09 µg/m³ to 0.84 µg/m³. The highest estimated concentration occurs at a census tract in downtown Beaverton.

Cancer risks can be estimated from these concentrations using a cancer unit risk factor for “diesel exhaust”(0.0003 µg/m³)-1published by the California Office of Environmental Health Hazard Assessment (OEHHA). Based on this factor, the estimated cancer risks due only to diesel exhaust for the census tracts with highest estimated concentrations would be 542-in-1,000,000 for Multnomah County, 267-in-1,000,000 for Clackamas County, and 253-in-1,000,000 for Washington County.

While these values might suggest that the cancer risk from diesel exhaust is more than order of magnitude greater than that for the other air toxics, direct comparisons should not be made between these estimated cancer risks for diesel and the NATA-estimated cancer risks documented in this report, because they are derived from different agencies' unit risk factors. To illustrate this point, the cancer risks previously summarized in the report are largely driven by benzene, but the OEHHA and EPA unit risk factors for benzene differ by a factor of four. Several other air toxics have considerably different unit risk factors between the two agencies. Therefore, comparing the estimated cancer risks from the draft report to those listed in the previous paragraph is not advised. The key point is that diesel exhaust likely accounts for a considerable portion of the estimated cancer risks in the Portland metropolitan area, and the estimated cancer risks from diesel vary widely throughout the area.

2. PATS addresses spatial variation in air toxics concentrations and risk, but NATA 2011 method does not address spatial variations.¹⁴ The high end of the risk ranges for various areas would be higher if diesel cancer risk were factored in and closest exposure areas were used.
3. Recent studies have suggested that residential wood combustion emissions data are likely biased low in NATA including PSU and DEQ's Woodsmoke in Oregon: House Bill 3068 - 2015 report.¹⁵

TOTAL CANCER RISK DISCUSSION AND FINDINGS (TABLE 2 AND FIGURE 2)

Total cancer risk for a given census tract is the sum of the estimated cancer risks across all individual air toxics considered. A non-zero total cancer risk due to air toxics is common. According to NATA, the nationwide estimated total cancer risk due to air toxics exposure is 40-in-1,000,000. Every census tract in the country, even rural and remote areas, is estimated to have at least a 10-in-1,000,000 total cancer risk attributed to air toxics exposure.

The main findings of the geographic analysis related to total cancer risk are as follows:

- Census tracts within the City of Portland tend to have higher total cancer risks. Conversely, the census tracts with the lowest estimated cancer risks are for the remote areas in Clackamas, Washington, and Clark Counties.
- For the four counties, approximately two-thirds of the total cancer risk in 2011 NATA results from exposures to formaldehyde and benzene, with all other carcinogens combined accounting for the remaining one-third of the total cancer risks. ***Again, 2011 NATA does not account for cancer risks attributed to diesel sources. In EPA's words, this "may be substantial"—especially in areas with a high concentration of diesel-powered engines and equipment such as ports, bus depots, and railyards.***
- For Multnomah County, pollutants formed in the atmosphere (i.e., secondary pollutants) accounted for 30 percent of the total cancer risk; primary emissions from on-road light duty mobile sources (including from associated refueling) accounted for 24 percent of the total cancer risk; and residential wood combustion accounted for 20 percent of the total cancer risk. A similar breakdown of cancer risk across source categories was observed for Clackamas and Washington Counties.

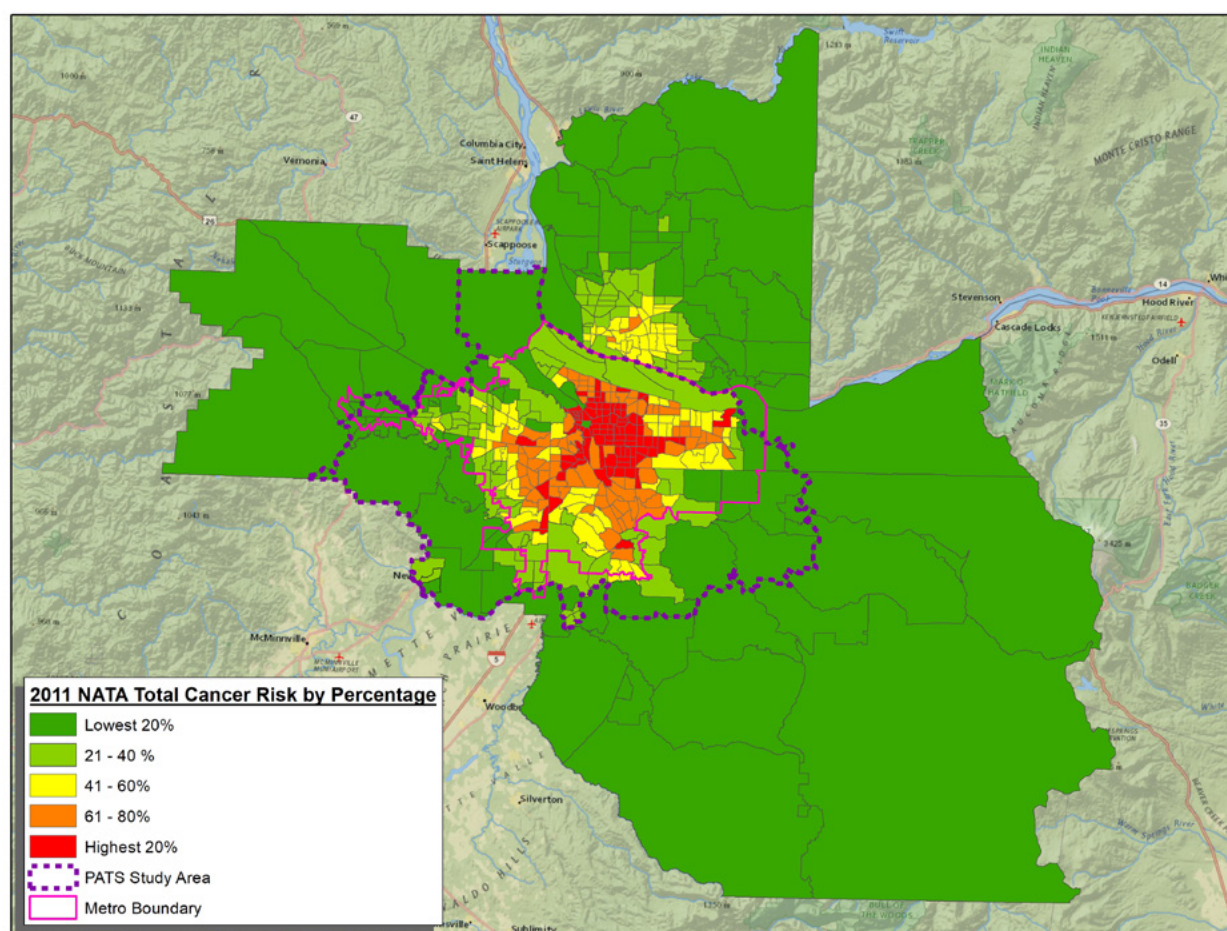
¹⁴ <http://www.oregon.gov/deq/FilterDocs/12aq035patsReport.pdf>

¹⁵ <https://www.oregon.gov/deq/FilterDocs/WoodsmokeOR.pdf>

Geographic Area	2011 NATA Results			Ranking of Areawide “Total Cancer Risk” from 1999 NATA
	Number of Census Tracts Considered	Mean Areawide “Total Cancer Risk”	Range of “Total Cancer Risk” across Census Tracts	
Portland, OR	142	53.3	33.7 – 85.8	1
Multnomah Co., OR	171	52.8	26.3 – 85.8	2
PATS study area	337	47	26.3 – 85.8	3
Vancouver, WA	45	43.4	34.9 – 50.5	6
Clackamas Co., OR	80	43.2	16.9 – 59.9	5
Washington Co., OR	104	42.2	20.6 – 61.8	4
Clark Co., WA	104	39.2	22.2 – 50.5	7

Note: Geographic areas are presented in order of decreasing cancer risk based on 2011 NATA. Refer to Figure 1 for the locations of the census tracts with the highest estimated cancer risks.

Figure 2 – NATA Total Cancer Risk by Census Tract



Notes:

- Cancer risks are estimates and may understate or overstate risks.
- Map shows cancer risks estimated for exposure to air pollution. Other risk factors for cancer (e.g., diet, genetics, behavior) are not considered.
- Estimated risks are based on current understanding of air pollution emission sources, and that understanding continues to evolve.
- The cancer risks for some carcinogenic air pollutants are not known.

NON-CANCER HAZARD INDEX DISCUSSION AND FINDINGS (TABLE 3 AND FIGURE 3)

For a given health endpoint (impact) or target organ, non-cancer hazard is expressed with a hazard index. Environmental and health agencies calculate hazard indexes for different exposure durations. This report's analyses are based on EPA's NATA, which assesses risks based on chronic (long-term) exposures. NATA was not designed to evaluate acute (short-term) exposures and the health effects that may result. The hazard indexes used in NATA are indicators of whether adverse non-cancer health effects might be expected for lifetime exposures to an environmental contaminant. When a hazard index from NATA is less than one, the appropriate inference is that lifetime exposures to the air toxic (or combination of air toxics) will not likely result in adverse health effects. On the other hand, a hazard index from NATA greater than one does not necessarily imply that health effects will occur. Risk assessors examine these scenarios on a case-by-case basis, considering the toxicity studies available for the pollutants of concern, the quantity by which the hazard index exceeds one, and other factors. Hazard indices approximate the aggregate effect on the same target organ or organ system. For example, a respiratory hazard index sums the hazard quotients of toxics that affect the lungs and other parts of the respiratory system. Likewise, a neurological hazard index would approximate the hazard quotients for all substances with adverse impacts on the neurological system.

The main findings of the geographic analysis related to the non-cancer hazard index are as follows:

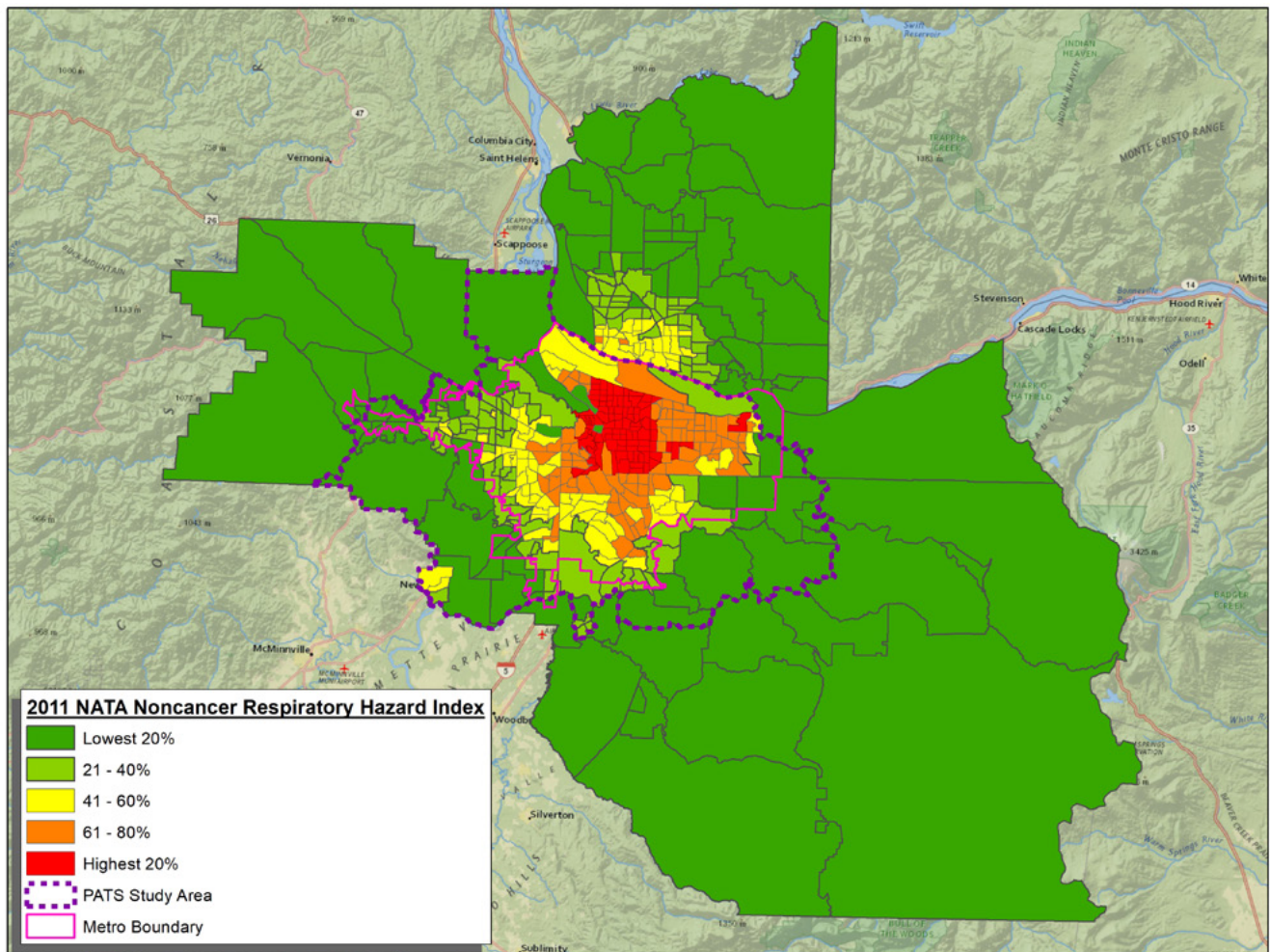
- For the Portland metropolitan area, only respiratory hazard indexes had values greater than one.
- Of the 112 air toxics included in the non-cancer hazard index values, one pollutant, acrolein, accounted for 90 percent of the respiratory hazard index for Multnomah County and dominated the respiratory hazard indexes for the other geographic areas. Airborne acrolein originates from two general categories of sources: some is directly released to the air from various emission sources (e.g., fuel combustion), but most is formed in the air from chemical reactions involving other pollutants (e.g., decay of airborne 1,3-butadiene). The complex airborne chemical reactions complicate efforts to reduce ambient concentrations of acrolein. However, an acrolein-dominated respiratory hazard index is not unusual to the Portland metropolitan area. This pollutant also accounts for nearly 90 percent of the respiratory hazard index for the state of Oregon and for more than 70 percent of the hazard index nationwide. This trend likely reflects acrolein's toxicity more than its abundance in air.
- If acrolein were not included in this analysis, all non-cancer hazard index values for the entire Portland metropolitan area would be less than one.
- Multiple source categories contribute to the estimated acrolein concentrations across the different geographic areas, with "non-point miscellaneous non-industrial" sources accounting for the greatest portion.

Table 3 – NATA Respiratory Hazard Indexes for the Portland Metropolitan Area

Geographic Area	2011 NATA Results			Ranking of Areawide Respiratory Hazard Indexes from 1999
	Number of Census Tracts Considered	Mean Areawide Respiratory Hazard Index	Range of Hazard Indexes Across Census Tracts	
Portland, OR	142	6.62	1.81 – 12.57	1
Multnomah Co., OR	171	6.12	1.77 – 12.57	2
PATS study area	337	4.59	1.05 – 12.57	3
Vancouver, WA	45	3.45	0.67 – 4.94	6
Clackamas Co., OR	80	3.42	0.79 – 5.40	5
Washington Co., OR	104	3.35	1.16 – 4.90	4
Clark Co., WA	104	2.98	0.97 – 4.31	7

Note: Geographic areas are presented in order of decreasing respiratory hazard index based on 2011 NATA. For reference, 2011 NATA predicts a nationwide respiratory hazard index value of 1.83, and the range of these respiratory hazard indexes in census tracts across the country is 0.17 to 40.78.

Figure 3 – 2011 NATA Noncancer Respiratory Hazard Index by Census Tract



Notes:

- Respiratory hazards are estimates and may understate or overstate actual concern.
- Estimated hazards are based on current understanding of air pollution emission sources, and that understanding continues to evolve.
- The respiratory toxicity for some pollutants is not known.

5. Collaborative, Non-Regulatory Agency

This chapter summarizes the results of the in-depth study of a collaborative, non-regulatory air authority: the **Denver Regional Air Quality Commission (RAQC)**.

RAQC Framework: Regulatory, Jurisdictional, Legal and Funding

Program Description: The RAQC is the lead air quality planning agency for the Denver metropolitan area and the Denver Metro/North Front Range Ozone Nonattainment Area. RAQC is a collaborative organization that focuses on planning, public information, and voluntary program implementation. The RAQC has no regulatory authority; instead, it must propose State Implementation Plans (SIP) and regulations through the Colorado Air Quality Control Commission. At times, RAQC has proposed or supported legislation before the Colorado General Assembly and programs and ordinances through local governments. The RAQC also implements many of its programs and initiatives through public/private partnerships with local governments, state agencies, businesses, and other stakeholders.

Regulatory Framework: The RAQC is legally organized as a non-profit corporation under Colorado law, but in some ways, the RAQC functions as a political subdivision of the state, as it was formed through an executive order of the governor in 1989. The governor's executive order establishes the RAQC's relationship with the state's environmental agency - the Colorado Department of Public Health and Environment (CDPHE). In addition, there are agreements with the Denver Regional Council of Governments (DRCOG), CDPHE, and the North Front Range Metropolitan Planning Organization (MPO) for coordination of air quality and transportation planning. The RAQC also delivers joint programs with the Colorado Department of Transportation (CDOT) and the Colorado Energy Office (CEO).

Jurisdictional Framework: As the lead air quality planning agency for the Denver metropolitan area, RAQC works closely with the CDPHE and the North Front Range MPO. The RAQC is governed by a 25-member board whose members are appointed by the Governor that represent a cross-section of the Denver/North Front Range community interests. The composition of the board has previously been modified by new incoming gubernatorial administrations – most notably the number of local government representatives has decreased over time.

Legal Framework: The RAQC has no legal authority under Colorado statutes to implement air quality programs; the RAQC's authority and mandate is derived from the Governor.

Funding Framework: Initial RAQC funding was provided by the CDPHE and voluntary contributions from local governments. Local government funding was reduced somewhat in the late 1990s, but it remains as an important and stable base source of funding. The current 2018 budget is ~\$6.5 million with a total of 16 different funding sources. In addition to CDPHE and local government funding, a major source of funding is grant funding.

Figure 4 – RAQC Operating Sources

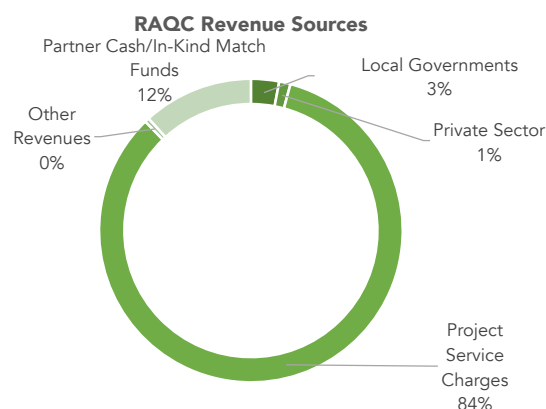
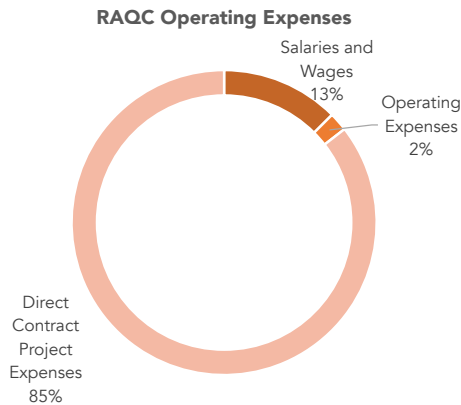


Figure 5 – RAQC Operating Expenses



Occasionally, RAQC receives funds from EPA and other funding sources. For example, the RAQC will be implementing a portion of Colorado’s Volkswagen settlement beneficiary plan. Initial staffing in 1990 was 5 staff members and current staffing is 10 staff. Funding dollars from grant sources fluctuate on an annual basis as some grants end while others start up. Given these fluctuations, RAQC utilizes carryover or surplus funding to ensure that in operating years without enough funding that the organization does not become insolvent.

Expense Details: Table 4 illustrates the operating revenue and expenses, including the averages by population and staff. Denver appears to have much larger revenues and expenses by staff member in comparison to PSCAA, but these values do not account for the contractor expenses which represent a significant portion of RAQC’s revenues and expenses (average of 85% of total expenses). The RAQC began in 1990 with five staff members and currently has 10 staff but they also leverage contractors for studies and program management. RAQC also acts as a pass-through to grant programs therefore the expenses per staff member are larger compared to the other two air quality programs (PSCAA and NRDE)

Table 4 – RAQC Revenues and Expenses

Average Annual Operating Revenues (\$)	Average Annual Operating Expenses (\$)	Revenue by Population (\$ per person)	Expenses by Population (\$ per person)	Revenue by Staff Member (\$ per person)	Expenses per Staff Member (\$ per person)
\$6,565,902	\$6,537,444	\$2.12	\$2.11	\$656,590	\$653,744

The current programs under way that are mostly implemented by contractors and managed by RAQC staff are as follows:

- Annual Planning/Modeling Contract
 - Annual Planning Contract
 - Volkswagen (VW) Mitigation Plan
 - VW Mitigation Plan (Charge Ahead Colorado)
 - Low-VOC Products Research
 - Ozone Public Outreach/Education Program
- Ozone SIP Modeling and Analysis
 - Transportation Demand Management Project
 - Local Agency Air Quality Mitigation Projects
 - Advanced Fleet Technology Program I & II
 - ALT Fuels Colorado Vehicle Program
 - Electric Vehicle Corridor Study

Findings: Denver RAQC

EFFECTIVENESS

Longevity of the RAQC, support by local governments and the business community, and the ability to survive several state administrations are indicators of Denver RAQC's effectiveness. The RAQC has emerged to be a reliable consensus building organization, based on stakeholder participation to both inform policy and also implement programs in a way that is respected by the private, public and non-profit sector.

RAQC led the effort to attain the NAAQS standards for CO and PM10 in the 1990s. In addition, RAQC has guided decreasing ozone levels in the region, even though attainment with the ozone NAAQS has been elusive due to tightening standards (i.e., met the previous 1-hour and 1997 8-hour standards, on the verge of attaining the 2008 standard, and expecting challenges with the 2015 standard).

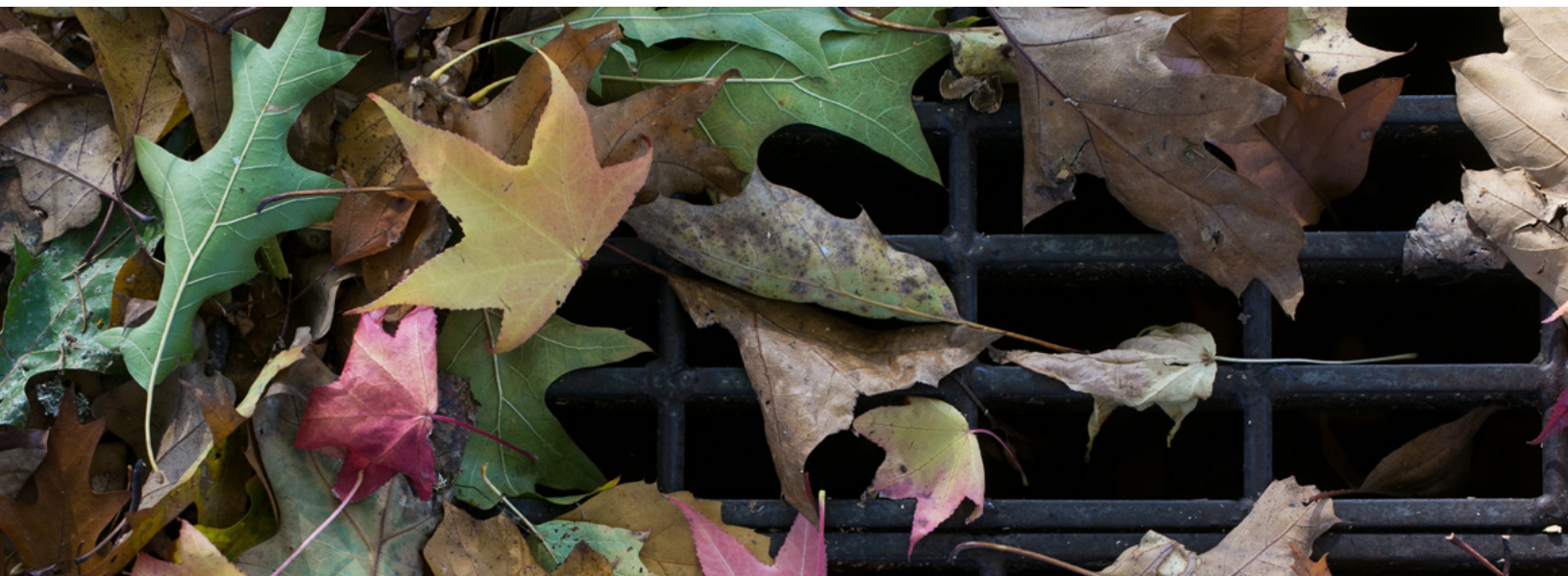
Denver RAQC developed a number of State Implementation Plan (SIP) elements, in coordination with CDPHE, that have been approved by the U.S. EPA, and the region achieves all federal air quality standards except the most recent ozone standards. All plans over the past 20 years submitted to U.S. EPA have been approved or partially approved.

Unique/Strong Program Aspects of Denver RAQC:

- **Collaborative advocacy:** RAQC is generally seen as being an impartial deliberative organization that provides rigorous and even-keeled advocacy. Some individual businesses and environmental organizations may oppose the RAQC from time to time on specific issues or initiatives, but in general, there is a level of respect and credibility for the RAQC and its initiatives.
- **Strong working relationships with local governments and state agencies:** One of the primary reasons for the successful relationship is its physical location within walking distance of most of its stakeholders. The ability for casual and regular meetings cannot be underestimated.
- **Strong leadership and political support:** This program has endured through the administrations of four separate governors and has remained effective over that period of time.

Challenges of Denver RAQC:

- **Unique organization structure may indicate that it cannot be replicated elsewhere.** The RAQC is a unique organization that relies on the Governor's Executive Order and the proximity of state agencies with the location of the state capital in Denver may not be easily replicated.
- **U.S. EPA's tightening of ozone air quality standards.** As Denver finds itself meeting the previous 1-hour and 1997 8-hour standards, meeting the 2015 standard by the deadline will be a significant challenge.



6. Regional/Local Air Quality Agency

Washington State, has seven regional air authorities. This chapter focuses on the largest authority and summarizes the results of the in-depth study for **Puget Sound Clean Air Authority (PSCAA)**. PSCAA was chosen over South Coast Air Quality Management District and Louisville, Kentucky's Institute for Healthy Air, Water, and Soil program due to the similar climatic and air quality conditions. Regarded as a highly effective, regional air quality agency, PSCAA's effectiveness can be attributed to the agency having an independent multi-county board, strong regional support, a stable funding source, and commitment to racial and social equity.

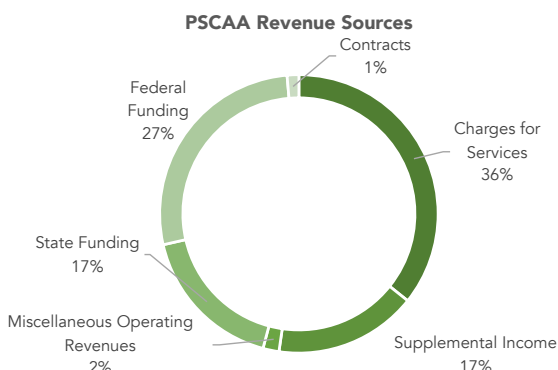
PSCAA FRAMEWORK: REGULATORY, JURISDICTIONAL, LEGAL AND FUNDING

Program Description: PSCAA is a stand-alone, regional air quality agency located in the Seattle-Tacoma metropolitan area, serving more than half of Washington State's population. The agency is over 50 years old and is tasked with preventing, reducing, and controlling emissions from significant sources of air pollution. To that end, PSCAA adopts and enforces air quality regulations through permitting, inspections, and enforcement of area sources, wood stoves, and stationary sources. The agency also conducts air quality monitoring, sponsors voluntary initiatives, and offers education programs. PSCAA programs include regulating wood burning and providing incentives, such as grants, to reduce air toxics and exposure to particulate matter.

Regulatory/Political Framework: PSCAA is a special-purpose, regional government agency chartered by the Washington Clean Air Act (WCAA) of 1967 (RCW 70.94). The agency complies with mandates in the federal Clean Air Act and the WCAA and assumes responsibility for almost all U.S. EPA and state duties that are applicable at the regional level.

Jurisdictional Framework: PSCAA has air quality program jurisdiction over King, Kitsap, Pierce and Snohomish Counties, and is governed by representatives from these jurisdictions that sit on an independent board. The 9-member PSCAA Board of Directors is composed of elected officials from each of the four counties, along with a representative from the largest city in each county, and one member representing the public-at-large. The PSCAA also has an Advisory Board which is composed of members representing large and small businesses, education, transportation, health, tribal nations, fire chiefs, environmental justice concerns, the environmental community, local ports, and the public-at-large.

Figure 6 – PSCAA Revenue Sources



Legal Framework: Any legal challenges to decisions made by the PSCAA go through the Pollution Control Hearings Board (Hearings Board). The Hearings Board consists of three members who are appointed by the governor and confirmed by the State Senate for staggered six-year terms. However, this Board is an administrative court that is independent of state agencies. Decisions by the Board can be appealed to the State's Superior Court.

Funding Framework: At its inception, the agency was created with start-up financial contributions from the jurisdictions within its boundary

and had a staff of less than 10. Currently, the agency has a staff of about 73 and is funded from a variety of sources.

Non-recurring grants have been a significant source of funding and have been used for woodsmoke and diesel emissions reduction projects. However, over the last few years, this funding source has been decreasing. These grants constituted 31 percent of total funding in FY17, but for FY18, these grants are budgeted to decrease to 8 of total funding due to the scheduled completion of large programs. Overall \$5.5 million, or 42 percent of the \$13.1 million in total funding, comes from fee revenues for self-funded programs. Per capita assessments are a “supplemental income” that currently contribute \$3.2 million, or 25 percent of total funding. Over time, the supplemental income has become a more significant funding source. Other fund draws of \$1 million are mostly from the fee programs fund reserves for operations during the fiscal year. The most significant PSCAA operating expense is personnel expenses at \$9.7 million. This constitutes 74 percent of total expenses of \$13.1 million.

As outlined in the WCAA, the per capita assessment is set annually and is levied against residents within the boundary of the air authority. Jurisdictions within the boundary cannot prevent or block the assessment. The air authority budget must contain an estimate of all revenues to be collected during the following budget year. Any remaining funds required to meet budget expenditures are to be designated as “supplemental income.” Approval of the supplemental income assessment requires the affirmative vote of three-fourths of all members of the board. The board then verifies with each municipality the share of the supplemental income to be paid. Each municipality is required to include this amount in its budget and to pay, in equal quarterly installments, the amount of its supplemental share. RCW 70.94.093.

Once approved by the board, each municipality must pay a proportion of the supplemental income to the authority as determined by:

1. The assessed valuation of property within city limits or within the unincorporated areas of the county, in relation to the total assessed valuation of taxable property within the boundary, or
2. The total population of the city or unincorporated county in relation to the total population within the authority boundary, or
3. A combination of these methods as described in statute

The PSCAA per capita rate was raised in 2018 to \$0.82; this was a 1 cent increase from the previous year. This increase addresses inflation, helps offset increased personnel costs, and goes to support PSCAA's strategic direction.

Charges for services include asbestos abatement, notices of construction, registration of small businesses (such as coffee roasters, gas stations and spray coating facilities) and operating permit fees. Intergovernmental revenue includes state and federal funding. Recent examples of these funding sources (shown in parentheses after each program) include:

State Core - Washington Department of Ecology (Ecology)

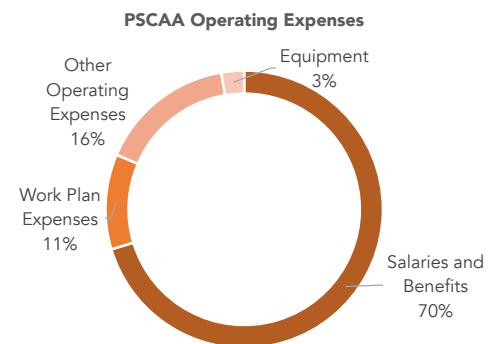
- SeaTac Airport Ground Support Equip - Ecology
- ScRAPs (Support Truck Scrappage and Replacements for Air in Puget Sound) - Ecology
- Harbor Craft Grant - Ecology
- Crowley Shore Power - Ecology

- Drayage Truck Replacements - Ecology
- FY16/17 Woodstove Replace/Removal - Ecology
- Woodsmoke Education & Enforcement Grant - Ecology

Federal Funding

- 105 Grant - Federal Core - United States Environmental Protection Agency (USEPA) & Ecology
- Sec 103 Grant, PM 2.5 - USEPA/Ecology
- National Association of Regional Councils - US Department of Energy (USDOE)
- Western Washington Clean Cities Coalition (WWCCC) - USDOE
- Clean Cities Coalition - USDOE
- Clean Fuels Ohio - WWCCC & USDOE
- CALSTART – WWCCC & USDOE
- Drayage Truck Replacements - Ecology - USEPA portion
- Drayage Truck Replacements - USEPA - Diesel Emission Reduction Act
- Air Toxics - USEPA
- Expansion of Woodstove Removal, PAH Grant - USEPA & Ecology
- Port of Seattle ScRAPs 2 and ScRAPs 3 – Federal Highways - Congestion Management Air Quality & Washington Department of Transportation

Figure 7 – PSCAA Operating Expenses



Expense Details: PSCAA operates an approximately \$15.4 million program based on an average over the past nine years. Figure 7 illustrates that staffing is the primary expense for the agency. Table 5 illustrates the operating revenue and expenses, including the averages by population and staff.

Table 5 – PSCAA Revenues and Expenses

Average Annual Operating Revenues (\$)	Average Annual Operating Expenses (\$)	Revenue by Population (\$ per person)	Expenses by Population (\$ per person)	Revenue by Staff Member (\$ per person)	Expenses per Staff Member (\$ per person)
\$15,399,292	\$14,423,858	\$4.02	\$3.76	\$215,395	\$201,326

Findings: PSCAA

Unique/Strong Program Aspects of PSCAA:

Agency effectiveness is highlighted by emissions reductions and a clear, goal-oriented strategic plan. Two main lessons learned from staff of the 50-year old, independent, regional air quality agency are:

1. Reliable funding sources and
2. Strong governance structure is essential.

Funding

Currently, PSCAA is funded by fees, grants, pass-through by state from U.S. EPA, and the per capita assessment. Because the per capita assessment cannot be prevented or blocked by jurisdictions, this funding mechanism is stable and has been used to achieve goals identified in the Strategic Plan that are not covered by federal funding or programs not in the regulatory realm, such as air quality monitoring, forecasting, and social equity and environmental justice programs.

Governance

PSCAA has formed the board of elected officials so that no one jurisdiction can control board actions. Further, the staff makes most decisions, and the 9-member Board of Directors sets policy. The board is explicitly prohibited to take action beyond policy, to prevent political influence such as approving/denying permits that is not always correlated with public health.

In the spring of 2014, the PSCAA Board of Directors adopted a 2014 to 2020 Strategic Plan.¹⁶ This plan outlines the goals and objectives for the intervening years and sets targets to gauge progress and details strategies to achieve these targets. One aspect of this plan is that it presents a clear and simply stated vision that ***“All people and natural systems in our region benefit from clean and healthy air all the time, regardless of socio-economic status or geographic location.”*** The PSCAA staff provide in-depth mid-term reports to the PSCAA Board updating them on progress toward goals.

The four notable unique strengths/aspects of the program are as follows:

- **Environmental justice/social equity focus:** With initial funding of \$25,000 from civil penalties to support an outreach program for impacted areas, PSCAA has identified 21 areas within their jurisdictional boundary that are highly impacted. With a current staff of 3, PSCAA also runs an air toxics program where community members conduct air quality monitoring using either mobile air quality monitors or particulate counters.
- **Ability to conduct personal/community air quality monitoring:** One rapidly emerging aspect of air quality programs is the use of personal air quality monitoring devices used for community monitoring programs. As the cost and ease of use of personal air quality monitoring devices is improving, community air quality monitoring programs are developing using devices like PurpleAir.
- **Focus on Health-Based Standards:** PSCAA prioritizes the greatest risks in the region that they have the ability to affect. For instance, PSCAA conducts air monitoring for (PM_{2.5}), which is used as a surrogate for diesel and then implements strategies to reduce diesel emissions. As diesel emissions decrease, cancer rates will decrease due to the correlation of PM_{2.5} with cancer rates.
- **Conversion programs for emitters:** PSCAA authority has run many voluntary programs to help support replacing woodstoves with ductless heat pumps to reduce woodsmoke. as well as port vehicle retrofits and upgrades to reduce diesel emissions from marine and mobile sources.

Challenges of PSCAA Program:

With the emergence of household level monitoring, PSCAA is taking care to clearly communicate to the public that the monitors do not represent a scientific study, but rather can be used as a means to discover areas for further scientific study. This balance of managing data quality, communication about data and scientific study requirements, while also cultivating and supporting community interest and participation is a challenge for all community monitoring programs nationwide.

¹⁶ <https://www.pscleanair.org/DocumentCenter/View/445>

7. Nonroad Diesel Engine Regulatory Programs

This chapter summarizes the results of the in-depth study of a nonroad diesel engine program: the **Nonroad Diesel Engine (NRDE) program** in Vancouver, Canada as well as some information about the California Air Resources Board (CARB) Program to Reduce Health Impacts from Freight Facilities (**CARB Freight**). Initiated in 2012, NRDE is a unique program that has been effective in phasing out nonroad Tier 0 diesel engines, the most polluting type of diesel engine and typically the oldest type, in a region with about 2.5 million residents. CARB Freight has yet to be implemented but will address diesel emissions that are concentrated around traffic corridors and specific facilities such as major distribution centers. More detailed information about NRDE and CARB Freight is available in the Appendices (see Task 3 memo).

NRDE Framework: Regulatory, Jurisdictional, Legal & Funding

Program Description: Studies conducted on air quality in the Greater Vancouver Regional District (Vancouver Metro) area established that diesel particulate matter (PM) emissions were responsible for 67% of the lifetime cancer risk from air pollution and that nonroad diesel engines were responsible for approximately 41% of total diesel emissions.¹⁷ These study results catalyzed the development of the NRDE program.

NRDE is an engine-centric program (vs. vehicle/equipment-centric) that imposes a requirement on all nonroad diesel engine operators to register Tier 0 and Tier 1 engines operating in the Metro region and phase out the use of these engines by 2015 and 2020, respectively. Registration is not required for Tier 2 engines and above. Engine tier is determined by horsepower (hp) and year of manufacture. Examples of machines covered by the regulation include: excavators, graders, asphalt equipment, forklifts, mobile generators, diesel pumps, backhoes, and tractors. The regulation exempts: 1) engines less than 25 hp, 2) agricultural equipment, 3) stationary emergency generators, 4) marine vessels, 5) line-haul locomotives, and 6) on-road vehicles.

Registration requires providing engine information, paying an annual fee, and labelling machines with a tier sticker that indicates the engine tier category and unique registration number. The program effectively assigns a cost for using a more polluting engine and also provides a way to recover the fees and apply them to the next engine upgrade or purchase. When the program started in 2012, the registration fee was \$4/hp per year for Tier 0 engines. In 2018, the engine fee is \$20/hp per year for Tier 0 engines. To promote retiring or retrofitting engines, Metro Vancouver offers a financial incentive that allows operators to recover registration fees if the engine emissions are upgraded to a higher tier emission standard through exhaust retrofits or by using alternative fuels. Eighty percent of fees paid into the program for the previous three years for an engine can be recovered if the engine is permanently retired from operation in the region or if the engine is retrofitted to a higher tier.

Compliance is evaluated and enforced by four officers dedicated to the program. The officers conduct spot inspections and scheduled inspections using a real-time, online database to verify that onsite

¹⁷ http://www.metrovancouver.org/services/air-quality/AirQualityPublications/Air_Toxics_Emission.pdf

engines are registered and labelled with Tier stickers. If an unregistered engine is determined to be Tier 0 or Tier 1, officers take the appropriate action to bring the engine/operator into compliance. Failure to comply may result in \$1,000 to \$200,000 fines. ***Importantly, responsibility for compliance rests not only on the owner/operator of the engines, but also on the company, landowner, developer, general contractor, or government that hires those using equipment that is out of compliance.*** This provides an indirect means of enforcement through specifications and contracting language that requires compliance with the program.

Regulatory Framework: The Province of British Columbia, Canada (BC) passed the Environmental Management Act that authorizes the Greater Vancouver Regional District (Metro) to provide the service of air pollution control and air quality management. Through this authority, the Board of elected officials pass bylaws related to air quality protection. This Board passed the Nonroad Diesel Engine Emission Regulation Bylaw (No. 1162). Public consultation for the NRDE program began in 2010, and the program became active on January 1, 2012. The regulation of older diesel engines was supported politically and by local medical health professionals.

In January 2015, the Port of Vancouver (Port) developed a similar program, with input from Vancouver Metro, for their tenants located on Port lands within the Vancouver Metro region. An informal agreement was entered into between Vancouver Metro and the Port that allows regulated companies to have the option to register their engines in either program.

Jurisdictional Framework: Vancouver Metro's jurisdiction covers 24 local authorities serving a population of approximately 2.5 million residents. The 2018 Vancouver Metro Board of Directors consists of 40 directors representing 21 municipalities, one electoral area, and one treaty First Nation. These directors are appointed to the Board by their respective councils.

Legal Framework: Because Vancouver Metro does not have authority to tax or to provide a direct benefit (grants) to businesses through creating a pooled source of funds, NRDE developed a unique program and could not simply copy similar California nonroad diesel programs. To resolve these issues, Metro relied on their authority to collect fees as long as those fees are funding an associated program. Metro structured the program so funds collected for a particular engine are to be associated with that engine in terms of rebates, in other words, it is an engine-centric program. Currently, the owner of an engine can recover 80 percent of registration fees paid into the program over the previous three years if the engine is retired or retrofitted.

Legal challenges associated with the program move through the Canadian general provincial courts, not administrative courts. Cases in the provincial courts can result in the legal challenges being lengthy and costly.

Funding Framework: The program is self-funded by registration fees. The program staff consist of one program lead, four officers, a business analyst, at least one information technology (IT) developer for online registration system/technical support, and one administrative staff. IT support is very important because aside from onsite inspections, all other aspects of the program, most importantly registration and taking complaints, is conducted online. The set-up costs for the program, which included initial research, idea development, consultation, legislative crafting, database development, and one year of outreach, are estimated to be approximately \$2,000,000. The spreadsheet excerpt in Table 6 created by the consultant team shows a rough financial history of the organization from start-up through 2020. Note that the startup period was not funded by program fees. Also note that fees are likely not high enough to cover all program costs.

Table 6 – Summary of Vancouver Metro's NRDE Budget

Revenues	pre-2012	2012	2013	2014	2015	2016	2017	2018*	2019*	2020*
Program Fees										
Non-Road Diesel Emissions Program Fees	\$0	\$300,000	\$600,000	\$900,000	\$1,400,000	\$1,800,000	\$2,200,000	\$2,000,000	\$2,000,000	\$1,900,000
Total Revenue (US\$)	\$0	\$300,000	\$600,000	\$900,000	\$1,400,000	\$1,800,000	\$2,200,000	\$2,000,000	\$2,000,000	\$1,900,000
Operating Expenses										
Policy and Overhead Expenses	\$700,000	\$150,000	\$150,000	\$150,000	\$200,000	\$200,000	\$250,000	\$250,000	\$200,000	\$200,000
Salaries and benefits	\$200,000									
Consultation	\$100,000									
Legislative crafting	\$100,000									
Research, background work and outreach	\$300,000									
IT Expenses	\$400,000	\$200,000	\$200,000	\$200,000	\$150,000	\$150,000	\$100,000	\$200,000	\$200,000	\$200,000
Database development										
Program Expenses	\$300,000	\$400,000	\$500,000	\$600,000	\$800,000	\$800,000	\$900,000	\$900,000	\$900,000	\$900,000
Tier 0 and 1 engine rebates										
Total Expenses (US\$)	\$1,400,000	\$750,000	\$850,000	\$950,000	\$1,150,000	\$1,150,000	\$1,250,000	\$1,350,000	\$1,300,000	\$1,300,000
Surplus / Deficit	-\$1,400,000	-\$450,000	-\$250,000	-\$50,000	\$250,000	\$650,000	\$950,000	\$650,000	\$700,000	\$600,000

Expense Details: Table 7 illustrates the operating revenue and expenses, including the averages by Metro Vancouver population and staff for comparison to the two previous programs.

Table 7 – NRDE's Revenues and Expenses - Note: Revenue calculations include operational years 2012-2017 and operating costs include start-up costs prior to 2012.

Average Annual Operating Revenues (\$)	Average Annual Operating Expenses (\$)	Revenue by Population (\$ per person)	Expenses by Population (\$ per person)	Revenue by Staff Member (\$ per person)	Expenses per Staff Member (\$ per person)
\$1,200,000	\$1,071,429	\$0.41	\$0.44	\$171,429	\$149,490

Figure 8 – Fee model for Vancouver Metro's NRDE program

Program fees, income source, and potential liability: As mentioned above, engine fees are a source of revenue for NRDE. However, rebates up to 80 percent for the last three years of the program fees are available to registrants if registrants retire or retrofit their diesel engine. In the initial years of NRDE, the rebates were a significant expense when there were not enough program fees to cover it. Of the 3,839 registered Tier 0 and Tier 1 engines, 185 have been retired and 43 have been retrofitted. Through 2017, NRDE has provided \$4.3 million in Tier 0 and Tier 1 rebates. Please see figure 8 for more detail.

Fee Rates

Year	Tier 0 (per-hp)	Tier 1 (per-hp)
2015	\$10.00	\$6.00
2016	\$14.00	\$8.00
2017	\$20.00	\$10.00
2018	\$20.00	\$10.00
2019	\$20.00	\$10.00
2020	\$20.00	\$10.00

Fee Calculation

Engines operating less than 2,000 hours in calendar year:

$$\text{Engine max. horsepower} \times \text{Fee Rate} \times \frac{\text{Hours operated in calendar year}}{2000 \text{ hours}}$$

Engines operating 2,000 hours or more in calendar year:

$$\text{Engine max. horsepower} \times \text{Fee Rate}$$

Rebates

Fee rebates of up to 80% are available where equipment is upgraded to Tier 2 or better for particulate matter emissions using an approved emission reduction measure (ERM), or removed from operation.

Findings: NRDE

Effectiveness:

NRDE estimates that there were about 5,000 Tier 0 and Tier 1 engines in the region at the start of the program. Of those 5,000 engines, approximately 25% of Tier 0 engines located in the Metro region were retired in the first two years after implementation of the regulation and are not included in the results below.¹⁸ To date, the program has had the following success beyond the relocation of older engines outside of the area as shown in Table 8:

Table 8 – NRDE first two year's progress

	Number of Engines	Percentage of Engines (%)
Registered engines (combined Tier 0 and Tier 1)	3839	100%
Retired engines	185	~5%
Retrofitted engines	43	~1%

NRDE staff note that, in addition to registrations, contractors and equipment rental companies have been moving engines out of the region. NRDE staff have also seen changes in the acceptance of the program and the behavior of construction and equipment rental companies in terms of planning for engine retirement, retrofit, or upgrades. Staff also noted that industry is now self-regulating as contractors are verifying that all subcontractors are in compliance. Finally, companies are now planning to phase out equipment and recover fees in the near future when retiring equipment as part of their business model.

Lessons learned:

- 1) The regulation should have required the registration of all nonroad diesel engines (not just Tier 0- and Tier 1 engines) to allow phasing out of additional tiers of engines over time.
- 2) The breadth of industries and types of equipment regulated was wider than initially thought and the program expanded as it learned more.
- 3) Focused and targeted outreach and education at initial stages of implementation was essential to success.

Unique/Strong Aspects of NRDE Program:

- **Bylaw Regulates all Parties:** The bylaw requires all parties to be in compliance, not just owners or operators, but those that hire the operators. For instance, fines from \$1,000 to \$200,000 can be levied against any of the following who hire owners/operators of engines not in compliance: landowner, developer, general contractor, or governmental entity.
- **Method of Conducting Inspections with Adequately Trained Compliance Officers:** NRDE inspection methods improved over time, allowing Vancouver Metro's NRDE program officers to implement an inspection strategy aimed at reaching many of the mobile equipment operators. The officers use laptops to update compliance checks in real-time which limits duplication of effort and provides history of a company before going onsite. Each week the officers review new construction permits and visit the jobs at their inception.

¹⁸ https://www.ccme.ca/files/Resources/air/mobile_sources/Options%20to%20Address%20Air%20Pollutant%20and%20Greenhouse%20Gas%20Emissions%20from%20In-use%20Heavy%20Duty%20On-road%20and%20

- **User-friendly Registration Supported by Strong IT Support:** NRDE offers an easy to navigate, user-friendly online platform for registration that also allows for taking complaints regarding out-of-compliance engines.

Challenges of NRDE Program:

- Large geographic area of Metro Vancouver
- Regulating small, transient businesses
- Field employees required to become experts on identifying engines because many older engines are without labels indicating horsepower or year manufactured
- Adequate training is required for compliance officers to work in hostile situations when engine operators are aggressive
- Limited exhaust retrofit options for improving emissions for older engines
- Registrants that are not computer-savvy require staff assistance for maintaining compliance.
- Not able to rely on low-cost, faster administrative courts.
- Retired engines are typically moved out of the Metro Vancouver area, not destroyed so the diesel pollution is exported to other areas
- Establishment of a similar program would likely need state legislature and Environmental Quality Commission support.

California Air Resources Board Program to Reduce Health Impacts from Freight (CARB Freight)

Although this freight program has yet to be implemented, it may offer a valuable model for addressing diesel emissions that concentrate around corridors and specific facilities and may disproportionately affect a neighbor or employees' health.

CARB oversees all air pollution control efforts in California to attain and maintain health-based air quality standards. To address the mandate of the CARB Board and public concerns over diesel-related health issues, lack of enforcement and coordination efforts, and location of warehouses, CARB staff are examining several paths forward for minimizing the community health impacts from large freight facilities. In March 2017, the CARB Board directed staff to develop concepts and proposals to reduce pollution from freight facilities. Staff concepts were presented to the CARB Board at a March 2018 meeting.

CARB conducted extensive community outreach activities within impacted communities and among stakeholders to identify concerns and obtain ideas for reducing impacts from freight-related emissions in communities. CARB also examined, in detail, facility-based and indirect source rule considerations, along with sector-based approaches. They also examined relative contributions to “near-source cancer risk” from seaports, inter-modal rail yards, freight distribution centers, and cold storage. In summary, CARB staff determined that the most effective approach for CARB to achieve significant, enforceable reductions was:

- Develop CARB freight rules using a hybrid approach affecting both equipment and facilities:
- Transition to zero emission operations/equipment, supplemented with near-zero emission engines

as the technology becomes deployable. See table 9.

- Establish facility requirements for fueling/charging infrastructure and compliant equipment
- Establish priorities based on community risk
- Work closely with air districts to weave together CARB sector rules and any air district Indirect Source Rule (ISR) rules.¹⁹

Table 9 – 2017-2018 State funding for freight initiatives in California. California's population is nearly ten times that of Oregon. Despite that scale difference, California is investing proportionately much more funding for minimizing freight impacts.

Agency	Program	Facility	Sector
CARB/Air Districts	Low carbon transportation (proposed) Also has air toxics benefits.	Zero & near-zero freight facilities: \$100M Warehouses: \$50M	Truck vouchers: \$188M Truck loan assistance: \$20M Off-road freight vouchers: \$40M
CARB/Air Districts	Carl Moyer (off-road equipment replacement)	N/A	All sectors including charging and refueling: \$69M allocated
CARB/Air Districts	AB 617	\$250M to support deployment of cleaner mobile technologies in disadvantaged communities	
CARB/Air Districts	Proposition 1B	N/A	All sectors including charging & fueling: \$267M allocated
CARB	Low Carbon Fuel Standard	N/A	Credits for plugging in certain electric equipment
California Energy Commission	Alternative and Renewable Fuel & Vehicle Technology Program	Charging: \$16.6M Natural gas fueling: \$2.4M	Natural gas trucks: \$9.7M Advanced freight & fleet technologies: \$17.5M
Caltrans	Trade Corridor Enhancement	Infrastructure including ports/rail: \$300M	N/A

¹⁹ CEQA requires state and local agencies within California to follow a protocol of analysis and public disclosure of environmental impacts of proposed projects and, unlike the federal National Environmental Policy Act (NEPA), adopt all feasible measures to mitigate those impacts.

Examples of two potential additional CARB actions specifically focused on freight hubs are:

- Develop a freight handbook document that identifies best practices for the siting, design, construction, and operation of freight facilities to minimize community exposure to air pollution; incorporate the use of zero-emission technologies; install any needed fueling/charging infrastructure; and maximize the capacity of freight transportation infrastructure.
- Establish a Freight Hub Enforcement Team responsible for enforcing CARB regulations that apply to combustion vehicles and equipment, including trucks, transport refrigeration units, large spark ignition engines, and nonroad equipment.



8. Statutory Authority of Stakeholder Agencies

Statutory Authority

Two statutory authorities of note are the recently passed Oregon Senate Bill 1541 and ORS 468A: Formation of a Regional Air Quality Authority. These two statutes are summarized below.

Oregon Senate Bill 1541 Cleaner Air Oregon – Department of Environmental Quality and Oregon Health Authority

Senate Bill 1541,²⁰ passed in March 2018, authorizes the Oregon Environmental Quality Commission (EQC) to adopt rules and a program for reducing the public health risks associated with individual sources of industrial air toxics and the ability to levy fees. The legislation also authorizes a pilot program for assessing and regulating the cumulative public health risks from multiple sources of industrial air toxics to be located in counties with a population of at least 500,000, i.e., Multnomah or Washington Counties. Although many details will be forthcoming when rulemaking is completed, the EQC will adopt rules requiring certain businesses to do the following:

- Report their emissions of air toxics
- In cases where emissions of air toxics exceed initial screening levels for potential health risks, conduct more thorough assessments to determine likely health risks to people nearby
- When health risks exceed certain levels, take steps to reduce those risks

The legislation sets in statute certain aspects of the Cleaner Air Oregon rulemaking initiated by Governor Brown and will require changes to the previously proposed rules. Specifically, the bill:

- Establishes, in statute, source risk management levels that trigger regulatory actions.
- Authorizes the agency to set more protective thresholds for pollutants that are expected to cause developmental human health effects or other severe health effects.
- Directs the EQC and DEQ to recognize when the Best Available Control Technology (BACT) is already being used to control pollution and prohibits further requirements except under certain circumstances. SB 1541 states that DEQ cannot require facilities found to be employing the Best Available Control Technologies (BACT) to reduce risk, unless risk from their emissions exceed the following thresholds; 4 times the cancer-risk regulatory benchmark and 4 times the non-cancer risk regulatory benchmark.
- Establishes one-time fees to be paid by all air quality permit holders. Those fees are expected to generate approximately \$1.7 million – enough to support 11 new positions at DEQ and 2.60 FTE at OHA.
- Authorizes the EQC to develop an ongoing schedule of fees necessary to cover the direct and indirect costs of operating the ongoing program.

²⁰ <https://olis.leg.state.or.us/liz/2018R1/Downloads/MeasureDocument/SB1541>

Policy-based source risk management levels are for cumulative risk for each point source and could be lowered over time. It is anticipated the agencies will begin implementing the program in early 2019, once rulemaking is complete.²¹

ORS 468A: OREGON HEALTH AUTHORITY

In 2015, OHA embarked on a multi-year process in response to the Oregon legislature's direction to modernize the state's public health system. Oregon's "Public Health Modernization" (PHM) effort is moving the public health system toward comprehensive reform to modernize the system at both the state and local levels. One focus area of modernization is on foundational programs including environmental health, and the core capability of building and sustaining partnerships and at the state and local levels, to inform and strengthen the work of public health. OHA is expected to be requesting funds to implement this modernization during the next legislative session.

Chapter 407, Division 43, 407-043-0010, Oregon Health Authority Transition Period Roles and Responsibilities, includes a stated authority to ensure the promotion and protection of public health. The Environmental Quality Commission may, on its own motion, after public hearing, grant authority to the OHA to enforce any rules of the commission related to air (2015 ORS 468.060).

METRO

Metro is an elected regional government that serves more than 1.6 million people living in 24 cities and urban areas in Clackamas, Multnomah, and Washington counties. Metro's responsibilities include planning for housing, jobs and transportation choices; managing the regional garbage and recycling system; operating the Oregon Zoo, the Oregon Convention Center, the Portland Expo Center and various arts facilities; and planning and caring for various parks and natural areas.

While Metro is engaged in a number of activities related to air quality, for Metro to play a greater role, whether in offering formal services as a coalition convener or as a regulatory authority, the elected Metro Council would need to consider its current commitments, available resources and whether local governments in the region already provide services in this area. Under its Charter,²² Metro can take on additional functions and exercise authority in areas that are designated as "matters of metropolitan concern." Metro's role on an issue declared a "matter of metropolitan concern" can include a number of functions from formal convener to regulator.

There are several routes by which Metro could designate air quality or other issues a matter of metropolitan concern if there is a desire by the Metro Council to take on a greater and more formal role. First, Metro Council can declare issues, which are not local government services that already provided, as "matters." Alternatively, the Metropolitan Policy Advisory Committee (MPAC),²³ could raise the issue which then go to the Metro Council for consideration. Another avenue would be through a voter initiative that declared an issue as a matter of metropolitan concern for Metro to take on.²⁴ Lastly, state legislation could require Metro to take on a specific function as a matter of metropolitan concern.

²¹ http://www.oregon.gov/deq/EQCdocs/ItemB_CleanerAirOregon03212018.pdf

²² <https://www.oregonmetro.gov/metro-charter>

²³ MPAC Metro Policy Advisory Committee is comprised of 21 voting members representing cities, counties, special districts and the public, and six non-voting members. Three Metro Councilors also participate as non-voting liaisons.

²⁴ It should be noted that Metro's Charter is not amended when adding items of metropolitan concern.

²⁵ ORDINANCE NO. 10-1231B: For the Purpose of Determining that Providing Financial Resources to Increase the Supply of Affordable housing is a Matter of Metropolitan Concern, Metro, 2010.

In 2010, the Metro Council took a limited step in regard to affordable housing issues by declaring Metro funding for affordable housing to be a matter of metropolitan concern.²⁵ During this process, MPAC was consulted, but because the designation did not supplant any existing local governments' services, their approval was not required for Metro Council action.

Short of declaring air quality a “metropolitan concern,” Metro’s will continue to address a number of air quality issues (e.g., land use and transportation planning; clean diesel for solid waste fleets). In addition, if the Metro Council agreed and resources were made available, Metro might also engage in joint research, outreach and education efforts or other collaborative activities related to air quality issues. Metro also has experience in licensing and franchising solid waste facilities which could be of value in regional discussions about air quality.

Formation of a Regional Air Quality Authority

In Oregon, regional air authorities can be created, where formation of an authority is controlled by statute, ORS 468A.²⁶ The statute states that a regional air authority may be formed in a contiguous area with a population greater than 130,000 that consists of two or more counties or two or more cities or a combination of a county and a city. Formation requires the participating cities and/or counties to adopt ordinances or resolutions specifying the participating jurisdictions and the boundaries of the authority. The EQC then orders the formation of the authority if the participating jurisdictions have adequate financing and the boundaries are reasonable. The authority generally exercises the powers of DEQ relating to air pollution control, but it can lose authority if it is determined that it is unable to regulate effectively. The governance structure and nature of the authority are also outlined in the ORS. Of note, the statute does not address staffing, nor does it address how a regional government like Metro could participate.

However, the air authority can exercise authority in incorporated and unincorporated areas within its territory, even if the governing body of that area is not participating. Nonetheless, the extent of this authority is dependent on the terms of agreement made with DEQ. If approved by EQC, potential authority includes:

- Monitoring, data management, and public education/outreach
- Regulating, limiting, controlling or prohibiting all air contamination sources not otherwise exempt
- Permit programs

COUNTY SCOPE OF AUTHORITY

There are two kinds of authority available to Oregon counties: constitutional home rule or statutory home rule. In 1958, Oregon voters amended the state constitution to allow constitutional home rule where counties can adopt individual “home rule charters.” Constitutional home rule authority is derived from Oregon law and county charter, code, and resolutions. These home rule powers may only be retracted or modified by charter or amendment to the State Constitution. Currently, nine of the 36 counties in Oregon have adopted constitutional home rule charters.

An Oregon law passed in 1973 created “statutory home rule counties,” also called general law counties. This law gave power to all counties to enact local legislation on matters of county concern, whether or

²⁶ [Oregon Revised Statute \(ORS 468A\)](#)

not they have a charter. Statutory home rule consists of powers delegated by the state legislature, which may be retracted or modified at any time by subsequent state legislation. General law counties are governed either by a board of commissioners or by a county court and have limited power to reorganize. Additionally, general law counties have no protection against preemptive state legislation, whereas charter counties have a limited amount of exclusive local control even under the current narrow interpretations of Oregon law.²⁷

Clackamas County does not have a county charter and is considered a statutory home rule county. Authority derives from a combination of state statutes and the general powers of county governments. The county has 5 commissioners.

Multnomah County is a constitutional home rule county that adopted their County Home Rule Charter in 1966.²⁸ In addition to having authority over matters of county concern to the fullest extent granted or allowed by the constitutions and laws of the United States and the State of Oregon, the charter is to be liberally construed, and each power of the county under the charter shall be construed as a continuing power unless the charter or the grant of the power indicates the contrary. The Charter can be revised by citizen vote each sixth year after a review by an appointed Home Rule Charter Commission, as directed by the Charter. The county has 5 county commissioners elected by district.

Additionally, the County can meet as the Board of Public Health and exercise certain powers, including imposing laws and regulations that protect public health on local jurisdictions, without impinging on their home rule.

Washington County also is a constitutional home rule county and was one of the first counties to adopt a “home rule” charter.²⁹ That said, Section 23 of the Washington County Charter states that the County ordinances enacted under their police powers will not apply within an incorporated city except in limited circumstances.³⁰ The County has a general grant of powers of matters of County concern and powers inside incorporated cities. It is expressly declared that city governments within the County are empowered by charter and by the Oregon Constitution and laws of the State to provide services and regulatory measures necessary to the general welfare of the people within the city. Washington County has 5 county commissioners.

Washington County exercised this authority for its wood stove exchange program in August 2016 as a collaboration between their Department of Health and Human Services and the Office of Community Development and local municipal jurisdictions.³¹ Their results are listed in the fact sheet shown in Figure 9.

CITY SCOPE OF AUTHORITY

City of Portland: The Portland Charter has a broad grant of corporate (Section 1-101) and general powers (Section 1-102).³² Aside from initiative and referendum power, Portland’s Charter vests city

²⁷ Tollenaar and Associates for the Association of Oregon Counties, County Home Rule in Oregon, 2005. https://drive.google.com/file/d/0B4bfnUJ9POS_RjVYMDhWZHowbHM/view

²⁸ <https://multco.us/file/23673/download>

²⁹ <https://www.co.washington.or.us/cao/chartercode/>

³⁰ https://www.co.washington.or.us/CAO/CharterCode/upload/Washington_County_Charter_2015b.pdf

³¹ www.woodstoveexchange.com

³² <https://www.portlandoregon.gov/citycode/28223>

³³ <https://www.portlandoregon.gov/bps/article/541599>

³⁴ <http://qcode.us/codes/hillsboro/>

³⁵ http://www.qcode.us/codes/hillsboro/view.php?topic=6-6_40&frames=on

powers in the council except as the charter otherwise provides. Portland does not regulate air quality, but Portland's new 2035 Comprehensive Plan addresses air quality in Chapter 7.³³

City of Milwaukie: The Milwaukie Municipal Code is published under general authority of the City Council and is maintained as provided in this chapter by the City Recorder. (Ord. 1902 § 1, 2002: Ord. 1614, 1986). Title 16.2: The Milwaukie Charter only addresses air quality in relation to building permits.

City of Hillsboro: Hillsboro's Municipal Code includes the City's Charter. Section 4 of the Hillsboro Charter sets forth the scope of authority. "[t]he city has all powers that the constitutions, statutes and common law of the United States and Oregon expressly or impliedly grant or allow the city, as fully as though this charter specifically enumerated each of those powers." This general grant of authority permits the City to take any action within its municipal boundaries provided that such actions are not preempted by state or federal law. Aside from initiative and referendum powers, Hillsboro's Charter vests all city powers in the council except as the charter otherwise provides. The council has legislative, administrative and quasi-judicial authority. The council exercises legislative authority by ordinance, administrative authority by resolution, and quasi-judicial authority by order. The council may not delegate its authority to adopt ordinances.

City of Hillsboro enacted Code 6.40: Wood Burning in order to reduce nuisances associated with the burning of wood, to comply with the requirements of the federal Clean Air Act of 1990, and to avoid the negative impacts of failure to comply with the requirements. This Code requires the City to communicate air advisories during the winter heating season, caution against the operation of fireplaces and solid fuel burning devices during yellow advisory days and bans the operations of fireplaces or other devices during red advisory days. See the above fact sheet.

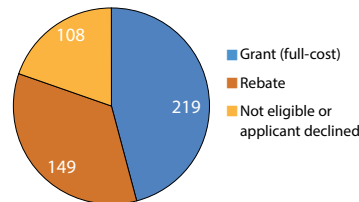


Progress Report #7 Aug. 24, 2016 – March 31, 2018

The Washington County Wood Stove Exchange is a collaboration between the Department of Health and Human Services and the Office of Community Development. The program, which was launched on August 24, 2016, replaces old and uncertified wood stoves with new and cleaner heat sources, including certified wood and pellet stoves, gas stoves and electric heat pumps. More information is available at www.WoodStoveExchange.com.

Some significant milestones were reached in the first quarter of 2018. More than 470 applications have been received and 240 exchanges completed. These exchanges have prevented more than 17 tons of wood smoke particulate (PM 2.5 and PM 10). Additionally, over 100 tons of hazardous air pollutants and gases have been prevented. Thank you to our partners and funders whose efforts have made this program so successful!

Total Applications Received: 476



Preferred New Heating Source

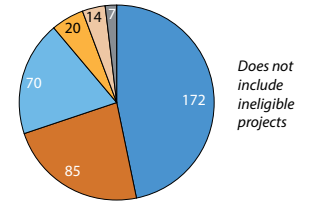


Figure 9 – Washington County's Wood Stove Exchange progress report 2018

Location	Requests	Installations
Aloha	40	22
Banks	7	3
Beaverton	85	41
Buxton/Gales Creek/Manning	4	2
Cornelius	32	16
Durham	1	1
Forest Grove	27	10
Gaston	24	13
Hillsboro	162	84
North Plains	10	3
Portland (Unincorp. WC)	30	16
Sherwood	9	3
Tigard	37	23
Tualatin	8	3
Totals	476	240

v. 4/2018

- Wood stove
- Gas stove
- Pellet stove
- Ductless heat pump
- Gas furnace
- Ducted heat pump

General Data

Completed initial assessments.....	400
Projects in progress	75
Completed exchanges.....	240

Pollutant Emissions Prevented	Tons
PM2.5 + PM 10	17.66
Carbon Monoxide (CO)	64.66
Methane	18.08
Volatile Organic Compounds (VOCs)	15.98
Total HAPS (Hazardous Air Pollutants)	1.50
Sulfur Dioxide (SO2)	0.09
Nitrogen Oxides (NOX)	0.70
Total emissions prevented	118.67

From U.S. EPA Emissions Calculator

9. Findings and Considerations for Developing Local Programs

This study focused on best practices and programs from leading agencies around the United States and Canada. While the consulting team provides recommendations for the establishment of a new collaborative, non-regulatory body and for program elements that are relevant to the Portland, Oregon metro region, the specific political and administrative context is mostly unknown to the consultant team and must be translated into the existing administrative and political context. Ultimately, programmatic and policy decisions will be driven by the elected leadership of Multnomah County and the City of Portland.

Geographic Analysis of Air Toxics in the Region Indicates that the Highest Risks are in Portland's Urban Core, then Multnomah County and then Metro.

The areas with the highest risks and hazards generally fall within the PATS study area; the areas with the highest cancer risk and non-cancer hazard generally align with the more densely populated areas in Metro's boundaries and the City of Portland and Multnomah County.

TOTAL CANCER RISK

- Census tracts within the City of Portland tend to have higher total cancer risks. Conversely, the census tracts with the lowest estimated cancer risks are for the remote areas in Clackamas, Washington, and Clark Counties.
- For the four counties, approximately two-thirds of the total cancer risk in 2011 NATA results from exposures to formaldehyde and benzene, with all other carcinogens combined accounting for the remaining one-third of the total cancer risks. ***Again, 2011 NATA does not account for cancer risks attributed to diesel sources. In EPA's words, this "may be substantial"—especially in areas with a high concentration of diesel-powered engines and equipment such as ports, bus depots, and railyards.***
- Multnomah County burns the most wood for home heating and also has the highest diesel emissions according to DEQ, this information is not showing for cancer risk in NATA but is a known concern.
- For Multnomah County, pollutants formed in the atmosphere ("secondary pollutants") accounted for 30% of the total cancer risk; primary emissions from on-road light duty mobile sources (Autos and associated refueling) accounted for 24 percent of the total cancer risk; and residential wood combustion accounted for 20 percent of the total cancer risk. A similar breakdown of cancer risk across source categories is observed in Clackamas and Washington Counties.

NON-CANCER RISK

- For the Portland metropolitan area, only respiratory hazard indexes had values greater than one meaning that these should be the focus of near term efforts.
- Of the 112 air toxics included in the non-cancer hazard index values (USEPA list, DEQ has an expanded list), one pollutant, acrolein, accounted for 90 percent of the respiratory hazard index for Multnomah County and dominated the respiratory hazard indexes for the other geographic areas. Airborne acrolein originates from two general categories of sources: some is directly released to the air from various emission sources (e.g., fuel combustion), but most is formed in the air from

chemical reactions involving other pollutants (e.g., decay of airborne 1,3-butadiene). The complex airborne chemical reactions complicate efforts to reduce ambient concentrations. However, the acrolein-dominated respiratory hazard index is not unusual to the Portland metropolitan area. This pollutant also accounts for nearly 90 percent of the respiratory hazard index for the state of Oregon and for more than 70 percent of the hazard index nationwide. This trend likely reflects acrolein's toxicity more than its abundance in air as well as the underestimation of other toxics such as woodsmoke and diesel emissions in inventory methodologies.

New Regulatory Authority Not Recommended: Stakeholder Agencies Support DEQ's Authority, Want Health-Based Standards and Seek Collaborative Partnerships for Program Development

WHY NOT A NEW AIR AUTHORITY?

While it appears that the City of Portland and Multnomah County have the legal authority to create a new regulatory body, this does not seem to be desired or necessary if the local agencies can actively coordinate and develop and implement programs to improve air quality for the specific pollutants of concern. Rather, a robust non-regulatory program that is funded and staffed may be more effective in delivering voluntary technology conversion programs and/or supporting DEQ further in their existing role as regulator. The concept is similar to how the area develops and supports water quality with many programs to reduce pollution and use best practices to create watershed health, without all staff being regulators – rather technical assistance providers. Below we outline what are the reasons for and what are the reasons against creating a new regional regulatory authority.

Reasons to Consider a New Authority

Where the concern is - The strongest argument for why there should be a new authority created is that the greatest number of emissions sources and the greatest number of people exposed to those emissions at higher concentrations are in the Portland urban core. This begs the question of whether or not a statewide regulator, with state wide rules, is the best fit for what a local issue with a very distinct area of concern is clearly. The City of Portland and Multnomah County have both the interest, concern and the authority to regulate air emissions if they choose to exercise their authority.

DEQ is underfunded to deliver what is desired - The next strongest argument is that DEQ is currently underfunded to deliver a program that can fully support human health. Given the current political realities and acknowledging the progress that Cleaner Air Oregon provides to DEQ in serving the most affected (11 new positions), the political concerns that shape funding at the state and federal level are very different from the City of Portland and Multnomah County.

Reasons to Reject Considering a New Authority

Funding needs to be developed regardless of who regulates - If DEQ is underfunded, then perhaps what is best is for local agencies to contribute funding to DEQ to support it through one-time and ongoing positions for things such as permit writing and enforcement. If the legislature does not view this as a priority, but local agencies do, then funding DEQ to ensure that permitting and enforcement keep pace with change is well advised.

All stakeholder agencies identified the importance of stable funding resources as key to effective implementation of any program/agency but acknowledged that public support for funding may be difficult

based on the region's attainment of the NAAQS. In lieu of nonattainment, there was general agreement that credible, science-based studies quantifying a public health hazard would facilitate the public support needed for funding. All acknowledged the need for general community and political leadership education to support informed decision-making. While the City of Portland and Multnomah County residents have made air quality a priority for their leadership, other jurisdictions – except for the City of Milwaukee – have not heard from their residents.

Funding demands for programs are significantly less than for a full regulatory authority –

Each program requires staff time, program overhead such as office space, computers, utilities, use of vehicles, etc., outreach, technology services, and communications budget and equipment as needed. As can be seen below in the table 10, Vancouver Metro's NRDE budget, a nonroad diesel program, is less than 12% of PSCAA's operating budget– a full regulatory agency with additional programming. Note that NRDE is a very targeted program that is just breaking even now and likely needs a higher set of fees to remain whole over time – although the unclaimed registration fees do accumulate towards the program. Denver's RAQC, a collaborative non-regulatory body, is greater than NRDE but covers much more program and is still ~56% of PSCAA's operating budget on a per capita basis. RAQC works with a relatively fixed staff and expands and contracts programs relative to funding sources through the use of contractors to administer programs which is visible in the revenue and expenses per staff in table 10. PSCAA is a full regulatory authority and has many service programs with the work predominantly performed in house.

Table 10 – Summary of program operating budgets

Air Quality Program	Average Annual Operating Revenues (\$)	Average Annual Operating Expenses (\$)	Revenue by Population (\$ per person)	Expenses by Population (\$ per person)	Revenue by Staff Member (\$ per person)	Expenses per Staff Member (\$ per person)
NRDE	\$1,200,000	\$1,071,429	\$0.41	\$0.44	\$171,429	\$149,490
RAQC	\$6,565,902	\$6,537,444	\$2.12	\$2.11	\$656,590	\$653,744
PSCAA	\$15,399,292	\$14,423,858	\$4.02	\$3.76	\$215,395	\$201,326

Based on the air quality programs, the following table 11 shows estimated prorated costs for an equivalent program being implemented in Multnomah County scaled to Multnomah County's population of approximately 790,000 residents.

Table 11 – Summary of program operating budgets if they were scaled to Multnomah County's population

Portland - Multnomah Program Scenarios	Annual Operating Revenues (\$)	Annual Operating Expenses (\$)
NRDE Equivalent	\$327,003	\$350,278
RAQC Equivalent	\$1,679,156	\$1,664,415
PSCAA Equivalent	\$3,180,287	\$2,971,520

Table 12 – NRDE (nonroad diesel program) startup budget

Start-Up Program Expenses		pre-2012
Policy and Overhead Expenses		\$700,000
Salaries and benefits		\$200,000
Consultation		\$100,000
Legislative crafting		\$100,000
Research, background work and outreach		\$300,000
IT Expenses		\$400,000
Database development		
Program Expenses		\$300,000
Tier 0 and 1 engine rebates		
Total Expenses (US\$)		\$1,400,000

Given the nature of what needs to be accomplished to create healthy air quality for the Portland Metro region and the specific concerns – the RAQC budget approximates best what is likely needed on a per capita basis.

For startup costs, both PSCAA and RAQC did not have the time to do the historical analysis of their budgets from several decades back to determine what was up front costs versus the beginning of ongoing costs. Table 12 shows the NRDE, a nonroad diesel program, startup costs which were predominantly staff time and a significant IT investment to support the program with interfaces for the public as well as the agency. For the initial research, idea development, consultation, legislative crafting, database development, and outreach NRDE spent \$700,000. Before launching in 2012, NRDE incurred \$1,100,000 in program development costs and an additional \$300,000 in engine rebates for a total cost of \$1.4 million.

City of Portland and Multnomah County would have to regulate all emissions, not just the ones that are of concern – There is no situation wherein the local agencies can select what they would regulate if they assumed the authority to regulate air emissions. So, while woodsmoke, diesel and cumulative emissions are the concerns to be focused on for local public health, the new agency would essentially be recreating what DEQ already does; causing significant hardship in the transition and perhaps creating another back log of permits and inspections. Further, City of Portland and Multnomah County can target new funding streams at supporting DEQ in their backlogs for the local area and apply more of their future funding sources to reducing emissions for the people most exposed to them without needing to create a full regulatory authority.

Additionally, every agency was interested in keeping DEQ's authority in place, while acknowledging that DEQ is under-resourced to deliver the types of programs that are needed. There is general support for local regulatory efforts for concerns such as woodsmoke. Washington County and its local jurisdictions have demonstrated success with establishing ordinances, monitoring for health effects and supporting a conversion program that maintains resident health while maintaining regulatory compliance which protects the companies providing economic benefits. Specifically, many local jurisdictions wanted a preemptive program for keeping areas in attainment with NAAQS standards (PM2.5 being one major concern) which would protect public health and supports positive economic activity and job growth for their residents.

Programs that address the improvement of air quality are needed as much as regulatory enforcement - While legal standards and inspections provide the compulsion to change emitters behavior and equipment, often there are other barriers in the way of implementing those behaviors and the installation of equipment.

Nearly every jurisdiction showed no interest in directly regulating industrial, mobile and indirect area sources. (It is important to note that according to NATA data, industrial sources make up a relatively small percentage of overall risk). Rather, the consensus was for a collaborative program that would voluntarily support conversion programs for diesel emissions and industrial sources that are in compliance but are part of an indirect area source or cumulative health concern. For the known concerns such as diesel engines, fireplaces and old woodstoves, the active education and facilitation of the transition to cleaner devices is as important as the enforcement of the rules. Especially in the case of lower income businesses and households, the removal of the device without providing or supporting the transition to the new equipment can be economically destructive. Trading one concern for another is a risk that must be avoided. For diesel emissions in particular, many agencies shared that a Metro area regulation would cause engines to be relocated to lower population density jurisdictions and hoped for a state-wide program or a program that requires destruction of a replaced engine.

Health based standards require in-the-community monitoring at a larger scale – This concept inherently makes sense from the protection of human health perspective but is just becoming technologically possible. For cumulative emissions that may create a health concern, scientific sampling must be done on a broader scale with the coordinated consistent methods across local geographic area.

Every stakeholder agency contacted by the consultant team for this study acknowledged the need for cumulative emission, health-based standards. Generally speaking, there was the interest to avoid re-locating emissions that would occur from relocations of businesses or equipment based on local rules. The concept of capping and reducing or trading emissions to reduce “hotspots” on a concurrent schedule was generally supported. Local agencies also expressed near universal support for education and outreach to residents and industrial partners as they view themselves as the best local agency to establish and /or maintain positive relationships with all concerned. County health authorities expressed similar interest in educating the public, monitoring air quality and running scientifically valid studies to support the development of health-based standards. The addition of the County health agencies to the existing efforts of Multnomah County, the City of Portland and PSU for monitoring projects is certain to create a more comprehensive understanding of the area's air quality conditions.

Cleaner Air Oregon establishes a first step towards addressing cumulative emissions -

For emission sources that are not in and of themselves out of compliance, SB 1541 establishes the path for a Pilot program that can assess health risks from cumulative emissions (stationary industrial and mobile) in one area. If the cumulative risk is above CAO risk action levels, then mitigation and enforcement actions possibly including technology conversion programs can be mandated to support the health of residents and protect the employment base. This Pilot is authorized for one identified area to be mitigated over the ten-year period. This innovative program is an opportunity to learn how to measure and address cumulative risk from multiple sources and source types and may serve to start the effort of developing future legal structures to enforce health-based standards.

Considerations for Developing Local Programs

This section shares elements from other programs around the United States that can provide a reliable starting point for program development. The program elements in which all stakeholder agencies want to participate are presented first, followed by other program elements that stand alone (i.e., where not all stakeholder agencies may choose to participate).

Table 13 presents the elements from programs currently implemented by stakeholder agencies.

Table 13 – Stakeholder agency's existing roles or potential future roles to play in a collaborative effort to reduce emissions of concern.

	Monitoring Data Interpret Modeling	Education Outreach & Environmental Justice	Setting Health & Environmental Standards:	Permitting, Inspections & Enforcement Fees	Program Administration	Collaborative Governance	Conversion Programs	Cumulative Emissions	Funding
Multnomah County	• Toxicology	• Established relationships • Communication platforms	• Ability and interest	• Diesel regulations • Indirect Area • Sources • Programs for AQ	• Co-staff • IT • Data housing • Crisis communications	• Convener • Diesel contracting rules • Elected board member	• Woodsmoke • Diesel	• SB1541 • Pilot program • Industrial • Indirect sources	Considering: • General fund • Fees • Transportation budgets
City of Portland	• GIS and EJ	• Established relationships • Communication platforms	• Support with EJ data	• Diesel regulations • Indirect Area • Sources • Programs for AQ	• Co-staff • IT • Data housing • GIS	• Diesel contracting rules • Elected board member	• Diesel	• SB1541 • Pilot program • Industrial • Indirect sources	Considering: • General fund • Fees • Transportation budgets
Metro	• Modeling	• Public outreach	N/A	- Permitting - Enforcement - Waste Haulers	- Training oversight of volunteers	- Convener after 2020 - Elected board member	• Diesel	- Land use buffers	N/A
County Health Departments	• Community monitoring • Data analysis	• Established relationships • Communication platforms	• Assist lead agency	N/A	N/A	• Elected board member	• Woodsmoke • Diesel	N/A	N/A
Other Cities	• Monitoring under direction	• Established relationships • Communication platforms	N/A	• Woodsmoke	N/A	• Elected board member	• Woodsmoke • Diesel	N/A	N/A
OHA	• Method • Interpretation	• Health risks • Disparity	• Assist lead agency	• Training and certifying	N/A	• Advisory	N/A	• SB1541 Pilot program	N/A
ODEQ	• Method • Equipment • Data housing	• Science-based communications	• Lead authority and funding	• Diesel • Industrial	N/A	• Advisory	- Woodsmoke - Diesel	• SB1541 • Pilot program • Industrial, mobile and indirect sources	• SB1541 • Ability to levy fees on industrial sources to pay for CAO implementation

PROGRAMS AND STRATEGIES ALL JURISDICTIONS CAN PARTICIPATE IN

Education and Monitoring. All agencies desire a healthy community in which people live and work. All agencies also noted that good quality health data is necessary to determine whether or not there is a need to act. Community based monitoring provides a path to look at all areas and determine where more robust, scientific studies are warranted. All stakeholders and researched agencies agree that with the availability of low cost air quality sensors, there is a need to act quickly to ensure that monitoring is done well and to avoid badly sampled data from that raises false alarms. Steps that each stakeholder agency can take to achieve this goal are listed in Table 14. Note that each table lists a chronological progression of actions. Some of these actions may be implemented concurrently.

Table 14 – Education and monitoring programs and strategies to consider

Strategy	Collaborators	Considerations	Cost
Develop coordinated plan for community monitoring	<ul style="list-style-type: none"> • Oregon Solutions 	<ul style="list-style-type: none"> • Engage local community groups, health departments and universities that compose Breathe Oregon as well as local agencies to develop a plan for education and monitoring. • Establish roles, clear objectives and metrics to know when outcomes have been achieved, resource needs and timelines. 	<ul style="list-style-type: none"> • \$40,000-\$60,000 (once)
Develop a community monitoring program	<ul style="list-style-type: none"> • DEQ • OHA • Multnomah County Health • City of Portland • City of Milwaukie • Clackamas County Health • Washington County Health" 	<ul style="list-style-type: none"> • Led by DEQ and OHA. DEQ is the central steward of all data. Community monitoring leverages existing efforts and is a named high priority for both DEQ and OHA. 	<ul style="list-style-type: none"> • Existing staff, additional staff coordination, cost of monitoring equipment and data stewardship (tools for data management and data analysis, web development)
Pursue grant funding	<ul style="list-style-type: none"> • Regional agencies 	<ul style="list-style-type: none"> • Use the Declaration of Cooperation to facilitate the pursuit of further grant funds as needed. 	<ul style="list-style-type: none"> • Existing staff time
Start Monitoring in Health Equity Zones	<ul style="list-style-type: none"> • DEQ • OHA • Multnomah County Health • City of Portland • City of Milwaukie • Clackamas County Health • Washington County Health 	<ul style="list-style-type: none"> • Initiate program in areas where underserved and low-income populations live and work. • Include sharing and education about the meaning of the Air Quality Index and air quality advisories, what actions to take, and how to make that information available to all even if you do not have access to the internet and a device to connect to the internet. • Establishing these channels is even more important with increasing risks and frequency from wild fires and smoke intrusion into the Portland region 	<ul style="list-style-type: none"> • Existing staff time, cost of new monitors, data stewardship (tools for data management and data analysis, web development)

Woodsmoke Reduction. Washington County and its municipal partners have developed ordinances, enforcement and conversion programs that have reduced health and near-nonattainment concerns for their airshed. Multnomah County has adopted a similar woodsmoke curtailment program but has yet to identify resources for a woodstove replacement program. Agencies in Metro's boundaries should consider replicating a similar program in partnership with DEQ, utilities, weatherization companies and affordable housing groups. Also, program elements from Klamath Falls, Oakridge and Prineville for the distribution of tarps, dry wood, moisture meters and methods for burning wood cleaner could be considered. Woodsmoke control program considerations are listed in Table 15.

Table 15 – Woodsmoke programs and strategies to consider

Strategy	Collaborators	Considerations	Cost
Woodsmoke ordinances similar to Washington County and Local Agency Partners. Focus on curtailment on inversion days.	<ul style="list-style-type: none"> City of Portland Multnomah County 	<ul style="list-style-type: none"> Primary heat source for ~3% of the population. This 3% is ~50% of wood burners. Enhancement to primary heat for ~50% of wood burners. Provides post-earthquake resiliency. 	2-3 FTEs for up to 5 years
Woodstove replacement program for lower income households	<ul style="list-style-type: none"> City of Portland Multnomah County Oregon Housing and Community Services 	Low income weatherization can reduce need for heat, reduces energy bills and will finance the upgrade to a ductless heat pump which provides cooling for rising temperatures.	Existing staff time, need for additional coordination.
Pursue additional funding for woodsmoke equipment conversion programs from State Legislature	<ul style="list-style-type: none"> Regional agencies 	In the 2018 legislative session, the legislature allocated \$250,000 for all communities statewide for grants. Consider that Washington County, Klamath Falls, Oakridge and Prineville all are facing similar woodsmoke air quality concerns.	Existing government affairs staff time.
Coordinated public communications	<ul style="list-style-type: none"> County Health Departments 	<ul style="list-style-type: none"> Much of the staffing and communications infrastructure is already in place. Different strategies will be needed for different audiences. Leverage existing funds. Leverage existing programs, like CA Spare the Air campaign. 	Existing staff time and funding in each agency.
Voluntary coordination for woodstove exchange program	<ul style="list-style-type: none"> Regional agencies 	Consider a bulk procurement or negotiated pricing for participants in the program to drive down costs and encourage more rapid deployment	Existing staff time
Pursue building code or zoning code for fireplace and woodstove retirement	<ul style="list-style-type: none"> Regional agencies 	Where possible at the local level – zoning code could be updated to ensure the retirement of wood burning devices in areas with known air quality concerns. Support the state building code updates to include restrictions on heavily polluting devices	Existing staff time



PROGRAMS CITY OF PORTLAND, MULTNOMAH COUNTY AND METRO SHOULD CONSIDER

All of the programs described below may become useful to other agencies as populations grow and urbanization continues. As such, City of Portland, Multnomah County, and Portland Metro may structure these programs to allow for other agencies joining the program in the future.

Diesel Emission Reduction

Not all agencies have the same level of public awareness and pressure, yet all agencies have diesel equipment operating in their jurisdictions. Although diesel particulate matter was not included in the 2011 NATA analysis, the associated cancer risk could be significant. For example, the PATS study found that the average concentration for PM from construction equipment was 12.2 times above the benchmark concentration and would require reductions in excess of 92 percent to reach the benchmark.

Given these understandings, the City of Portland, Multnomah County and Metro should start the effort with an open invitation to the stakeholder agencies to implement the program elements and strategies listed in table 16.



Table 16 – Diesel emission reduction programs and strategies to consider

Strategy	Collaborators	Considerations	Cost
Expand the alignment of public construction diesel equipment specifications beyond the Tri-county area and throughout the state	<ul style="list-style-type: none"> • Port of Portland • City of Portland • Multnomah County • Metro • Clackamas and Washington Counties 	Ensure that Oregon Department of Transportation, Oregon Department of Administrative Services and transit authorities participate which ensures that contractors to have the same standards on every job.	Specifications require coordination, support to expand data management and implementation costs of programs below.
Pursue grants to support the retrofit, upgrade and repowering of all diesel engines above 100 HP and below Tier 3 Engines	<ul style="list-style-type: none"> • City of Portland • Multnomah County 	<ul style="list-style-type: none"> • Prioritize small business contractors that support public projects to avoid disparity barriers to cleaner air on jobsites • Pursue VW settlement funding • Require engine destruction to avoid exporting concern to other locations. EPA requires this for any project receiving federal Diesel Emissions Reduction Act (DERA) funds. 	\$316,000 + based upon Multnomah County Population
Garbage truck retrofit regulations	<ul style="list-style-type: none"> • Metro • Local agencies that franchise haulers 	<ul style="list-style-type: none"> • The City of Portland and the City of Beaverton have required that franchise haulers retrofit or replace their diesel-powered engines to meet current EPA diesel engine standards. • Haulers can build this cost into the rates they charge for trash and recycling collection implemented over time. 	
Support Tri-Met to convert or upgrade their fleet for low income areas	<ul style="list-style-type: none"> • City of Portland • Multnomah County • Tri-Met 	<ul style="list-style-type: none"> • Tri-Met's fleet operates in most neighborhoods that show high diesel emission rates. • Help determine which routes could benefit most from the reduced emissions of an upgraded engine. • Support accelerated conversion to low/no-emission buses. 	
Require the registration and increasing fee structure for old diesel engines below Tier 3	<ul style="list-style-type: none"> • DEQ • City of Portland • Multnomah County • OSHA 	<ul style="list-style-type: none"> • Requires legislative and Environmental Quality Commission Approval • Determine if enforcement could be delegated to local agencies if desired • Provide one to two year's advanced notice • Look to potential to register engines at point of sale and resale • Partner with Occupational Safety and Health Administration (OSHA). The operators of the nonroad equipment are exposed the most to the health concerns. 	
Regulate diesel where it accumulates as an indirect source	<ul style="list-style-type: none"> • DEQ • City of Portland • Multnomah County 	<ul style="list-style-type: none"> • Regulate nonroad sources as well as corridor or distribution center cumulative emissions as area sources if an exceedance of the defined health standard in SB 1541 can be ascertained in a short period of time. • Pair with a conversion program to support the rapid retrofit, upgrade or re-power of the equipment of concern using VW settlement funds. Monitor CARB Freight program planning and implementation, especially implementation of an indirect source rule (ISR). • Collaborate on lobbying for statewide effort- ISR – if cumulative emissions exceed the health benchmark, state can regulate emissions 	
Ban the sale of older equipment inside Multnomah County and /or City of Portland	<ul style="list-style-type: none"> • City of Portland • Multnomah County 	<ul style="list-style-type: none"> • Legal review would be required. 	

Industrial and Cumulative Emissions - Elected Official Collaborative Governance Body

To start to address the funding gap for DEQ, the City of Portland and Multnomah County should consider and discuss with DEQ funding temporary positions to help catch up with the backlog of industrial permit writing and enforcement actions. The permits should be prioritized by location of known concerns and/or EJ areas where lower income households live and work.

To address cumulative emissions, Cleaner Air Oregon – (SB1541) establishes the development of one pilot program to assess and regulate one location for cumulative emissions in the Portland Metro area across a 10-year span. This pilot program only allows for regulating multiple industrial sources. Rulemaking is underway and not complete. If rulemaking provides a pathway to regulate cumulative emissions beyond the pilot study or if there is no regulatory method to reduce cumulative emissions, a group that is analogous to Denver’s RAQC should be considered. In any approach to cumulative emissions, the tools developed in Oregon’s Division 246 geographic approach rules³⁶ and those being developed in California’s AB 617 framework³⁷ should be considered in methodologies to address cumulative risks.

This board would develop the strategies for reducing cumulative emissions – either for the Portland Metro area in aggregate or for a specific, highly local “hotspot.” This body could be extended to establish a plan for greater area mitigation of diesel emissions or the next emerging concern, whether or not the area is out of attainment. This board should also develop a methodology by which funding could be prioritized to help reduce emissions in areas that pose the greatest human health concern. This methodology should be created in advance of the first scientifically identified location where cumulative emissions exceed the health standard. When the overall community mitigation strategies and the cumulative emissions methodology are established, the board can go into a less active mode and perhaps meet annually to check progress and to modify the strategy to be more successful for program staff to act on.

This body should include City Commissioners and County Commissioners and be staffed and supported by an advisory board of health officials, business representatives, human toxicologists, economic development officials, and citizens at large. See table 17 for specific considerations.

³⁶ <https://www.oregon.gov/deq/Filtered%20Library/IMDairtoxics.pdf>

³⁷ https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB617

Table 17 – Industrial and cumulative emissions programs and strategies to consider

Strategy	Collaborators	Considerations	Cost
Temporarily fund additional permit writers for DEQ to catch up on backlog. Temporarily fund enforcement officers.	City of Portland Multnomah County DEQ	<ul style="list-style-type: none"> • Focus on permits for sources that are in the known geographic areas of concern as demonstrated in the maps in Section 4 of this report. • Focus on sources in lower income neighborhoods. 	2 FTE @ \$120,000 = \$240,000 annually
Support conversion to cleaner technology conversion whenever possible	City of Portland Multnomah County	Consider utility type fees to help fund conversion of technologies for cleaner air. Analogous to East Multnomah Soil and Water Conservation District to protect watershed health.	TBD
Pursue the expansion of the pilot program from CAO to apply to any proven health risk above the established threshold in SB1541	City of Portland Multnomah County	Government affairs staff pursue the expansion before the concern is identified, but also after community monitoring establishes scale of concern.	TBD
Establish a governing board to develop a specific pollutant mitigation strategy	City of Portland Multnomah County Elected officials	<ul style="list-style-type: none"> • State Implementation Plan (SIP) like process for achieving health-based standards or for the possibility/eventuality of near or nonattainment. • Use this procedure to establish a specific plan based on the pollutants of concern. • Establish methodology for mitigation plans for location specific cumulative emissions concerns to ensure predictable and fair process. 	Staffed by Portland and Multnomah County
Establish an advisory board to develop a specific pollutant mitigation strategy	Business representatives Health representatives Go Biz Neighborhood representatives	Vet programs concepts, funding sources and other procedures to inform the governing body.	Staffed by Portland and Multnomah County

Next steps

In order to move forward, several things need to be done. First and foremost is a detailed discussion with the leadership of City of Portland, Multnomah County, Metro and City of Milwaukie to present this report and discuss its findings. These are the agencies that have the woodsmoke, diesel emissions and cumulative emissions concern in their jurisdiction and are most likely to be compelled to act for the public good. The discussion/agenda should focus on reaching consensus on several important critical-path issues, including:

1. Determine if City of Portland and Multnomah County could temporarily fund catching up on the industrial permitting and enforcement backlog.
2. Determine actions that are not pre-empted by state or federal law. Work with state legislature and Environmental Quality Commission for DEQ authority to establish diesel engine registry with an increasing fee structure and advanced notice retirement years.
3. Determine, perhaps through an Oregon Solutions process, the roles each party would play in a coordinated effort and how resources will be garnered.
4. Develop pro-forma for all positions and programs that are desired. Identify existing funding in participant agencies to determine if that is adequate or if it requires additional funding. Price out equipment for neighborhood level monitoring and equipment conversion programs based on similar programs conducted in nearby states.
5. Determine funding source for conversion programs for wood burning devices and for diesel engines. Determine whether or not a “clean air fee” can be assessed on a per capita basis to fund equipment conversion, staffing, and technology services needed for mitigation programs.

