State of Oregon
Department of Environmental Quality Memorandum

Date: Aug. 1, 2012

To: Environmental Quality Commission

From: Dick Pedersen, Director

Subject: Agenda item I, Informational item: Portland Air Toxics Solutions summary of comments and next steps
Aug. 23-24, 2012, EQC meeting

Why this is important

In the Portland area and across the state, the risk to the public from toxic air pollution – including cancer and other health effects – is unacceptability high. By recommending follow-up actions for the top risk drivers, the Portland Air Toxics Solutions project and report provides the scientific and policy roadmap to guide DEQ's efforts to reduce air toxics risk in the Portland area over the next several years. To be most efficient, DEQ plans to seek air toxics reductions from high priority source categories as co-benefits from ongoing efforts to reduce criteria pollutant and greenhouse gas emissions. This multi-pollutant approach is described below under "Current PATS Implementation Plan." DEQ also plans to focus its efforts on a combination of DEQ actions and partnerships with local government, business and citizens. DEQ is seeking commission acknowledgement and support for this approach to implementing the PATS recommendations.

Background and other information

In 2003, based on recommendations from two policy advisory committees, the Environmental Quality Commission adopted Oregon's state air toxics program. This risk-based program supplements federal efforts by further addressing the need to decrease air toxics emissions from vehicles, equipment, unregulated commercial and consumer activities and cumulative emissions in geographic areas. At the heart of the Oregon air toxics geographic strategy is the idea of evaluating risk holistically from all sources, and developing a plan to reduce risk from point, area and mobile sources commensurate with their contribution to emissions above clean air goals. The Portland Air Toxics Solutions project is Oregon's first effort to implement this geographic approach.

In 2006, the program took a major step forward when the Environmental Quality Commission adopted Ambient Benchmark Concentrations for 51 air toxics in Oregon. The benchmarks are set at levels protective of human health over a lifetime of exposure, and are based on recommendations of DEQ's Air Toxics Science Advisory Committee. The benchmarks serve as both measurement tools and goals, allowing analysis of air toxics problems, prioritization of projects and tracking of progress in risk reduction in the absence of federal standards. The benchmarks are expressed as annual average concentrations that would protect human health during a lifetime of exposure. The Air Toxics Science Advisory Committee reviews the benchmarks at least every five years, or more

frequently if important new health or scientific information arises.

Following the last two years of work with a diverse advisory committee and the release of a report detailing technical findings and a recommended framework for reducing air toxics, DEQ conducted a public comment period on the Portland Air Toxics Solutions Report and Recommendations between May 11 and June 29, 2012. The purpose of public comment was to gather input on how DEQ may use the advisory committee recommendations. At its June 21, 2012 meeting, DEQ briefed the commission about the Portland Air Toxics Solutions project, and members of the advisory committee and public had an opportunity to address the commission. DEQ is now concluding the structured public involvement phase of the Portland Air Toxics Solutions project by summarizing and evaluating public comment, and asking the commission for its consideration and support with next steps.

Current PATS Implementation Plan

DEQ initiated the Portland Air Toxics Solutions project to work with local communities to develop an air toxics reduction plan for the Portland region. Ultimately, DEQ seeks to reduce air toxics levels to Ambient Benchmark Concentrations.

Together with the Portland Air Toxics Solutions Advisory Committee, DEQ developed a new analysis and understanding of air toxics problems and potential solutions in the Portland area. Included in the project are: an extensive technical analysis based on monitoring; an emission inventory and modeling; a groundbreaking analysis of air toxics impacts on disadvantaged communities; white papers that lay an initial technical foundation for future emission reduction strategies; future steps for additional technical analysis; and future steps for stakeholder involvement, including representation and consideration of environmental justice issues.

The committee identified five high-priority emission categories for near term follow up action, along with potential emission reduction recommendations for each category. This prioritization is based on total modeled risk, practicability of emission reductions and the directive in Oregon air toxics regulations to address both area-wide and localized risk.

The five priority categories are:
Residential wood combustion
Light duty vehicles (mostly gasoline-fueled)
Heavy duty vehicles (mostly diesel-fueled)
Construction equipment (mostly diesel-fueled)
Industrial metals facilities

There are several ways DEQ can address these pollution sources. Many source categories emit several different types of air pollution at once, including air toxics, fine particulate, ozone -forming pollution and

greenhouse gases. DEQ and partner agencies have the opportunity to develop multi-pollutant strategies. Strategies to meet the fine particulate standard by reducing emissions from residential wood combustion can be designed to also reduce air toxics. Strategies to meet the ozone standard by reducing emissions from light duty vehicles can likewise be designed to reduce air toxics such as benzene. Strategies to reduce greenhouse gases and black carbon emissions from vehicles and fuels can be tailored to reduce benzene and diesel particulate. DEQ will also look for opportunities to reduce air toxic pollution directly within available resources, as guided by the Portland Air Toxics Solutions analysis and report. In addition, DEQ will continue to implement existing industrial and commercial air toxics regulations, as well as existing area and mobile source regulations – such as gasoline vapor recovery and vehicle inspection – that achieve substantial air toxics co-benefits.

Reducing emissions from diesel engines has also been a priority for DEQ since 2001, and will remain a high priority based on the PATS analysis. DEQ received many comments about the risk of diesel pollution and agrees that the diesel source category needs more emphasis, including a comprehensive and strategic approach to implementing the Portland Air Toxics Solutions recommendations. DEQ's next step in developing such a comprehensive strategy is to conduct an equipment survey in 2013 of construction equipment. This survey will better characterize diesel pollution problems and prepare DEQ to work with stakeholders to plan for the most effective emission reduction strategies.

Public outreach

DEQ started its public outreach on Portland Air Toxics Solutions in 2008 when staff presented information at five neighborhood and three local government meetings in the Portland area. The advisory committee met 14 times over two years, and staff made numerous presentations to government, public interest groups and industry associations. Between May and June 2012, DEQ conducted five public meetings and offered an online survey in which participants could submit comments about Portland Air Toxics Solutions. DEQ also collaborated with advisory committee members and government partners to maximize public participation.

Comments received

DEQ received a total of 55 comments including those written, made on the surveys, and received verbally in meetings. The comments are summarized in attachment A and are available online at http://www.deq.state.or.us/aq/toxics/pats.htm. In addition to those attending the June 2012 EQC meeting, 61 people attended public comment meetings held in the Portland area. DEQ received a great deal of thoughtful and valuable input that supplements and expands upon on the work of the Portland Air Toxics Solutions advisory committee. Following is a brief discussion of several key issues that surfaced in

public comments.

Diesel emissions

DEQ received various comments on diesel emissions and the diesel Ambient Benchmark Concentration. Some commenters expressed concerned that Oregon's diesel Ambient Benchmark Concentration is not protective enough, especially compared to a level two orders of magnitude lower currently in use by air toxics programs in California and Washington. If the lower level were used, estimated risk from diesel in the Portland area and statewide would be about thirty times higher than risk from other top categories in the PATS project.

Despite the difference between California and Oregon benchmarks, diesel source categories are a high priority in PATS recommendations.. The PATS analysis concluded that most diesel engine categories will require reductions of more than 90 percent to meet the Oregon benchmark. Using the existing diesel benchmark, the PATS analysis identified the top two sources of diesel emissions in the Portland area – diesel on-road vehicles and diesel construction equipment – as two of the top five priority categories for air toxics risk reduction. As noted above, reducing emissions from diesel engines is a priority for DEQ, and efforts will continue in this area.

In 2006, Air Toxics Science Advisory Committee members, using their professional expertise and judgment, reached consensus on the diesel benchmark as a level within the range of values from scientifically credible sources that acknowledged the pollutant's carcinogenic potential. Recently, the International Association for Research on Cancer has concluded that diesel exhaust is a known human carcinogen. The diesel benchmark and several others are due for re-evaluation when DEQ resources allow. During this review, DEQ will work with its Air Toxics Science Advisory Committee to evaluate current science and toxicology and determine the adequacy of the Ambient Benchmark Concentration for diesel and other air toxics. If the committee recommends lower, more protective concentrations, these will be proposed for adoption as rule amendments.

Source prioritization

DEQ heard from business stakeholders that, based on modeling results, no industrial emissions should be included in the high priority categories. Some commenters disagreed with the order of the top five priority categories, stating that residential woodstove emissions should not be the top priority. However, others in neighborhoods heavily affected by residential wood burning strongly supported prioritizing efforts in this category.

The PATS advisory committee designated the five high-priority categories by first looking at total modeled risk, and then by factoring in feasibility and the regulatory directive to address both area-wide and localized impacts. Even though the industry category was eighth in overall risk, industrial metals was designated as high priority because of estimated localized impacts.

PATS modeling confirmed common sense knowledge that concentrations of various pollutants and the importance of source categories varies widely throughout the Portland area. Residents' exposures to air toxics and also perceptions of their exposures can vary greatly depending on where they live, work or recreate. DEQ does not regard the order of the five priority source categories as a rigid ranking. DEQ believes that the advisory committee correctly identified the high priority source categories and that emission reductions in any of the categories as opportunities allow, would make a difference to protect public health in the Portland area.

Industrial emissions

DEQ heard additional concerns and public comments about emissions from bulk petroleum storage facilities, and odor impacts in north and northwest Portland. Several commenters reported frequent and significant impacts from petroleum odors. DEQ is investigating the source of these odors and will work with bulk petroleum facilities to identify best practices for leak detection and odor prevention.

Technical and monitoring issues

Both public interest and business stakeholders have expressed concerns about potential inaccuracies in the PATS model. Business stakeholders view model assumptions as overly conservative, leading to potentially unnecessary and misleading recommendations for emission reductions. Public interest stakeholders are concerned that the model may not be capturing all emissions from business, and does not account for the additive or combined health effects of multiple pollutants.

DEQ understands both of these concerns, and has done everything within its current resources to use the best available emissions and toxicology information, reasonable but protective assumptions and comparisons between modeling and monitoring to gauge the accuracy of pollutant estimates. DEQ discussed data quality issues at length with the PATS advisory committee and in many cases the data and analysis was greatly improved by the committee's input. Despite data uncertainties and the need for ongoing refinements, the PATS model still provides valuable information that allows DEQ and the community to understand air toxics problems, sources and potential solutions. DEQ is confident that, taken together, the PATS monitoring and modeling analyses have correctly

identified the high-priority emission source categories to focus on in the coming years.

DEQ agrees that additional monitoring resources are desirable to ground truth modeling assumptions, better identify and understand air toxics problems and track progress. DEQ would like to further pursue monitoring grants or other opportunities for monitoring in partnership with universities and health departments. However, it must be recognized that state and federal resources for air monitoring of all kinds are very scarce.

Next steps and commission involvement

Air Quality Division staff will be available to answer any questions, provide additional materials or briefings on the PATS project and public comments.

Attachments

A. Summary of public comment on Portland Air Toxics Solutions Report and Recommendations
B. Factsheet: Portland Air Toxics Solutions Report and Recommendations
C. PATS Report Executive Summary, Introduction and Recommendations

Available upon request

1. Full PATS report and appendices

Approved:

Northwest Region Division: _____

Air Quality Division: _____

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Summary of public comment on Portland Air Toxics Solutions Report and Recommendations

This document summarizes public comment received on the Portland Air Toxics Solutions (PATS) Report and Recommendations. The full text of comments received is available from DEQ upon request and will be posted on the project website at http://www.deq.state.or.us/aq/toxics/pats.htm.

Topics, Comments, Responses and Additional Information
1. Diesel
a. In general
Comment: Put more emphasis on diesel emission control.
Response: DEQ agrees that more diesel emission control is necessary. Sources emitting diesel are among the top priorities in the PATS recommendations.
b. The diesel benchmark
Comment: DEQ did not use an adequately protective benchmark when evaluating and prioritizing diesel risk in the PATS study area. DEQ should use a more protective benchmark like California's, Washington's or New Jersey's. A lower more protective benchmark would result in higher risk estimates and higher prioritization of diesel pollution sources.
Response: While DEQ acknowledges that the diesel benchmark is due for review, the existing diesel benchmark used in the PATS evaluation is protective of public health and represents an aggressive emission reduction goal. For example, to meet the existing benchmark, the emissions from most diesel engine categories would need to be reduced by more than 90 percent. Using the current diesel benchmark, DEQ identified the top two sources of diesel emissions in the Portland area – diesel on-road vehicles and diesel construction equipment – as two of the top five priority categories for air toxics risk reduction. Reducing diesel emissions has been, and will continue to be, a high priority for DEQ. The rules that govern setting the Ambient Benchmark Concentrations require DEQ to periodically review benchmarks and propose revisions if needed to incorporate current toxicology and scientific knowledge. The initial Ambient Benchmark Concentrations for air toxics were adopted in 2006 based on the work of the Air Toxics Science Advisory Committee. When ATSAC recommended the ABC for diesel particulate, it represented a pioneering position in that EPA had not offered any benchmark for diesel particulate cancer risk. DEQ's existing diesel benchmark assumes diesel emissions are a known carcinogen. That conclusion has only now been reached by the International Association for Research on Cancer, after 24 years of deliberation. Because the diesel benchmark and several others are due for re-evaluation, DEQ plans to initiate this review when resources allow. In the mean time, DEQ believes the existing diesel ABC is protective of public health and appropriate for guiding emission reduction actions.
Comment: DEQ should recalculate the data in the PATS report using the California diesel benchmark of .003 micrograms per cubic meter instead of the Oregon benchmark of .1 microgram per cubic meter and reprioritize emissions.
Response: Using the Oregon diesel benchmark, the top two sources of diesel emissions in the Portland area – diesel on-road vehicles and diesel construction equipment – ranked as two of the top five priority categories for air toxics risk reduction. Use of the California diesel benchmark would increase PATS diesel risk by about 30 times and move the diesel categories to the very top of the list. This would make the diesel

categories stand out from other sources of emissions, however the level of reductions required to meet the Oregon ABC is so significant - over 90 percent - that use of the California diesel risk factor would not significantly change the goals of the reduction strategies.

Comment: The diesel benchmark should consider additional non cancer health endpoints. Additional endpoints could include neurodevelopmental disorders, ADHD and learning disabilities when exposure occurs during pregnancy.

Response: When DEQ reviews the diesel and other benchmarks, DEQ will consider all health endpoints for which there is scientifically credible data.

c. Diesel process issues

Comment: Benchmark issues were beyond the scope of PATS committee work, so members did not get a chance to address the diesel benchmark.

Response: DEQ agrees that the level and form of Ambient Benchmark Concentrations was beyond the scope of the PATS Advisory Committee, as established in the PATS charter. DEQ relies on advice from a different advisory committee – the Air Toxics Science Advisory Committee – in setting Ambient Benchmark Concentrations. DEQ deliberately separates the work of science and policy advisory committees based on their different expertise and missions. Air Toxics Science Advisory Committee members have expertise in toxicology, epidemiology, environmental health, and air pollution measurement and modeling and are charged with advising DEQ in setting benchmarks that apply statewide. The Portland Air Toxics Solutions Advisory Committee members represent a broad range of perspectives on air toxics issues and were charged with designing an air toxics emission reduction strategy for the Portland area. While not within the scope of the Portland Air Toxics Solutions Committees' formal charge, DEQ welcomes comments on the benchmarks, and will consider all issues raised during the next opportunity for technical benchmark review. The Air Toxics Science Advisory committee and benchmark review and discussion process is open to the public, and provides another opportunity for the public to comment on proposed benchmarks.

Comment: Two representatives of the Air Toxics Science Advisory Committee who worked on the diesel benchmark had ties to industry.

Response: By rule, the membership of DEQ's Air Toxics Science Advisory Committee includes expertise in toxicology, epidemiology, environmental health, and air pollution measurement and modeling. Committee membership is periodically vetted through a public process and approved by the Environmental Quality Commission Recommendations from the Air Toxics Science Advisory Committee and decisions on benchmark values are made by DEQ and the EQC after an open public rulemaking process. The 2006 ATSAC recommendation on the diesel benchmark was reached by a consensus of all members, who are from different backgrounds and technical disciplines. Because this comment about the independence of former ATSAC members has been made during previous benchmark rulemakings, DEQ previously determined that ATSAC members were in compliance with statutory conflict of interest requirements for advisory committee members.

d. Further control of diesel sources

Comment: Diesel powered dredgers and ships docked on Swan Island run 24/7 year round and their emissions impact the bluff and St. Johns peninsula area.

Response: DEQ is interested in learning more about marine diesel emissions and potential impacts on nearby communities. DEQ staff continues to look for partnership opportunities to promote clean diesel operations and will work with any source to identify practicable strategies. Persons observing diesel

engines creating adverse impacts can call Kevin Downing at 503.229.6549.
Comment: Diesel engines will continue to get cleaner, especially because of economics favoring use of natural gas alternative technology. DEQ should continue to work in partnerships to advance clean diesel technology. DEQ should conduct an economic analysis of the strategies and recommendations for on road diesel and consider all avenues available before issuing new guidelines or regulations.
Response: DEQ's Clean Diesel Program will be following developments in clean diesel technologies and continuing to advance partnerships for emission reductions. DEQ acknowledges that trucking fleet turnover to available technologies like natural gas and new clean diesel engines will result in much lower diesel particulate and NO_x emissions. Natural gas engines and the newest heavy duty diesel engines are effectively equivalent in terms of respirable pollutant impacts. The advances in pollution control technology now required for new diesel engines effectively make them very low emitting vehicles. However, the benefits of this technology will only come from acquisition and deployment of these new, low emitting technologies. Heavy duty truck sales since 2006 have fallen precipitously with vehicle sales at least 200,000 units less per year than in previous years. To the extent that the industry continues to operate 2006 and older trucks and not replace these with cleaner technologies, these vehicles will continue to contribute to the problems identified in PATS and forestall relief from pollution impacts. DEQ will work to continue reducing emissions from legacy fleets of older diesel vehicles and engines. DEQ's focus has been on retrofitting, repowering and replacing old vehicles through incentive programs and partnerships. Should DEQ develop new guidelines or regulations in the future, the agency will work with industry experts, other stakeholders and the public to evaluate the environmental and economic effects of possible strategies.
Comment: DEQ should not implement any additional regulations for on road diesel engines. National requirements are sufficient and support a uniform national regulatory framework.
Response: DEQ will stay apprised of progress with national on road diesel regulations and continue to work in partnership with this sector. However, DEQ remains concerned about emissions from older, existing legacy diesel fleets. Heavy duty truck sales have dropped since 2006, the year before national requirements took effect for heavy duty diesel trucks. According to analysis done in the Oregon Clean Diesel Program, older, dirtier trucks continue to be used in the fleet, contributing to the problems identified in PATS. Extrapolating from EPA health impact data, a 2006 and older truck creates downstream direct and indirect public health costs at a rate of $2 per gallon. In adopting the national requirements, EPA projected that full realization of the benefits from the requirement will take over 23 years, until 2030.
2. Fuels
a. Clean fuels
Comment: Consider using cleaner fuel including reformulated gasoline or California Air Resources Board fuels in Oregon and Washington
Response: This is a potential PATS strategy contained in committee recommendations and is identified for further consideration by DEQ. The best time to evaluate this strategy concept is in the 2015-2017 timeframe when DEQ intends to revaluate the Portland ozone plan. At that time DEQ will be evaluating the benefits of a wide variety of pollution reduction strategies to reduce both ozone and air toxics concentrations.
Comment: The PATS report proposes a rule to establish low carbon fuel standards, which is opposed by the

trucking industry because it could increase the cost of fuel and would have little environmental benefit.
Response: The PATS project did not result in recommendations for a low carbon fuel standard. Instead, the report recommends exploration of alternative fuels and coordination with partners developing infrastructure for low emitting vehicles, both of which can reduce air toxics. DEQ has separately proposed a low carbon fuel standard, known as the Clean Fuels Program, as a greenhouse gas reduction strategy.
3. Industry
a. In general
Comment: Make sure to address all industrial emissions.
Response: The PATS model included emissions from all permitted industrial facilities in the study area. Through the PATS modeling study, DEQ has identified the need for more information about non-permitted commercial emissions stemming from solvent or fuel use.
Comment: Put an emphasis on cleaner industrial technology.
Response: DEQ agrees that emphasis should be placed on cleaner industrial technologies. DEQ and EPA regulations encourage pollution prevention and set emission standards and work practices to reduce air toxics emissions from existing and new industrial facilities. DEQ also provides technical assistance to help companies incorporate cleaner technology and practices to reduce emissions.
Comment: A new layer of ad hoc permit-by-permit review actions above and beyond new federal requirements without actual monitoring data
is not consistent with the state air toxics program structure and is not supportable.
Response: Several members of PATSAC proposed that permitted facilities in areas that do not meet benchmarks after ten years should be required to reduce emissions based on an independent audit conducted at the time of permit renewal. While the committee did not reach consensus on this proposal, the final report recommends that DEQ refine estimates of industrial emissions, encourage facilities with modeled impacts over benchmarks to make voluntary reductions, and convene a follow-up stakeholder process to recommend strategies to achieve maximum feasible emission reductions, including strategies to encourage ongoing reductions.
Comment: DEQ should actively look for industrial facilities that are unpermitted and required to have permits.
Response: DEQ agrees that it is important for all facilities that are required to have permits to obtain and comply with permits. DEQ uses a number of approaches to identify companies that violate the requirement to obtain a permit, including data analysis, records requests, inspections, complaint response and enforcement. The PATS study provided valuable information that can help with this effort. For example, the model to monitor comparison indicated that some sources of cadmium in the PATS study area may be missing from the emission inventory. In addition, the cross correlation between reports by permitted facilities and EPA's Toxics Release Inventory helped identify sources missing from the inventory. In addition to improving the accuracy of the emission inventory, these techniques can help identify unpermitted facilities that may be required to have permits.
Comment: DEQ should work to actively decrease emissions from individual processes in facilities by placing specific emission unit requirements in permits.
Response: DEQ uses a combination of emission unit-specific requirements and facility-wide requirements to control industrial emissions. For example, the National Emission Standards for Hazardous Air Pollutants

establish specific standards and work practices at the emission unit level. Oregon rules also include standards at the equipment and emission unit level for a variety of industrial processes and pollutants. In addition, DEQ uses facility-wide limits that require emissions to remain below regulatory thresholds that would trigger additional emission-unit specific requirements.
Comment: DEQ should gather more specific and accurate information from businesses emitting air toxics by requiring them to report their emissions as accurately as possible, even if they need to perform source testing.
Response: DEQ agrees that reporting of air toxics emissions should be as accurate as possible. In some cases, source testing is the best approach to quantifying emissions. In other cases, conducting a mass balance calculation or using other methods may provide more accurate information.
b. Permitting process
Comment: Make sure to involve the public and have transparency on industrial permitting.
Response: DEQ agrees. DEQ's permitting rules lay out specific requirements for public involvement, including provisions to provide earlier and more extensive public involvement for permitting actions where there is significant public interest. DEQ has worked to improve public notices, fact sheets, public meeting formats and web information, and welcomes additional suggestions for further improvements.
c. Metals facilities
Comment: Because facilities are already regulated by federal requirements and will be subject to further EPA analysis and potential reductions, recommendations to decrease industrial metals emissions will not be effective or efficient, and mislead the public.
Response: The PATS analysis identified metals facilities as accounting for essentially all of the manganese, nickel and lead, and most of the cadmium projected in 2017 concentrations that contribute to benchmark exceedances in localized impact areas. The analysis, which included all existing federal emission control requirements, also identified arsenic, benzene, hexavalent chromium, and naphthalene emitted by metals facilities as potential drivers near the facilities. However, the report recommended that DEQ refine emission estimates for metals facilities that modeled over or near benchmarks for 2017, using facility-specific models, improved emissions characteristics and more detailed receptor locations. In the evaluation of potential emission reduction strategies, the report notes that the strategies are draft and in need of further research, analysis and refinement. The report further notes that DEQ anticipates that the further refinement will occur in future stakeholder committees and related efforts. With these caveats, DEQ does not agree that the report is misleading.
d. Petroleum storage and handling
Comment: DEQ should implement better monitoring and environmental controls for bulk petroleum facilities
Response: Bulk petroleum facilities are currently regulated by state and federal regulations implemented through permits, but DEQ is interested in learning more about best practices for leak and odor prevention.
Comment: DEQ should look closely at bulk terminals, especially in association with noxious and foul odors in North Portland. These facilities did not seem to be included in the PATS study or recommendations.
Response: The bulk gasoline storage terminals in Northwest Portland were included in PATS modeling. There are slightly elevated levels of benzene estimated for the immediate vicinity of those terminals. DEQ is interested in learning more about the source of odors in North Portland, and ways to prevent those impacts.

e. Other facilities
Comment: DEQ should consider decreasing emissions for metal coating and metal drum reconditioning.
Response: This source category is included under the longer term follow-up plan in the PATS report. DEQ will also look for opportunities to address air toxics emissions from this category as a co-benefit when developing pollution reduction plans for other pollutants.
Comment: DEQ should consider decreasing emissions at remedial clean up locations.
Response: DEQ will also look for opportunities to address air toxics emissions from this category as a co-benefit when developing pollution reduction plans for other pollutants.
f. Odor
Comment: Lakeside Industries Asphalt Plant emits a heavy petroleum odor, consider relocating this facility.
Response: While DEQ does not have authority to require a facility to relocate, DEQ will forward concerns to regional staff working on the permit for this facility to evaluate whether odor abatement measures are feasible.
Comment: The Daimler facility on Swan Island is causing air pollution and odor in the neighborhood above the facility. Odor should be evaluated during peak periods.
Response: DEQ is working with the Daimler facility on odor issues in the current permit renewal process.
Comment: DEQ should more comprehensively and definitively address odor as an air quality issue.
Response: DEQ acknowledges that odor can be a significant air quality problem that affects quality of life and can cause health effects. DEQ has been partnering with the Health Authority to understand and address odor issues at facilities where neighbors experience impacts.
4. Residential wood burning
Comment: Wood burning from homes is a huge problem that needs to be controlled. Emissions enter into indoor air, and are visible at levels that look like a fog in neighborhoods.
Response: The PATS technical study confirmed the importance of decreasing wood burning emissions, and also the high level of variation in some air toxics concentrations in the Portland area. Wood burning emissions can cause high levels of risk in neighborhoods with woodstoves in use, while others with few wood burners may experience very low impacts from these sources. The PATS report recommends addressing both significant localized as well as area-wide air toxics risk. Because wood burning is also the primary source of fine particulate pollution in Oregon, DEQ already has a number of programs designed to reduce emissions from this source. DEQ requires wood heating devices that are exempt from federal certification standards to meet the same requirements as those subject to federal certification. DEQ also requires uncertified wood heating devices to be removed from homes when they are sold and bans the installation of used, uncertified wood stoves. The PATS report includes a number of recommendations to further reduce emissions from wood heating, and DEQ plans to integrate follow-up on this category with efforts to meet the federal fine particulate standard and reduce exposure to fine particulate.
Comment: Promote wood burning avoidance during stagnant air episodes.
Response: Wood burning curtailment during stagnation events has been used successfully to help meet the federal fine particulate standard and could be considered in a follow-up stakeholder process for this category. This strategy is a good complement to efforts to replace older wood stoves with cleaner heating devices.

Comment: Increase weatherization incentives for homes that heat with wood and add incentives for new wood stoves.
Response: The PATS report recommends that DEQ and partners assess the need for and access to weatherization programs and incentives for those who frequently (or primarily) heat with wood.
Comment: Place a user fee on wood sold for use in fireplaces and use the funds for wood burning education and burning minimization.
Response: The PATS report recommends that DEQ coordinate with partners to advocate for funding assistance for wood stove replacements and weatherization programs. DEQ has proposed a user fee for this purpose in the past, and it is an option that can be further considered to fund wood heating emission reduction efforts.
Comment: High efficiency wood stoves used properly can be a great asset in residential green construction because they lessen the demand for coal and gas. Wood is abundant, less expensive, and relatively carbon neutral.
Response: DEQ agrees that the sustainable use of wood for space heating devices can reduce greenhouse gas emissions from fossil fuel combustion. Using certified wood stoves, properly seasoning wood, properly designing chimneys and avoiding burning during air stagnation can help minimize health effects from exposure to air toxics and fine particulate.
5. Cars and trucks
Comment: Consider a congestion pricing toll on bridges.
Response: The PATS report recommends that Metro and its transportation committees integrate air toxics reductions in their efforts to achieve a per capita reduction of 20 percent of greenhouse gas emissions from light duty vehicles by 2035. Metro is evaluating a number of scenarios to achieve this goal, including pricing strategies such as tolls on bridges.
6. Non road engines
Comment: DEQ should further control or ban gas powered lawnmowers and leaf blowers.
Response: The PATS report includes lawn and garden equipment as part of the longer term plan for reducing air toxics. Because lawn and garden equipment also contributes to ozone formation, the best time to further explore this concept is in the 2015-2017 timeframe when DEQ intends to revaluate the Portland ozone plan.
7. Aviation
Comment: General aviation and helicopter instruction is a big source of pollution and noise in Hillsboro.
Response: The PATS report includes airport emissions as part of the longer term plan for reducing air toxics.
8. Monitoring
Comment: DEQ should perform fence line monitoring of high tech emissions to understand and reduce solvent emissions.
Response: A variety of tools are available to understand and reduce solvent emissions including monitoring, mass balance, process evaluation, material substitution and capture and control technology.
Comment: DEQ should perform fence line monitoring to protect close neighborhoods and homes affected by industrial emissions.
Response: DEQ agrees that fence line monitoring can be part of an assessment of the impacts of industrial

facilities on ambient concentrations. Challenges to this approach include the variability in wind direction, impacts from background concentrations and other nearby sources, the availability of monitoring locations that meet siting criteria, detection limits and monitoring costs. Benefits of this approach include actual measurements at specific locations of the total concentration and the potential to assess emission changes over time.
Comment: It is important to restore funding for monitoring and utilize monitoring data rather than modeling data serve as the baseline for the technical information on air toxics.
Response: DEQ agrees that it is important to expand monitoring for air toxics. However, monitoring alone is not sufficient to serve as a baseline for technical information on air toxics. Monitoring provides ambient concentrations at specific locations, but modeling can estimate concentrations at many more locations, estimate source contributions to ambient concentrations, forecast future ambient concentrations and estimate emissions for which there are no monitoring methods or for which concentrations are below detection limits. More air toxics monitoring is needed in addition to modeling, not as a substitute for modeling.
Comment: There is a need for monitoring on West Hayden Island to compare to benchmarks and understand how development could affect the air quality in that area.
Response: DEQ agrees that monitoring is desirable if funding is available, and also notes that the PATS modeling provides a wealth of information that is helpful to understand how development could affect air quality in the West Hayden Island area.
9. PATS Technical Study
Comment: Toxicology data used in the PATs study is incomplete because it only represents the effects of individual pollutants when people are exposed to many pollutants at a time. Synergism should be factored into the risk assessment process, especially for air pollutants identified above benchmarks.
Response: DEQ understands the concerns about health effects from exposure to multiple pollutants. The PATS technical study was the largest and most comprehensive study ever in Oregon to evaluate the health effects of all sources of toxics emissions together in an airshed, considering a wide array of priority toxic air pollutants. This groundbreaking analysis provided invaluable information on the overall risk to public health from air toxics. Unfortunately, the current state of the science does not allow for the evaluation of synergistic effects from the interaction between multiple toxic air pollutants. DEQ plans to track scientific developments in this important area.
Comment: DEQ should factor in potentially increased emissions from coal shipping through Oregon and Portland. This could include emissions of coal dust and diesel engine emissions. These emissions would likely have more impact on low income communities and communities with a higher percentage of minority residents.
Response: The possibility of large-scale increased coal shipments was not known at the time the PATS analysis was completed, and potential emission increases from this activity are not included in the PATS analysis. DEQ is closely following coal energy permitting because there may be air quality and other environmental requirements for such facilities. DEQ recognizes the potential for coal dust and diesel emission impacts on all communities, including sensitive populations.
Comment: The PATS model is misleading and inappropriate because it used extremely conservative assumptions to show that air toxics reductions are necessary.

Response: DEQ disagrees. The combination of modeling and monitoring data evaluated in PATS provides an appropriate basis for characterizing air toxics exposure in the Portland area and guiding future strategy development toward the highest priority emission source categories that need to be addressed to reduce public health risk. For pollutants with available data, DEQ compared model results to monitoring data to gauge model performance. The model met performance criteria established by EPA, indicating that modeled estimates can generally be used to set emission reduction targets (see appendix 10.6 of the PATS report for a detailed description of the monitor to model comparison). For many categories of emissions, especially those with greater data uncertainty, further investigation and analysis is appropriate before advancing to regulatory controls.
Comment: The source category white papers are technically flawed and should be omitted from the report.
Response: DEQ disagrees. The source category white papers are an initial compilation of emission reduction options, including analysis of technical feasibility and cost. They are intended solely to provide background and survey-level findings for potential emissions reduction measures for specific source categories. The white papers informed the PATS advisory committee process and serve as a starting point for further investigation when working with stakeholders in the future to plan emission reductions.
Comment: Cadmium emission and risk estimates in the model may not be accurate. The cadmium benchmark is too low.
Response: DEQ agrees that a source of cadmium emissions may be missing from the emission inventory. DEQ's investigation of this issue is described in section 10.6.7 of the PATS report. DEQ will include the information submitted about cadmium in the materials for benchmark review by the Air Toxics Science Advisory Committee the next time it is convened.
Comment: DEQ should engage with EPA to improve the quality and quantity of air toxic information in AP-42.
Response: States and EPA do collaborate to improve the quality and quantity of emission and activity factors for air toxics. DEQ recently focused on improving emission estimates for residential wood heating, which is the largest driver of risk in the PATS study area, by contributing to a national residential wood combustion workgroup aimed at standardizing knowledge with new real-world data from a statewide survey of Oregonians' behaviors associated with residential wood burning.
Comment: The PATS report was not supported by sufficient air monitoring information.
Response: DEQ disagrees. Section 3.6 of the PATS report provides an overview of the air monitoring information used in the PATS analysis. In 2005, there were six monitoring stations in the Portland area: Vancouver, North Roselawn, NW Post office, SW Kelly and Curry, Southeast Lafayette, and Beaverton. In addition, the North Roselawn station has been in continuous operation since 2009. Monitoring results from these sites informed the PATS evaluation in many ways, including a monitor to model comparison.
10. Source prioritization
Comment: DEQ should prioritize air toxics from industrial emissions.
Response: Based on the PATS analysis, DEQ has included industrial metals in the near term plan for follow-up because this category contributes to projected benchmark exceedances in localized areas near facilities. Other industrial emission sources are included in the longer term plan for follow-up.
Comment: DEQ should prioritize air toxics from diesel emissions.

Response: Diesel emissions are one of DEQ's top categories for reduction under PATS.
Comment: Woodstove emissions are prioritized too high and outweighed by the risks from diesel engines.
Response: Emissions from residential wood heating are ranked at the top of the list because the PATS analysis identified this source category as contributing most to risk from air toxics in the Portland area. Diesel on-road vehicles and construction equipment also ranked within the top five categories for near term follow-up. From a practical standpoint, the exact order of the top ranking sources is not critical because all are considered high priority and the timing for addressing them will be driven more by opportunities for co-benefits with criteria pollutant and greenhouse gas reduction efforts than by their order on the near term follow-up list.
Comment: Transportation is a top source of air toxics and should be prioritized high.
Response: On-road light duty and heavy duty vehicles are both included in the list of the top five categories for near term follow-up.
Comment: DEQ should target the highest emitters.
Response: The prioritization in the PATS report is based on the source categories that contribute most to area-wide and localized risk, considering feasibility. For the most part, the highest emitting sources contribute most to risk. Other factors include the location and distribution of the sources, the number of sources in an area, growth forecasts, the phase-in of already adopted emission controls, emission characteristics such as stack height, meteorological factors such as wind direction relative to housing, and chemical reactions in the atmosphere.
Comment: DEQ should review and revise the prioritization of air toxics sources.
Response: DEQ plans to use the current PATS prioritization of air toxics sources for near term follow-up. DEQ will periodically review the prioritization, particularly if the ambient benchmarks are updated or new opportunities develop to reduce air toxics emissions as a co-benefit to reducing criteria pollutants and greenhouse gases.
Comment: Based on estimated risk in the PATS study, the categories presenting the greatest risk to the population of Portland are in order of decreasing concern: Residential wood combustion; On road mobile; Area other – dominated by structural fires; Construction; Non road other; Lawn and Garden; Solvent use; Industry; Airport; Rail; and Residential open burning. The focus on industrial metals facilities is not justified by the data.
Response: DEQ disagrees. The PATS advisory committee designated the five high priority categories by first looking at total risk, and then factoring in feasibility and the regulatory directive to address both area wide and localized impacts. The category of "area other" dropped out because it was dominated by structural fires which cannot be easily controlled and for which data was somewhat uncertain. The industrial metals category moved up into the near term follow-up list because, even though it was lower on the scale of total relative risk, it caused localized impacts. DEQ concluded that emission reductions in any of the five high priority categories would make a difference to protect public health, and the rankings were not meant to be absolute or rigidly followed. All emissions categories in the top priority group should be addressed.
11. Environmental Justice
Comment: DEQ must comply with the 2007 legislation requiring environmental justice to be considered in

every environmental decision in Oregon. The PATS process integrated environmental justice concerns into its analysis and the agency needs to move forward with more collaborative and representative inclusion of communities affected by environmental decisions and actions.
Response: The PATS process included the most through environmental justice analysis DEQ has done to date. In follow-up to the PATS recommendations, DEQ plans to include and collaborate with representatives of affected disadvantaged communities. This may include participation in follow-up advisory committees, targeted outreach and enhanced opportunities to participate in public meetings.
Comment: The EJ analysis does not address the well-documented history of disproportionate impacts of childhood asthma and adult emphysema among African Americans along the metro area freeways.
Response: The PATS environmental justice analysis demonstrated the existence of disproportionate impacts from air toxics on minority and low-income populations in the Portland area. In general, DEQ found that the Hispanic/Latino population experienced the highest impacts from residential wood combustion emissions, the Asian population from on-road mobile emissions, the African American/Black population from area source emissions, and the population living below the poverty level from on-road mobile emissions. Non-road mobile emissions also significantly impact minority populations, while point sources disproportionately impact populations living below the poverty level. Consideration of community medical information was beyond the scope of the PATS environmental justice analysis. See section 8 of the PATS report for more information on the EJ analysis.
12. General
*Comme*nt: DEQ should call for review of a Health Impact Assessment before approval of any coal export facility or transport by any state agency.
Response: This issue is being evaluated by the Governor's Office and the Oregon Health Authority.
Comment: DEQ should move beyond voluntary agreements to create standards and safeguards that protect public health.
Response: DEQ has numerous regulatory standards that apply to point, area and mobile sources of air toxics emissions. Voluntary agreements, such as the ESCO Good Neighbor Agreement, are in addition to (and not instead of) regulatory standards.
Comment: To be most effective and focused, the PATS report should not include topics outside of the PATSAC process. Discussions of topics such as green house gas emission goals and low carbon fuels recommendations should be removed.
Response: To be most efficient, DEQ is seeking to coordinate efforts to reduce air toxics with ongoing efforts to reduce greenhouse gas and criteria pollutant emissions. References to greenhouse gas emission and criteria pollutant reduction strategies are included in the PATS report because, in many cases, these strategies can also achieve reductions in air toxics emissions. For example, the Clean Fuels Program could reduce emissions of air toxics in the Portland area, depending on the mixture of fuels (especially electricity) the industry uses to comply with the program.
Comment: Before requiring emission reductions in PATS, DEQ should verify levels of concern by monitoring. Higher certainty of air toxics problems is necessary before businesses incur control costs
Response: DEQ agrees that additional analysis and verification are needed before specific regulations are proposed in follow-up to PATS recommendations. However, additional monitoring is not appropriate or feasible in all cases. For some pollutants, such as diesel particulate, there are no ambient monitoring

methods available. In this case, emissions and modeling analysis provide a strong basis for reducing diesel emissions. For some source categories, such as metals industry, benchmark exceedances are anticipated due to growth that can only be analyzed through modeling. Because the PATS modeling was at an area-wide scale, the PATS report calls on DEQ to conduct additional source-specific modeling and other analysis before proposing regulations. Non-regulatory approaches, such as the ESCO Good Neighbor Agreement, are also part of the solution to air toxics risk.

Portland Air Toxics Solutions Report and Recommendations

Together with the Portland Air Toxics Solutions Advisory Committee, DEQ developed a ground-breaking study of air toxics problems and potential solutions in the Portland region. This fact sheet summarizes the **Portland Air Toxics Solutions Report and Recommendations.** For more information, to contribute your ideas and to sign up for Portland Air Toxics Solutions project updates go to: http://www.deq.state.or.us/aq/toxics/pats.htm.

Is the air in Portland healthy to breathe?

There are many different pollutants in Portland's air and what people breathe depends in part on how close they are to pollution sources such as woodstoves, busy roadways and industrial facilities.

Overall, air pollution in the Portland area has decreased dramatically over the last 30 years. Important success stories include reducing lead, carbon dioxide and ozone (smog) to meet federal clean air standards.

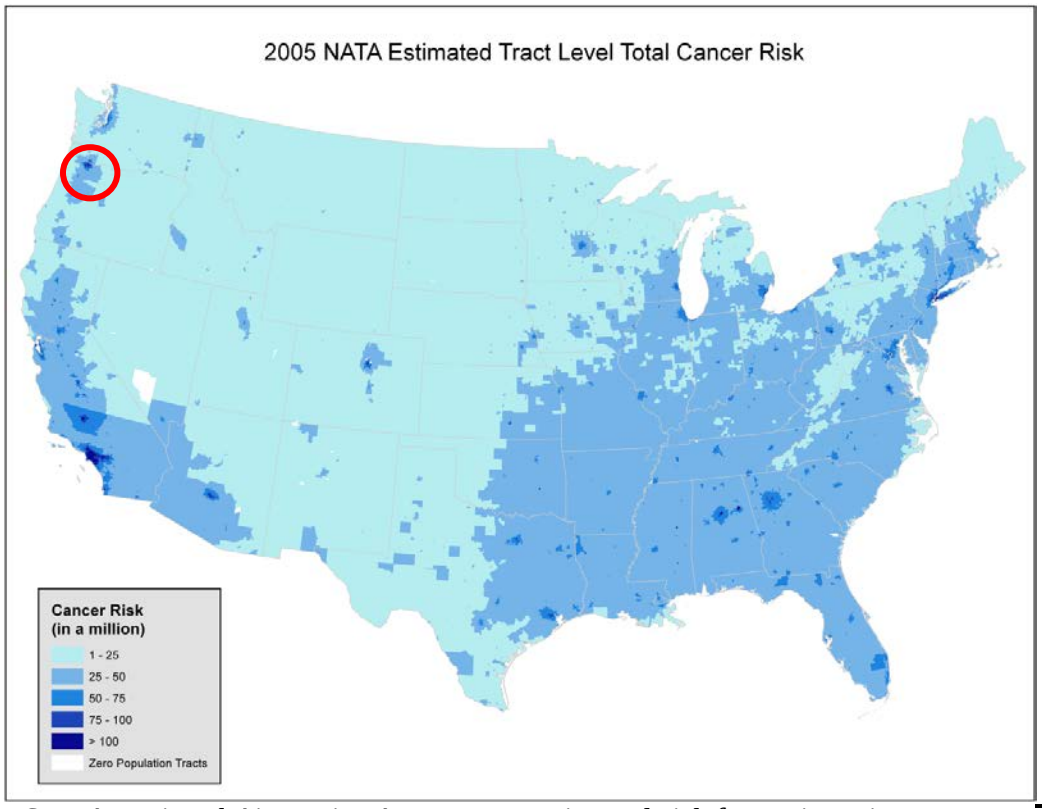
Despite this progress, DEQ is concerned about levels of other pollutants called air toxics, which are known or suspected to cause serious health problems including cancer, nerve damage and respiratory irritation. Much of our scientific knowledge about air toxic is still emerging. However for many pollutants and sources, there is currently enough information to understand problems and prioritize emission reductions.

Air toxics include diesel soot, benzene, polycyclic aromatic hydrocarbons (tar-like by-products from auto exhaust and other sources commonly called PAHs), and metals including manganese, nickel, and lead. Air toxics come from a variety of sources including cars and trucks, all types of burning including burning wood in fireplaces and woodstoves, businesses and industries of all sizes, and consumer products such as solvents and pesticides. There are no federal standards for air toxics.

How does the air in Portland compare with other locations?

Compared to other areas of the state, the Portland region has the highest risk to the population from air toxics. This is because the region has the most people and development. Air toxics in Portland are comparable to levels in other similarly sized cities across the country. Along with national estimates of air toxics emissions, Portland monitoring studies confirm the presence of air toxics at levels that can cause adverse health effects. The map below shows estimated total cancer risk from air pollutants from a study released by the U.S. Environmental Protection Agency. The majority of toxic air

pollutants are associated with cancer risk. The darker blue areas have higher estimated cancer risk, and a red circle marks the location of Portland.



US EPA National Air Toxics Assessment estimated risk from air toxics

How does DEQ evaluate air toxics levels?

Monitoring and modeling

DEQ collects information about air toxics by sampling and analyzing air quality and also by estimating levels through computer modeling studies. These levels are compared to ambient benchmark concentrations, which serve as DEQ's clean air health goals for air toxics. A summary of **air toxics monitoring** is available at: http://www.deq.state.or.us/aq/forms/annrpt.htm .

Ambient benchmark concentrations

Oregon has adopted ambient benchmark concentrations that serve as clean air goals for 52 air toxics known to be present in the state. Each air toxic of concern has a benchmark set based on its non-cancer or cancer causing effects, whichever level would be more protective. An ambient benchmark concentration is the annual average concentration of a toxic chemical in air that individuals, including more sensitive groups such as children or the elderly, could breathe continuously for a lifetime without experiencing any non-cancer health effects or without increasing their risk above the background cancer rate by greater than one chance in a million. Oregon's benchmarks are available at: http://www.deq.state.or.us/aq/toxics/benchmark.htm .


Air pollution monitor

What is DEQ doing to reduce air toxics in the Portland region?

Portland Air Toxics Solutions Project

DEQ created the Portland Air Toxics Solutions 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. Because many of the same sources produce air toxics, particulates, greenhouse gases and ozone, Portland Air Toxics Solutions links with other ongoing and future regional air pollution reduction efforts.

The map below shows the Portland Air Toxics Solutions Study Area.

Between August 2009 and October 2011, DEQ collaborated with the Portland Air Toxics Solutions Advisory Committee, made up of diverse stakeholders, to consider a technical study and recommend a framework for an air toxics reduction plan. The technical study included an analysis of available monitoring information from the past several years and computer model estimates of Portland's expected pollutant levels in the year 2017. Together with the advisory committee, DEQ developed the Portland Air Toxics Solutions technical study, providing ground-breaking analysis and a new understanding of air toxics problems and potential solutions in the Portland region.

Portland Air Toxics Solutions study area

The Portland Air Toxics Solutions modeling study greatly advanced our knowledge about air toxics in Portland. DEQ used this study to estimate air toxics concentrations for 19 pollutants projected for 2017. The model included the most current and detailed emissions information from hundreds of emission sources across the Metro area, including industrial sources, mobile sources like cars and trucks, and residential activities. The model also factored in economic conditions, population growth, topography, weather and new regulations to reduce pollution. The study allowed DEQ and the advisory committee to understand significant pollutants, their sources, how they are distributed across the Portland region, and how best to prioritize potential reduction strategies. Results of the **Portland Air Toxics Solutions modeling study** are available at: http://www.deq.state.or.us/aq/toxics/pats.htm .

What pollutants are above clean air health goals?

The Portland Air Toxics Solutions modeling study assessed 19 pollutants and identified 14 of them that are above clean air health goals, or benchmarks. Eight of the 14 pollutants cause the most risk. These pollutants are: 1, 3 butadiene, benzene, diesel particulate, 15 PAH, naphthalene, cadmium, acrolein, and formaldehyde.

The largest sources of air toxics are gasoline and diesel engines that produce 1,3 butadiene, benzene, diesel particulate, arsenic and chromium 6. Another large source of air toxics is residential wood burning that produces 15 PAH (polycyclic aromatic hydrocarbons which are tar-like by-products) and naphthalene. The model shows emissions of metals including manganese, nickel and cadmium are concentrated in or near some industrial areas.

Where are the highest concentrations of air toxics?

The study shows that air toxics are found throughout the Portland region. Higher concentrations are found in densely populated neighborhoods, near busy roadways and in areas with higher levels of business and industrial activity. The chart below shows pollutants estimated above Oregon's air toxics benchmarks, the top source of each pollutant and the general locations of concentrations in the Portland region.

Pollutant	Top Source	Impact Area
More than 10 times over benchmark		
1,3 butadiene	Cars and trucks	Region wide/neighborhood
Benzene	Cars and trucks	Region wide/neighborhood
Diesel Particulate	Cars and trucks	Region wide/neighborhood
15 PAH	Residential wood burning	Region wide
Naphthalene	Residential wood burning	Region wide/neighborhood
Cadmium	Industry	Neighborhood
Formaldehyde	Chemical formation in atmosphere[1]	Region wide
Acrolein	Chemical formation in atmosphere[2]	Region wide/neighborhood
Between 1 and 10 times over benchmark		
Arsenic	Cars and trucks	Region wide/neighborhood
Manganese	Industry	Neighborhood
Nickel	Industry	Neighborhood
Chromium VI	Cars and trucks	Region wide/neighborhood
Dichlorobenzene	Solvents and pesticides	Region wide/neighborhood
Acetaldehyde	Chemical formation in atmosphere[1]	Region wide

1. Toluene and xylene from vehicle exhaust and vegetation react in the atmosphere to form formaldehyde and acetaldehyde.
2. 1,3 butadiene from vehicle exhaust reacts in the atmosphere to form acrolein.

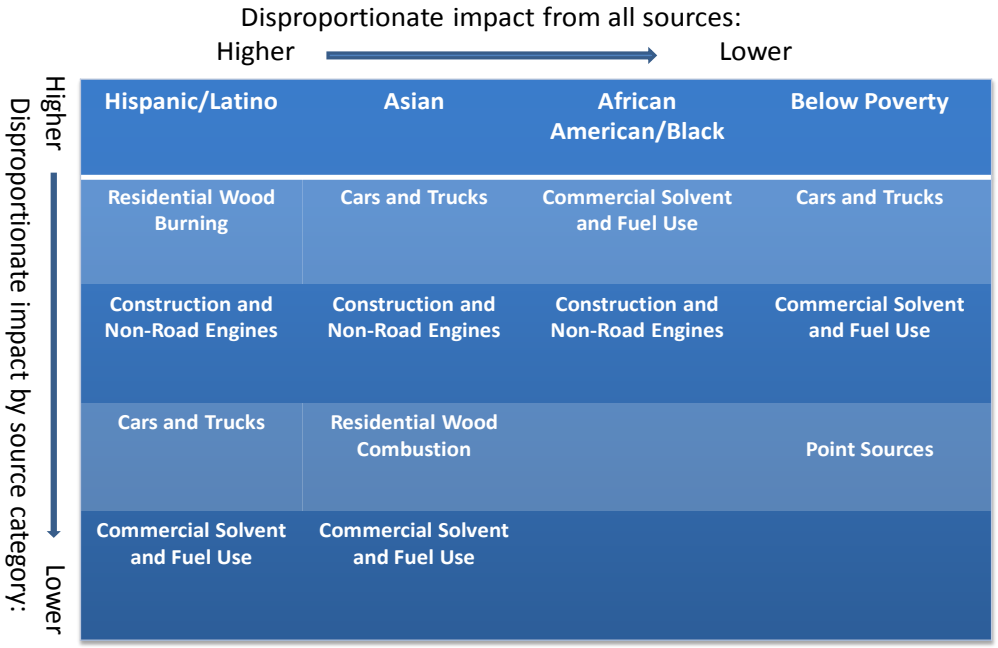
Portland Air Toxics Solutions estimates of air toxics in 2017

How do air toxics impact minority and low income people in the Portland region?

As part of the Portland Air Toxics Solutions Study, DEQ used its modeling estimates to conduct an environmental justice analysis of air toxics impacts. Environmental Justice entails 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. DEQ's environmental justice analysis demonstrated that disproportionate impacts from air toxics do occur for minority and low-income populations in the Portland region. Different minority groups are affected by different types of emission sources.

In general, DEQ found that the Hispanic/Latino population experienced the highest impacts from residential wood combustion emissions, the Asian population from car and truck emissions, and the African American/Black population from commercial solvent and fuel use emissions. In addition we found that the

general population (all races) living below the poverty level is disproportionally affected by toxic air pollution from cars and trucks. Emissions from construction and other non-road engines also significantly impact minority populations, while industrial and business sources disproportionately impact populations of all races living below the poverty level. This information will be incorporated into emission reduction strategies and used by communities and local government to prioritize efforts to improve public health. The chart below summarizes DEQ's statistical analysis of air toxics impacts on minority and low income populations in the Portland region.



Summary of minority and low income air toxics impacts in the Portland region

What are the next steps to reduce air toxics in the Portland region?

DEQ and its advisory committee identified five high priority emission categories for follow up action, along with potential emission reduction recommendations for each category. While the emission recommendations reflect the advisory committee's best efforts at consensus, they were not endorsed by all members. The prioritization is based on total estimated risk from air toxics, practicability of emission reductions, and the directive in Oregon air toxics regulations to address both region wide and localized risk.

The five priority categories are:

- Residential wood combustion
- Cars and trucks
- Heavy duty vehicles
- Construction equipment
- Industrial metals facilities

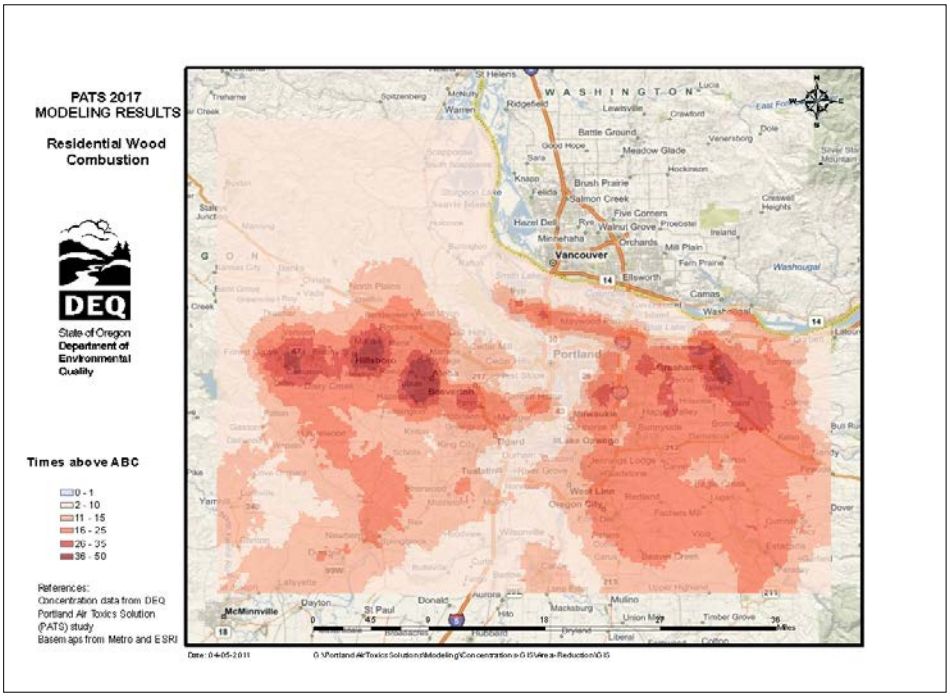
For all priority categories, DEQ will further consult with affected people and businesses to develop emission reduction actions. This consultation will include more detailed technical analysis and more thorough

investigation of emission reduction considerations including cost effectiveness, feasibility and benefits analysis. DEQ and partners will implement the emission reduction recommendations by integrating them into DEQ's ongoing emission reduction work.

What are the recommendations to reduce emissions from the priority categories?

Residential wood burning

In the Portland region, roughly two percent of homes are heated by wood. Many people burn woodstoves and fireplaces as an additional heat source or for aesthetic reasons. Old uncertified woodstoves and conventional fireplaces contribute the bulk of toxic pollution in this category. The pollutants causing the most risk from wood burning are 15 PAH, 1,3-butadiene and formaldehyde. The map below shows estimated risk from wood combustion in the Portland area. Darker red areas have higher estimated concentrations of pollutants from wood burning, many of which are Environmental Justice communities.



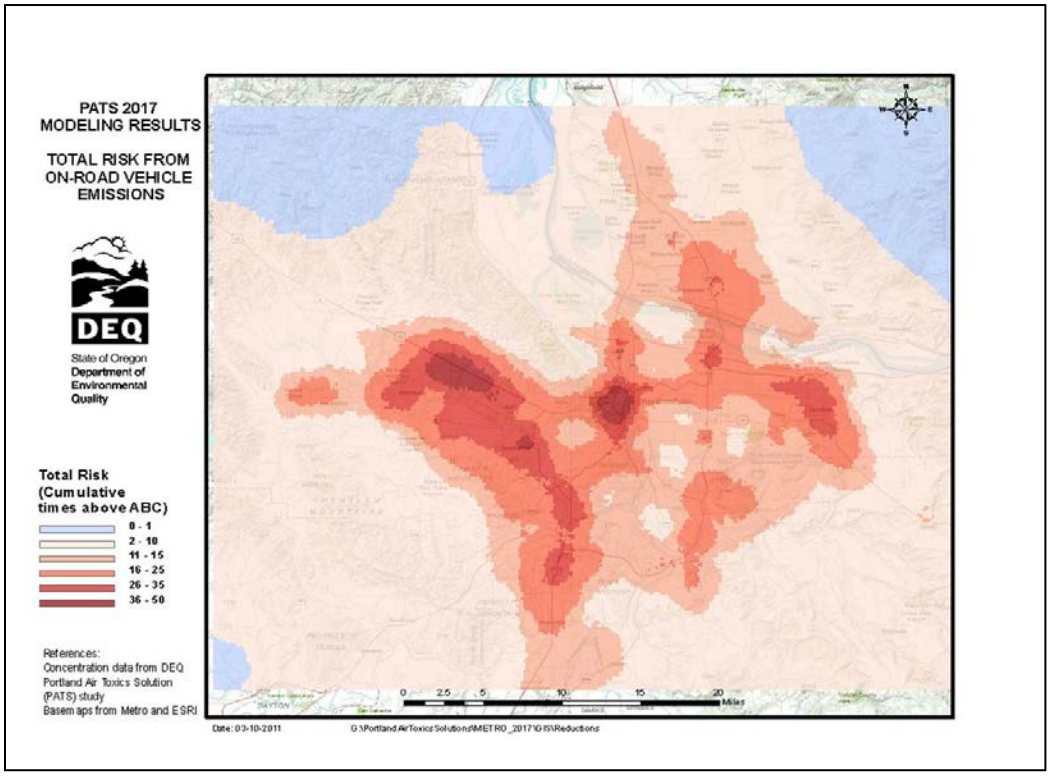
In addition to emitting air toxics, residential wood burning emits fine particulate pollution that contributes to violations of national clean air standards. DEQ plans to coordinate efforts to reduce air toxics from residential wood burning with ongoing work to meet the fine particulate standard. Recommendations for next steps to decrease pollution from residential wood burning include:

- Conduct a residential wood heating survey to refine DEQ emission estimates
- Implement a regional public awareness campaign to promote cleaner burning techniques
- Improve DEQ's uncertified woodstove change out program, with emphasis on assistance to low income communities
- Find long term funding for woodstove change outs
- Evaluate the effectiveness of setting smoke density limits

- Support stronger national standards for new wood heating devices

Cars and trucks

Vehicles have both gasoline and diesel engines. For emission reduction recommendations, there are two categories: light duty vehicles, which are mostly use gasoline, and heavy duty vehicles, which are mostly use diesel. The map below shows the estimated risk in 2017 from both categories together. Darker red areas have higher estimated concentrations of pollutants from cars and trucks. Higher concentrations of pollution from cars and trucks follow major highways.



Light duty cars and trucks

Air toxics from light duty vehicles occur throughout the Portland region with the highest concentrations occurring in high traffic areas. Emissions are highest within 500 yards, the length of five football fields, of roadways with high traffic. However, because much of the study area is developed, on road gasoline emissions influence risk in much of the Portland Air Toxics Solutions study area.

Gas powered vehicles are subject to federal and state regulations that limit new car and truck emissions. To meet emission requirements automakers developed better engine designs, computerized engine controls and pollution control technology such as catalytic converters. These efforts reduced the emission of traditional pollutants to a fraction of what they were thirty years ago. In the Portland region, vehicle inspection requirements ensure proper vehicle maintenance, further controlling emissions. Both the federal Corporate Average Fuel Economy standards and Oregon's greenhouse gas

emission limits reduce the amount of gasoline vehicles use. This reduces metallic air toxics that may be naturally present in gasoline and which are not reduced by pollution control equipment. The pollutants causing the most risk from light duty cars and trucks are 15 PAH, benzene, 1,3 butadiene, formaldehyde, arsenic and chromium.

In addition to emitting air toxics, light duty cars and trucks emit greenhouse gases and pollutants that contribute to ozone. DEQ plans to coordinate efforts to reduce air toxics from light duty cars and trucks with Metro's ongoing work to reduce vehicle miles travelled and DEQ's work to reduce greenhouse gas emissions and prevent a recurrence of unhealthy ozone levels. Recommendations for next steps to decrease pollution from light duty vehicles include:

- Use the ongoing regional transportation planning process to reduce vehicle use
- Target a 20 percent person per person reduction in vehicle emissions by 2035
- Improve traffic signals to reduce congestion
- Support strong national standards for clean vehicles
- Adopt the latest California clean car standards
- Promote electric vehicle charging stations
- Work with Metro and other partners to incorporate environmental justice considerations into transportation and land use planning

Heavy duty vehicles

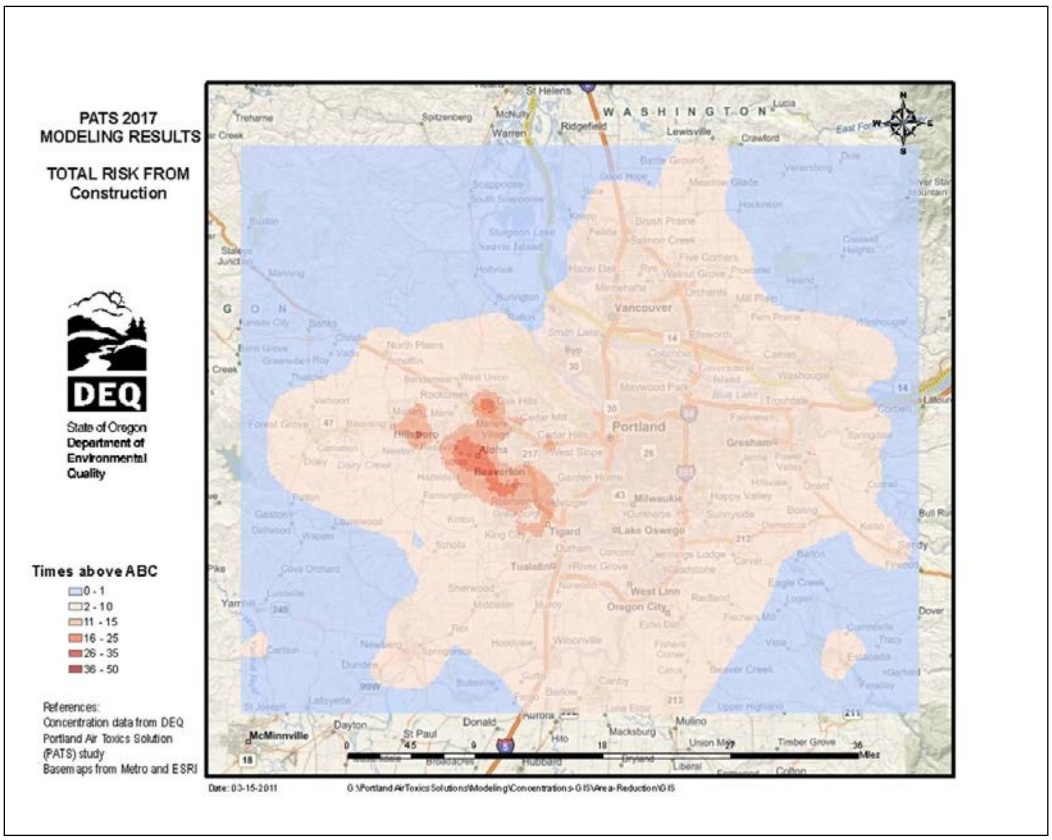
Air toxics from on-road heavy duty vehicles occur throughout the Portland region, with the highest concentrations occurring in areas of high vehicle traffic. Heavy duty vehicles include trucks that make deliveries within the Portland area and trucks that are used mainly in interstate freight. The majority of these vehicles have diesel engines. Like light duty vehicles, heavy duty vehicles have become cleaner over the last decade with tighter federal emission standards. However, because diesel engines are long lasting, the turnover from older dirtier engines to newer cleaner engines is much slower. Pollutants from heavy duty vehicles causing the most risk are diesel particulate matter, 15 PAH, benzene, and 1,3 butadiene.

DEQ has an active clean diesel program to reduce diesel particulate emissions from heavy duty vehicles. Recommendations for next steps to decrease pollution from heavy duty vehicles include:

- Identify opportunities for financial support of clean diesel projects
- Identify the most effective use of education and outreach
- Accelerate engine turnover, repowering, and retrofits
- Evaluate requirements for clean diesel fleets at publically funded projects
- Evaluate alternative fuels and the need for a fuels technical clearinghouse
- Evaluate efficiency measures, and current idling restrictions in Oregon and other jurisdictions
- Work with Metro and other partners to incorporate environmental justice considerations into transportation and land use planning

Construction equipment

Construction equipment emissions are caused mainly by diesel engines. These engines power non-road equipment such as backhoes and graders. Construction equipment emissions are widely dispersed across the Portland area associated with construction projects. Compared to light and heavy duty on road engines, construction equipment engines have the slowest rate of turnover to cleaner engines. The pollutants causing the most risk in the construction category are diesel particulate matter and 15 PAH. The map below shows the estimated risk in 2017 from construction equipment. Darker red areas have higher estimated concentrations of pollutants from construction engines. Because construction projects can occur in many locations, elevated concentrations as shown on the map will fluctuate throughout the region.



While DEQ's clean diesel program has focused on trucks, buses and barges, it can also be used to reduce diesel particulate emissions from construction equipment. Recommendations for next steps to decrease pollution from construction include:

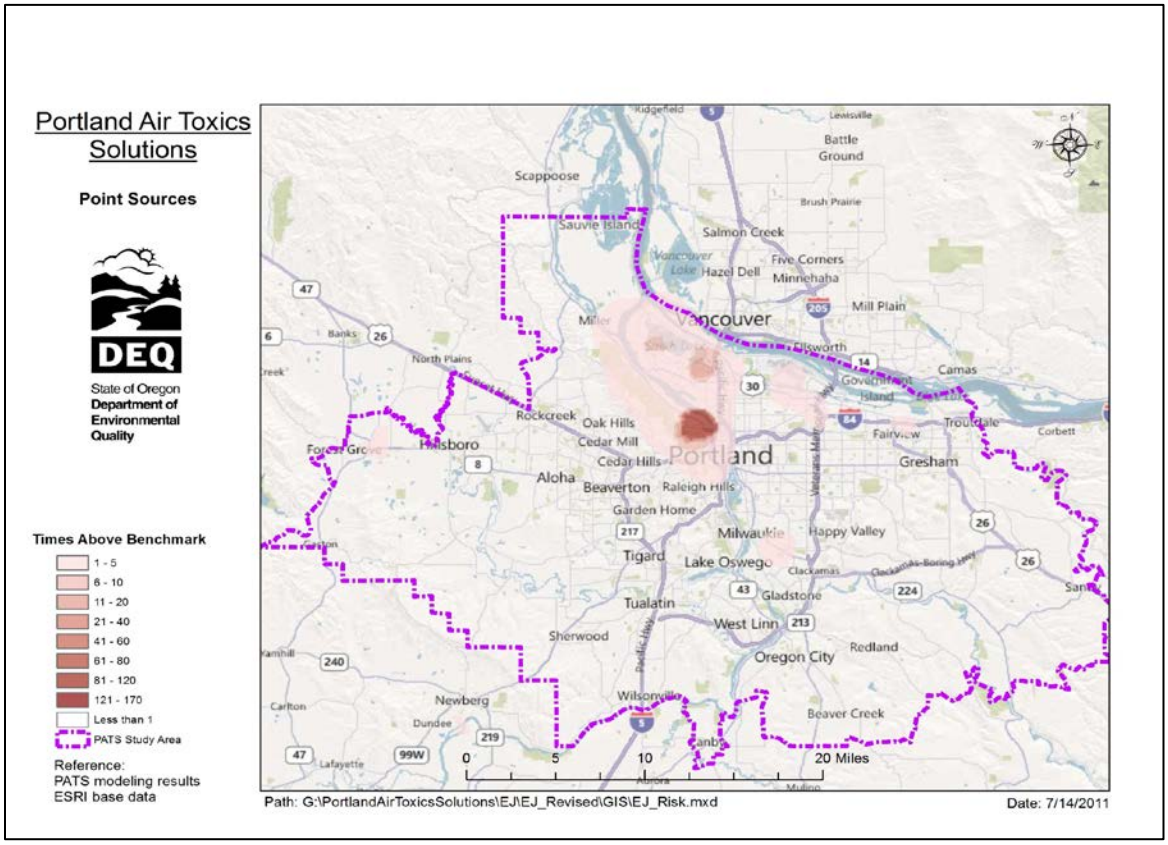
- Conduct a survey to better understand the universe of construction equipment
- Evaluate an equipment registration system
- Evaluate the impacts of higher emission equipment imported from California, which has more stringent standards for construction equipment
- Identify opportunities for financial support of clean diesel projects
- Accelerate engine turnover, repowering and retrofits

- Evaluate requirements for clean diesel equipment on publically funded projects
- Evaluate alternative fuels and the need for a fuels technical clearinghouse
- Evaluate efficiency measures and the feasibility of idle reduction for construction equipment

Industrial Metals Facilities

Industrial metals facilities account for most of the documented cadmium, manganese and nickel concentrations estimated above benchmarks in the Portland Air Toxics Solutions Study. These pollutants occur fairly close to industrial facilities, with concentrations decreasing greatly at the distance of a quarter mile. DEQ needs to further investigate emissions from industrial metals facilities for a full understanding of their impacts. In particular, DEQ is working to identify the sources of cadmium in the Portland region. Monitored levels of cadmium are considerably higher than modeled levels, indicating that there are additional unknown sources that were not included in the model. The map below shows the estimated risk in 2017 from industrial facilities, the majority of which comes from metals processing. Darker red areas have higher estimated concentrations of pollutants from industrial facilities.

Metal casting equipment



DEQ's industrial permitting program ensures that industrial facilities comply with federal and state air toxics emission limits. Recommendations for next steps to decrease pollution from industrial metals facilities include:

- Refine emission estimates using facility-specific models and improved emission characteristics
- DEQ to encourage facilities with modeled impacts above benchmarks to make voluntary early reductions

How will DEQ implement the recommendations for the high priority categories?

DEQ will incorporate the recommended air toxics reduction strategies into ongoing ozone, particulate, clean diesel and green house gas reduction work. DEQ is also coordinating with local government partners to bring current air toxics considerations into the transportation and land use planning process.

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1. Executive Summary

1.1 Background and Purpose

Compared to other areas in Oregon, the Portland region has the highest risk to the population from air toxics due to business and population density. Along with national estimates of air toxics emissions, Portland monitoring studies confirm the presence of air toxics at levels that can cause adverse health effects. Forming individual airsheds based on geography allows the Department of Environmental Quality or DEQ to define problem areas for air toxics in Oregon. It also allows DEQ to prioritize and focus efforts to reduce air toxics. Under this geographic approach, DEQ and community members evaluate air toxics holistically in an area, striving for reductions from various sources roughly commensurate with their contributions.

DEQ created the Portland Air Toxics Solutions project, also called PATS, to work with local communities to develop an air toxics reduction plan for the Portland region. Ultimately DEQ seeks to reduce concentrations of air toxics to ambient benchmark concentrations, health based clean air goals established in state regulations. Between August 2009 and October 2011, DEQ collaborated with a diverse stakeholder committee called Portland Air Toxics Solutions Advisory Committee, known as PATSAC, to develop a foundation and framework for an air toxics reduction plan. In a series of 14 meetings, the committee and DEQ worked through the challenges of understanding and discussing air toxics problems and potential solutions in the Portland area, considering monitoring and modeling data, pollutants above health based benchmarks, sources of pollutants and potential emission reduction strategies.

1.2 Technical Study

To understand Portland air toxics problems and sources, DEQ produced a PATS modeling study that projects air toxics concentrations for 19 pollutants in 2017. The PATS model used the most current and detailed emissions information from industrial, mobile, and residential activities. The model also factored in economic conditions, population growth, topography, weather and new regulations to reduce pollution. PATSAC reviewed all stages of the PATS modeling and monitoring data and initiated technical advances that improved methodologies and data quality. In addition, DEQ and the advisory committee considered monitoring data from a 2005 regional monitoring study and performed a model to monitor comparison.

The PATS modeling study identified 14 of the 19 pollutants above health based benchmarks. Eight of the 14 pollutants cause the most risk. These pollutants are: 1, 3 butadiene, benzene, diesel particulate, 15 PAH,

naphthalene, cadmium, acrolein, and formaldehyde. The study shows that most air toxics are found throughout the study area. Higher concentrations are found in densely populated neighborhoods, near busy roads and highways and in areas with business and industrial activity.

1.3 Portland Air Toxics Solutions Advisory Committee Contributions

The advisory committee provided DEQ with a wide diversity of opinion on the technical study and developing emission reduction options. DEQ fully considered and incorporated much of the committee's input. While the scientific complexity, need for additional stakeholder representation, and lack of consensus about air toxics in the study area prevented DEQ and PATSAC from developing the type of ten year plan envisioned in the project charter, PATSAC work resulted in ground-breaking analysis and understanding of toxics problems and potential solutions in the Portland area.

PATSAC and DEQ developed a framework for next steps, including:

- A priority list of air toxics source categories;
- White papers that lay an initial technical foundation for future emission reduction strategies;
- Definition of key considerations;
- Future steps for technical analysis; and
- Future steps for stakeholder involvement, including representation and consideration of environmental justice issues.

1.4 Priority Emission Source Categories

Five categories of emissions are high priority for near term follow up action, including stakeholder consultation, planning, and emission reduction actions. This prioritization is based on total modeled risk, practicability of emission reductions, and the directive in Oregon air toxics regulations to address both area wide and localized risk. The prioritized source categories will guide DEQ and partner actions to reduce toxics. However DEQ and others may take advantage of additional emission reduction opportunities as they arise. The five priority categories are:

- Residential Wood Combustion
- On Road Mobile Light Duty
- On Road Mobile Heavy Duty
- Construction
- Industrial Metals

For all priority categories, it is clear that additional stakeholder consultation will be necessary to thoroughly consider emission reductions. This consultation will allow development of more detailed technical information and more complete consideration of affected stakeholder interests. Future stakeholder processes will also evaluate strategies to achieve emission reductions, and recommend specific actions consistent with the PATSAC considerations, including cost effectiveness, feasibility and benefits analysis as well as options for ongoing improvement. Highlights of recommendations for the priority categories are summarized below.

1.4.1 Residential Wood Combustion

In the category of residential wood combustion, the next steps are to conduct a residential wood heating survey to refine DEQ emission estimates, to implement a regional public awareness campaign to promote cleaner burning techniques, and to improve implementation of the uncertified woodstove change out program, with emphasis on assistance to affected environmental justice communities. DEQ follow-up actions also include evaluation of opacity limits, finding long term funding for woodstove change out, and supporting stronger national standards for new wood heating devices.

1.4.2 On Road Mobile Light Duty Vehicles

For on road mobile emissions, DEQ plans to coordinate with Metro's ongoing regional transportation planning process to reduce vehicle miles traveled (VMT) from light duty vehicles. Under this effort, Metro, DEQ and partners would work to identify sustainable funding for VMT reduction, incorporate air toxics reductions into existing VMT reduction planning and strive to achieve a per capita reduction of 20% of light duty vehicle air toxics emissions by 2035. Other VMT reduction elements include transportation demand management, operation improvements and transit improvements. DEQ plans to advocate for strong national standards for light duty vehicles, adopt California LEV III standards and promote infrastructure for low emitting vehicles. Cleaner fuel recommendations include a life cycle evaluation of air toxics reductions from low carbon fuels, and an evaluation of reformulated gasoline.

1.4.3 On Road Mobile Heavy Duty Vehicles

General strategies to reduce emissions from on road mobile heavy duty vehicles are to identify opportunities for financial support of clean diesel activities and to identify the most effective use of education and outreach. To burn fuel cleaner, DEQ is directed to work with stakeholders to accelerate engine turnover, repowering, and retrofits. DEQ can also work with partners to assess the feasibility and effectiveness at all levels of government of incenting or requiring clean diesel fleets at publically funded projects. To burn cleaner fuel, DEQ can evaluate alternative fuels as well as the need for a technical clearinghouse on environmental benefits of alternative fuels. To burn less fuel DEQ can evaluate efficiency measures, and current idling restrictions in Oregon and other jurisdictions.

1.4.5 Construction Equipment

Recommendations in this category direct DEQ to conduct a survey of construction equipment in the Metro area. This would better define equipment characteristics, improve emission estimates, and inform reduction strategies. Other general strategies include evaluations of an equipment registration system and evaluation of the impacts of high emission equipment imported from California. DEQ can identify opportunities for financial support of clean diesel activities as well as the role of education in promoting clean diesel activities. Strategies to burn fuel cleaner include acceleration of engine turnover, repowering and retrofits, and evaluation of requiring clean diesel equipment on publically funded projects. To burn cleaner fuel, next steps include evaluation of alternative fuels and a technical clearinghouse on alternative fuels. To burn less fuel, DEQ and partners can evaluate efficiency measures and the feasibility of idle reduction for construction equipment, including private and other jurisdictions' idle reduction programs.

1.4.6 Industrial Metals

For industrial metals facilities DEQ would refine emission estimates using facility-specific models and improved emission characteristics. DEQ would encourage facilities with modeled impacts above benchmarks to make voluntary early reductions, and as with all the other high priority categories, convene a stakeholder process to identify and evaluate strategies to achieve emission reductions.

1.5 Additional Technical Information

The PATS process highlighted several areas in need of data refinement for better understanding of emissions, potential risks and possible emission reduction strategies. With assistance from EPA and other state and local partners, DEQ would develop additional and more accurate information in the following areas:

- Methylene chloride
- Secondary formation pollutants
- Cadmium
- Arsenic
- Additional Monitoring Studies

1.6 Next Steps

In collaboration with PATSAC, DEQ identified several important future considerations for implementing emission reduction strategies. For many categories of emissions there are common potential future needs:

1) continuous improvement in achieving emission reductions,
2) responding to growth in emissions,
3) providing the best quality information about air toxics, and
4) mitigating exposures in ways that complement reduction strategies.

DEQ understands through comments received and group discussion that many PATSAC members support the next steps stated in this section. However, the report and recommendations do not represent the views of all PATSAC members. DEQ will seek further comment from the public and stakeholders before finalizing this proposal for presentation to the Environmental Quality Commission.

At the time of this report, DEQ has exhausted the funding for ongoing air toxics work. However, because air toxics are produced by many of the same sources that produce particulate, ozone precursors and greenhouse gases, DEQ will link efforts to reduce all of these pollutants in a comprehensive approach. While DEQ will coordinate local air toxics reduction efforts, it is also relying on partnerships and collaborations with local agencies and communities for resources and for strategy implementation.

2. Introduction

2.1 Preamble

This report is a culmination of a two year effort by 29 Portland Air Toxics Solutions (PATS) advisory committee members and DEQ, representing the largest and most diverse stakeholder groups in DEQ's history. Between August 2009 and October 2011, the committee worked to develop a comprehensive air toxics plan with aggressive reduction goals for the Portland region. Developing the PATS emission reduction plan was a long and technically difficult process that is unique in Oregon and nationally. According to the committee charter, the goal for the final report was to catalogue a set of consensus recommendations. Throughout the two year process, committee members discussed and advised DEQ on methods of analysis, emission reduction goals, prioritization of emission sources, environmental justice impacts, potential actions, and a blueprint for next steps. DEQ drafted recommendation language for the committee in an attempt to capture the full range of committee member perspectives.

At their last meeting in October 2011, committee members and DEQ discussed the most accurate and beneficial way to represent committee discussions and accomplishments in the context of diverse opinions and the lack of consensus. DEQ initially proposed to author its own report incorporating the input of committee members. However, for greatest transparency, and to recognize the extensive contributions of committee members, DEQ has chosen to present the PATS report as a committee work product. While the recommendations included in the report reflect best efforts at consensus, the report does not imply endorsement by all members. Committee members' comments and letters are included in Appendix 12.13. In addition, DEQ will be conducting a public comment process on the PATS report and recommendations to be summarized and presented to the Environmental Quality Commission.

2.2 Background – Description of Community Based Air Toxics Reduction Project

2.2.1 Objectives and Progress

The Portland Air Toxics Solutions (PATS) project is a community-based air toxics reduction effort under the state Air Toxics Reduction Program in Oregon Administrative Rules 340-246-0010 through 0230. (see Appendix 12.1) The purpose of Portland Air Toxics Solutions (PATS) is to improve public health by meeting or making progress towards air toxics risk reduction goals. The objectives of PATS are to:

- Designate the Portland area as the first Air Toxics Geographic Planning Area;
- Use data to clearly describe emissions, risks and reduction opportunities;
- Conduct a representative stakeholder process that addresses Portland air toxics needs, regulatory requirements, and community values;
- Produce an emission reduction plan that meets OAR 340-246 criteria and is clear, realistic and measurable;
- Reduce risk from air toxics; and
- Develop a model geographic planning process that could be used in other Oregon communities.

To accomplish PATS objectives, DEQ formed Portland Air Toxics Solutions Advisory Committee (PATSAC), a broad based stakeholder group. The PATSAC membership is included in Table 1. PATSAC advised DEQ on a broad range of topics, including study methodology, data sources, and potential emission reduction strategies. EPA and DEQ data show that some sources of air toxics are area-wide, such as motor vehicles, wood stoves, and other citizen related activities. Other air toxics have impacts on localized areas. The dispersed, widespread nature of most of the emissions makes reducing air toxics challenging. In order to successfully reduce risk posed by area-wide air toxics, it is critical to involve local governments, nonprofits, business leaders,

neighborhood groups, and residents in the area to form partnerships and collaborations that will reduce emissions in the community.

The 29 member PATSAC provided DEQ with a wide cross section of views and expertise, and helped DEQ develop a roadmap or next steps to address air toxics in the Portland area. DEQ and the committee had many challenging discussions about the fundamental science of air toxics, estimating emissions and risk, options for reducing emissions, and many other technical, economic and community considerations influencing strategy choices. DEQ's expertise in air toxics, as well as the state air toxics program greatly benefitted from this challenging work.

DEQ sincerely acknowledges and lauds the great progress and advances made as a direct result of PATSAC work. PATSAC reviewed the study methodology, data sources, emissions and modeling results. During review and discussion of the technical study, PATSAC members voiced many perspectives and suggested improvements that added high value to both the technical study and process of developing an emission reduction plan. While it proved difficult to accomplish all of the goals ambitiously stated in air toxics regulations, PATSAC enabled DEQ to analyze and develop an understanding of toxics problems and potential solutions in the Portland area. In addition to this analysis, PATSAC helped DEQ develop:

- A priority list of air toxics categories;
- White papers that lay an initial technical foundation for future emission reduction strategies;
- Definition of key considerations;
- Future steps for technical analysis; and
- Future steps for stakeholder involvement, including representation and consideration of environmental justice issues.

DEQ also acknowledges and values the many collateral advances resulting from PATSAC work. DEQ could not have achieved these significant results without the effort, expertise and perseverance of PATSAC members. These advances include:

- A practical approach to screening and understanding Toxics Release Inventory data for permitted facilities;
- An enduring data quality ranking system; and
- DEQ's first air quality Environmental Justice analysis using census and GIS based data.

The complexity and broad scope of air toxics in the study area were challenges to DEQ and the committee in developing a full and detailed air toxics reduction plan as originally envisioned under the Geographic Approach of the Oregon Air Toxics Regulations. DEQ and PATSAC spent ten of their fourteen meetings working through data issues to develop a common understanding of air toxics sources and problems in the study area. While the PATS advisory committee was large at 29 members, the broad spectrum of sources considered in the technical study included interests that went beyond committee representation. During the process it became clear to DEQ and PATSAC members that additional stakeholder consultation is needed to thoroughly consider emission reductions in individual priority categories. This consultation will allow development of more detailed technical information and more complete consideration of affected stakeholder interests.

In developing emission reduction plans for high priority categories, DEQ will continue to strive towards the objectives stated above and in the program regulations. Section 2.4 of this report discusses next steps for developing and implementing the Portland Air Toxics Solutions Plan. Section 9 includes identification of source categories, recommendations for emission reduction options and guidance for future stakeholder consultation.

2.2.2 Scientific Foundation for PATS

PATS began in response to knowledge gained from the U.S. Environmental Protection Agency's (EPA) National Air Toxics Assessment[1] (NATA) and the Portland Air Toxics Assessment[2] (PATA). NATA models pollution impacts on a nation-wide scale, and PATA modeled information specific to the Portland Metro area. Information on air toxics risk gained from both NATA and PATA helped in the selection of a geographic area for strategic reduction of air toxics.

Based on ranking of county air toxics risk statewide, DEQ selected the Portland area as the first community to participate in geographic air toxics reduction planning. While the risk from air toxics in the Portland region is similar to other large urban areas around the country, DEQ selected this area because it has the highest public health risk from air toxics in Oregon. The PATS project and study area includes portions of Multnomah, Clackamas and Washington Counties. DEQ also involved Clark County Washington near Vancouver and a portion of Yamhill County, since these areas share the same air shed as the Portland metro area.

Air toxics are pollutants suspected or known to cause serious health problems including cancer, birth defects, organ damage and respiratory irritation. Sensitive populations, which include children, older adults, people who work outdoors, athletes who exercise outdoors, people with asthma or other breathing problems and heart disease, are especially vulnerable to air toxic emissions.

There are many different pollutants in the Portland air shed, including criteria pollutants with federally mandated air quality standards and air toxics with no federal ambient standards. Pollution levels fluctuate with the season, weather, and community behavior patterns. While the Portland-Vancouver air shed met all existing federal standards for criteria pollutants at the time of this report, various air toxics are above Oregon benchmark levels, or are projected to be above benchmarks levels in 2017. In order to determine which pollutants will be above air toxics benchmarks and understand their emission sources, DEQ modeled air toxics for 2005 and a projected year of 2017, and considered monitoring data for the Portland area.

PATS is distinct from other air toxics control efforts to date because it evaluates risk holistically to produce an area-wide plan to decrease emissions from sources roughly commensurate with their contribution to problems. DEQ's collaboration with a diverse advisory committee and other interested stakeholders provides a representative public the opportunity to work with DEQ and build partnerships to implement the emission reduction strategies for the PATS study area.

At the time of this report, DEQ has exhausted the funding for ongoing air toxics work. However, because air toxics are produced by many of the same sources that produce, particulate, ozone precursors and greenhouse gases, DEQ will link efforts to reduce all of these pollutants in a comprehensive approach. While DEQ will coordinate local air toxics reduction plans, it is also relying on partnerships and collaborations with local agencies and communities for resources and for strategy implementation.

2.3 Program History and Context

Historically, EPA and DEQ have focused on criteria pollutants[3], which are six air pollutants with federal standards or limits. In the past, the criteria pollutants carbon monoxide, ground level ozone, and particulate matter were above federal ambient concentration standards in the Portland area. DEQ has successfully reduced these pollutants below federal standards, so that the Portland-Vancouver air shed currently meets all federal criteria pollutant air standards; and DEQ works with businesses and the public to maintain these air standards.

[1] http://www.epa.gov/nata/
[2] http://www.deq.state.or.us/aq/toxics/pata.htm
[3] Criteria pollutants are ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur oxides and lead.

Air toxics make up a second category of pollutants that have no federal concentration limits but, through typically long term, low-level exposure, pose the risk of serious health problems such as cancer, organ, nervous system, or respiratory damage. As more science on air toxics emerged, EPA responded by developing national control requirements for various categories of industrial emissions. In the Federal Clean Air Act, the EPA lists 187 toxic or hazardous air pollutants to reduce from industry and business activity. At this level, EPA has established many regulations that specifically decrease air toxics from large industries to small businesses. EPA has also established many regulations for new on-road vehicles (like cars and trucks), off-road vehicles (like construction equipment, trains and recreational boats), and small portable engines (like generators and landscape equipment). While the focus of these regulations is to minimize the emission of criteria pollutants, they also reduce air toxics. The federal program is far-reaching; however, it does not address the emissions of air toxics from the larger pool of existing vehicles, equipment and other unregulated sources in communities, or risk from cumulative emissions caused by many sources in urban areas. Even with fully phased-in federal standards to reduce air toxics, communities will still experience levels of air toxics above Oregon's health-based benchmarks. To address the need to lower risk from air toxics, Oregon implements its own risk based air toxics program to supplement federal efforts.

To implement the state of Oregon program, DEQ employs a three-part system to address all sources of air toxics. First is a focus on categories of sources or activities that emit air toxics statewide, like woodstoves, diesel engines, and open burning. These are known as sector strategies. Second, the geographic strategy (such as the Portland Air Toxics Solutions) focuses on communities where people experience the most risk, in larger cities and highly populated areas. Third is an opportunity to address the rare case where pollutants from a specific facility are not fully controlled and pose problematic levels of risk to people living nearby.

In 2003, the Environmental Quality Commission[4] adopted Oregon's state air toxics program. (See Appendix 12.1 for air toxics regulations and program information) At the heart of the Oregon geographic strategy is the idea of evaluating risk holistically from all sources in an urban area, and developing an area-wide plan to reduce risk from point, area and mobile sources commensurate with their contribution to emissions above clean air goals. The program is also designed to address risk from source categories or individual sources that are not otherwise regulated by federal standards.

In 2006, the program took a major step forward when the Environmental Quality Commission adopted ambient benchmark concentrations (ABC) for 51 air toxics in Oregon. The benchmarks are set at levels protective of human health over a lifetime of exposure, and are based on recommendations of our Air Toxics Science Advisory Committee. The benchmarks serve as both measurement tools and goals, allowing analysis of air toxics problems, prioritization of projects, and tracking of progress in risk reduction in the absence of federal standards. The ABCs are expressed as annual average concentrations that would protect human health during a lifetime of exposure. The Air Toxics Science Advisory Committee reviews the ABCs at least every five years, or more frequently if important new health or scientific information arises.

2.4 PATSAC Purpose and Charter

In August 2009, DEQ convened PATSAC, a broad based stakeholder group tasked with recommending the elements of a Portland air toxics reduction plan to DEQ and the Environmental Quality Commission. The purpose of the committee was to conduct a representative stakeholder process to address Portland air toxics needs, regulatory requirements, and community values; and to produce a set of recommendations that met emission reduction goals and regulatory requirements and that are clear, realistic and measurable. DEQ met with this diverse advisory committee and other interested stakeholders to develop an air toxics reduction

[4] The Environmental Quality Commission is a five-member citizen panel appointed by the governor to four-year terms, serving as Department of Environmental Quality's (DEQ) policy and rulemaking board.

strategy that fosters innovation, improves partnerships, and builds support to carry out emission reduction strategies. PATSAC included representatives from neighborhoods, public interest organizations, government health and transportation departments and business. PATSAC considered the best available science and information available at the time. The PATSAC Charter and Operating Principles can be found in Appendix 12.2.

2.4.1 Process

Requirements for a local air toxics advisory committee, such as PATSAC, are contained in Oregon Administrative Rules 340-246-0170 (1) through (4). See Appendix 12.1 for Oregon rules related to air toxics. PATSAC met 14 times from August 2009 to October 2011. Throughout the process, the committee collaborated with DEQ to improve the quality of technical information, discuss prioritization of emission categories, and explore potential emission reduction options. A detailed description of the PATSAC process is found in section 2.4.1.2.

The PATS effort focused on air toxics measured or modeled above ambient benchmarks in the study area. While reducing the highest risk air toxics was a priority for PATSAC and DEQ, the committee also considered multi-pollutant benefits, including green house gas and criteria pollutant reductions, as well as many other considerations described in section 2.4.3.2 of this report. PATSAC evaluated air toxics emissions from all types of sources.

State air toxics regulations state that when feasible, PATS emission reduction plans will be designed to reach air toxics levels that are equal to or below ambient benchmark concentrations as expeditiously as possible, with a base goal of 10 years from the date of Environmental Quality Commission approval. Because emission reduction next steps reached the point of identifying priority categories, each with a roadmap for further stakeholder work and reductions, this report does not include a proposal for specific reduction requirements, milestones or ten year goals. These elements will be incorporated for each priority category in future collaboration with an additional stakeholder process.

"Feasibility" is not defined in DEQ's air toxics regulations, but is generally understood to require consideration of practical, economic, social, scientific, and health factors for each pollutant and associated source. Because diesel particulate matter, polycyclic aromatic hydrocarbons (PAH), and benzene are produced by engines and combustion sources, which are ubiquitous, it may not be feasible to reduce emissions quickly enough to reach benchmark levels within ten years from approval of an emission reduction plan. Background pollutants also affect the feasibility of reaching benchmarks, especially for pollutants with a high level of atmospheric formation, like formaldehyde and acetaldehyde.

Once DEQ and partners establish emission reduction plans, DEQ will periodically evaluate progress using both monitoring and modeling data. For pollutants that cannot be monitored, only modeling will be used. For those that can be monitored, DEQ will still rely primarily on modeling data and check it against monitored values. Unlike monitoring data, which is limited to measuring only the area near the monitor, modeling data provides estimates for every census block in the entire PATS study area.

2.4.1.1 Representation

DEQ greatly appreciates and values the time, interest and effort of PATSAC members and ex-officio members who attended 14 meetings over a two year period. Table I below shows PATS membership at the time of the committee's final meeting in October 2011. Workload and employment shifts caused some change in membership during the PATS project, but the majority of core interests were consistently represented. DEQ also thanks members who served on the committee for part of the process: Jeri Williams, Portland Office of Neighborhood Involvement, Jennifer Baldwin, American Lung Association of Oregon, Mark Turpel, Metro

Regional Government, Steve Mason, The Boeing Company and Charles Lapin, Western States Petroleum Association.

Table 1: PATS Advisory Committee Members as of October 17, 2011

Lisa Arkin, Oregon Toxics Alliance	Debra Dunn, Oregon Trucking Associations	Sandra Galganski, Oregon Metal Industry Council
Aubrey Baldwin, Pacific Environmental Advocacy Center	David Farrer, Oregon Public Health Division	Jim Norman, Oregon Department of Transportation
Nick Bouwes, North Portland	Warren Fish, Multnomah County Office of Sustainable Development	John Ostar, OPAL
Matt Bihn, Metro Regional Government	Toby Harris, Washington County Health Department	Mary Peveto, NW Portland Neighbors for Clean Air
Dan Bower, Portland Department of Transportation	Eric Hesse, TriMet	Eben Polk, Clackamas County Office of Sustainability
Dave Breen, Port of Portland	Dona Hippert, Oregon Toxics Alliance	Vivek Shandas, Portland State University
Daniela B. Cargill Southwest/Downtown Portland	Charles Lapin, Western States Petroleum Association	Scott Stewart, Intel Corporation
Ben Duncan, Multnomah County Health Department	Sia Lindstrom, Washington County Administrative Office	Carter Webb, Associated Oregon Industries
Carrie Nyssen, American Lung Association		

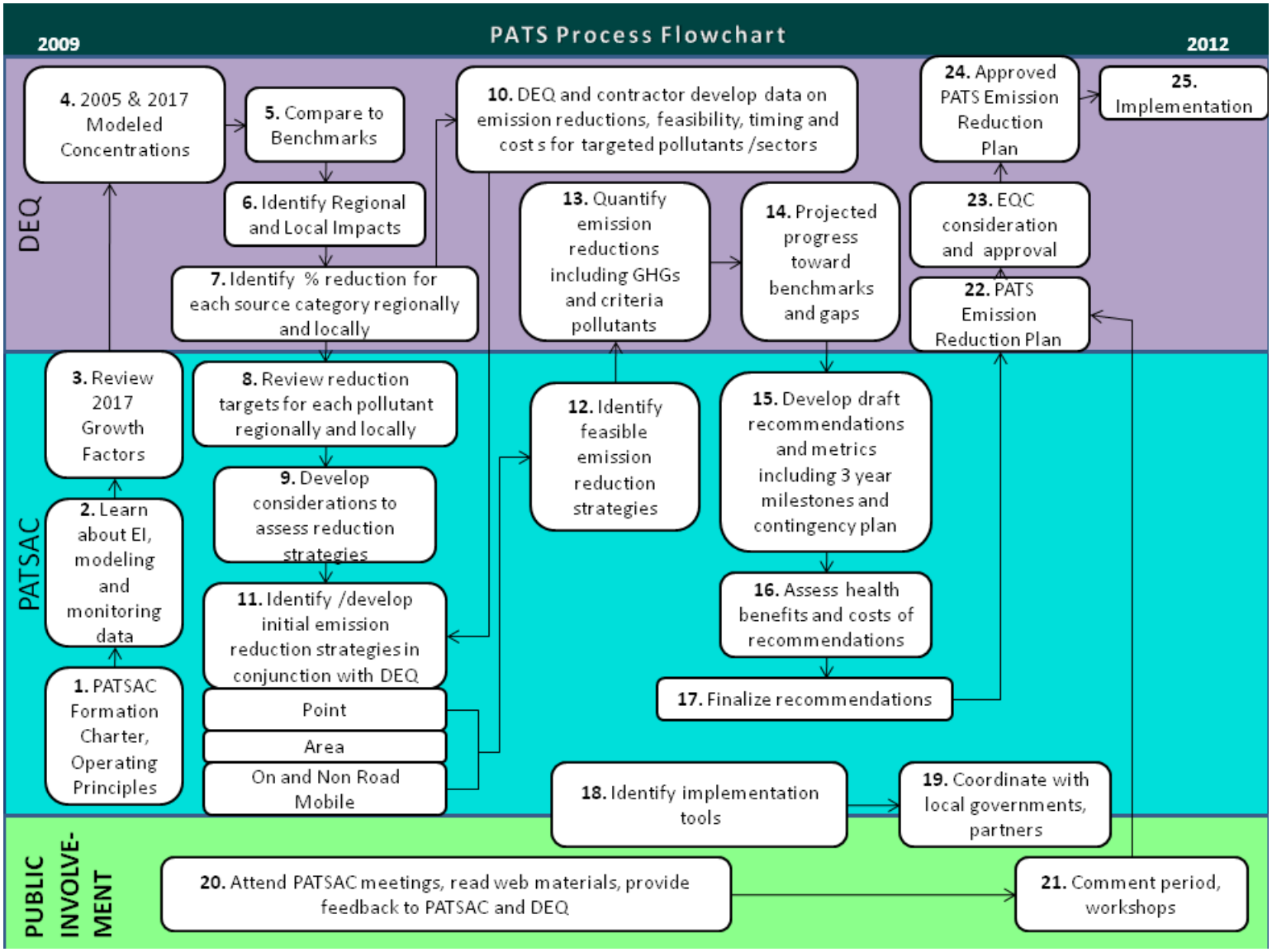
PATS Advisory Committee Ex-officio Members

Merlyn Hough, Lane Regional Air Protection Agency	Natalia Kreitzer, Southwest Clean Air Agency	Michael McNickel, Yamhill County Public Health
Bob Palzer, Sierra Club		

2.4.1.2 PATS Process Flowchart

Figure 1 illustrates the PATS process. The Process Flowchart is divided into three categories of activity: DEQ's, PATSAC's, and interested persons or the public. For reasons described in 2.2.1, Objectives and Progress, PATS reached partially into step 15 of the flowchart. The steps in the flowchart are described below.

Figure 1: PATS Process Flowchart



1. The first PATSAC step was formation, charter and operating principles. (See Appendix 2.2)
2. A concurrent early and ongoing step for the committee was building an understanding of data DEQ has developed to inform the PATS process. This data includes:
   - DEQ Air Toxics Benchmarks (See section 3.2)
   - Emission Inventory (2005 base year, 2017 projection) (See section 3.4)
   - Modeling (2005 base year, 2017 projection) (See section 3.5 for an overview and section 4 for modeling results)
   - Monitoring (2005 base year) (See section 3.6)
3. PATSAC and DEQ reviewed draft 2017 growth assumptions for air toxics in the PATS study area. (See section 3.4) This information is the foundation and base case for understanding source category contributions and emission reduction strategies. 2017 growth assumptions include:
   - Projections for economic recovery and growth, including population growth
   - Existing emission control regulations
   - Emission control regulations to be phased in from 2011 to 2017

4. After PATSAC gave DEQ feedback to fine-tune the 2017 growth assumptions, DEQ used the emission inventory and the PATS model to generate 2017 estimated concentrations. 2005 was used as a base to estimate 2017. (See section 3.5 for a modeling overview and section 4 for modeling results)
5. DEQ compared 2017 modeled concentrations throughout the PATS study area to ambient benchmark values, which serve as air toxics clean air goals. DEQ compared modeled concentrations rather than modeled exposures to the benchmarks. Air toxics regulations direct DEQ to use concentrations to determine progress toward benchmarks, which is more conservative and protective of human health. Modeled concentrations also compare better to monitoring data. See section 4 for further discussion of modeled concentrations vs. modeled exposure concentrations.
6. DEQ's analysis of modeling data considered average concentrations across all census tracts, as well as localized impacts in much smaller areas of one to several census tracts.
7. & 8. DEQ calculated how much emission reduction is needed for each pollutant for each source category both regionally and locally, expressed as percentages. The reduction targets for each category are roughly commensurate with source category emission contributions. The targets do not take feasibility or economics into consideration, but serve as starting point for proposed reductions.
9. PATSAC developed criteria or considerations to evaluate emission reduction strategies. Several emission reduction plan criteria are listed in the air toxics rules. PATSAC also developed other important considerations for implementing emission reduction strategies. Several considerations became core concepts to evaluate potential reduction strategies. (See section 2.4.3)
10. & 11. Through brainstorming, assistance from DEQ's contractor Eastern Research Group and consultation with partners, PATSAC and DEQ developed a comprehensive list of potential emission reduction strategies.(See section 6 and Appendix 12.9) DEQ and Eastern Research Group analyzed emission reduction strategies for priority categories in a series of white papers. This assured that PATSAC could consider a full array of emission reduction options and have more detail in technical areas than DEQ would otherwise be able to support. DEQ and the contractor developed white papers detailing potential emission reduction strategies. (See section 6 and Appendix 12.9)
12. PATSAC discussed roughly commensurate reductions from all categories and applying core considerations to engage in discussions towards draft recommendations. (for information on core considerations, see section 2.4.3) Because of the large number of sub-categories and pollutants, this was a high-level approach allowing a framework for future development.
13. The white papers quantify emission reductions from strategies where possible, including greenhouse gases, ozone and particulate. (See section 6 and Appendix 12.9).
14. The white papers contain information on potential emission reductions and potential gaps between emission reductions achievable and the target benchmarks. (See section 6 and Appendix 12.9)
15, 16 & 17. Considering committee comments, DEQ drafted the next steps for emission reductions. Health benefit assessment, milestones and contingency planning will follow as DEQ and partners are able to address emission reduction planning for priority categories.

18 &19. During development of the emission reduction plan, DEQ and the committee identified implementation tools and coordination with local governments and partners needed for implementation. DEQ requested that committee members begin the process of coordinating with their organizations and working to identify implementation tools early in the process.

20. In the area of public involvement, DEQ encouraged interested persons to engage in the meetings, become informed and provide feedback. A public comment period was held at every meeting. Committee members were responsible to engage with their affiliated colleagues and interested persons.
21. After assembling a draft proposal, DEQ will host public workshops and conduct a comment period on the recommended plan.
22. DEQ will take PATSAC recommendations and public input to form a final proposal for PATS emission reduction planning.

23 & 24. The Environmental Quality Commission will have an opportunity to learn about, discuss and approve the final PATS emission reduction plan.

25. Because air toxics are produced by many of the same sources that produce, particulate, ozone precursors and greenhouse gases, DEQ will work with partners to link efforts to reduce all of these pollutants in a comprehensive approach to maximize co-benefits.

2.4.2 Elements of the PATS Emission Reduction Plan

The following plan elements are identified in Oregon Administrative Rule (OAR) 340-246-0170. PATSAC considered each of these possible plan elements in discussing potential emission reduction strategies. These elements will continue to guide development of emission reduction strategies for priority categories.

Voluntary and Mandatory Strategies. The plan may contain a mix of voluntary and mandatory emission reduction strategies that may be administered region-wide or in separate jurisdictions. Depending on the type of source, the plan may include public education, pollution prevention, economic incentives and disincentives, technical assistance, local ordinances and DEQ regulations.

Proportionality. The plan must include emission reduction measures that are roughly commensurate with source contributions, considering relative emissions, toxicity, exposure, technical feasibility, cost effectiveness, public health and the economic impacts air toxics have on public health and equity. The plan will include commensurate reductions from point, area and mobile sources. The commensurate contribution from any particular source or source category will vary depending on whether the impacts are evaluated at a regional or local level. Both scales are valid and must be evaluated.

Milestones. The PATS emission reduction plan will include milestones to be evaluated by DEQ and PATSAC representatives. If DEQ finds lack of progress at designated milestones, it will consult with PATSAC to evaluate the need for corrective measures.

Regulatory Coordination. The plan elements must be coordinated with other local, state and federal requirements to the extent possible.

Data Elements. If necessary, the plan will include specific recommendations to develop ongoing emissions inventory or ambient monitoring to track local air toxics trends.

Address Wide-Spread and Localized Impacts. The plan must include strategies to reduce concentrations of air toxics above ambient benchmark concentrations in smaller portions of the geographic area, as well as pollutants causing risk above benchmarks throughout the study area.

Contingency Plan. The plan must include a contingency plan to be implemented if the year six evaluation shows lack of progress toward milestones and is projected to fall short of the ten year goals. The contingency plan must include, but is not limited to, re-evaluation of planning assumptions, evaluation of existing conditions and effectiveness of emission reduction strategies and new or progressively more stringent strategies to be considered.

2.4.2.1 Issues Included in PATSAC Consideration

In considering emission reduction strategies, PATSAC used monitoring and modeling analyses to understand air toxics in the study area, including distribution of concentrations, causes, and potential solutions. PATSAC considered solutions for the entire study area as well as smaller areas where people are exposed to air toxics above benchmarks because of localized source emissions. Based on DEQ's environmental justice analysis,

PATSAC also began to consider adverse impacts on sensitive or vulnerable populations and environmental justice communities.

2.4.2.2 Issues not Directly Related to PATSAC Recommendations

To focus the scope of the PATS project, DEQ did not seek direct recommendations on the issues listed below. However, DEQ documented committee input on these issues and, when possible, will refer them for follow-up in an appropriate forum.

- Ambient benchmark concentrations
- Statewide air toxics regulations
- Conditions to be placed directly in the permit of a specific regulated source, though strategies may include pollution reductions from types of stationary sources identified as significant contributors to ambient concentrations and exposures above benchmarks.
- Worker exposure
- Measures specifically designed to improve indoor air quality

2.4.3 Emission Reduction Considerations/Criteria

The advisory committee and DEQ used "core" considerations, as well as a number of other important considerations, in developing recommendations. The core considerations include the magnitude of reductions achieved by a strategy, the timeframe to reduce emissions, the technical feasibility of a strategy, and the cost of a strategy. All of the considerations are listed in section 2.4.3.2.

2.4.3.1 PATS Threshold Regulatory Requirements

DEQ regulations directed DEQ and the advisory committee to focus in certain areas:

- The PATS emission reduction plan must focus on air toxics measured or modeled above ambient benchmarks in the PATS study area. (OAR 340-246-0170 (4)(1))
- Mandatory emissions reduction strategies must be commensurate with source contributions, considering relative emissions, toxicity, technical feasibility, cost-effectiveness and equity. (OAR 340-246-0170 4(f)). The methodology for considering percent reduction targets used percent contributions for each category and ranked them according to total risk achieved commensurate reduction goals.

2.4.3.2 Considerations

PATSAC and DEQ developed a list of considerations as an informal tool to evaluate toxics reduction strategies. DEQ expects that these considerations will be useful to future stakeholder groups tasked with developing emission reduction strategies.

1. **Effectiveness**
   a. **Magnitude**: amount of each air toxic reduced by the strategy.
   b. **Timeframe:** Length of time required by strategy to reduce emissions. How readily are results measureable? (OAR 340-246-0179 4(d))
   c. **Effect on exposures**: How well does the measure target spatial extent of the emissions? Some reductions may have more pronounced effects on localized concentrations; others may do more to reduce pollutants area-wide. (OAR 340-246-0170 4(g)). Ability to address short term or acute exposures if relevant.
   d. **Pollution prevention**: Where does the strategy fit in the pollution prevention hierarchy? 1. Modify the process, raw materials, or product to reduce the quantity and toxicity of air contaminants generated. 2. Capture and reuse air contaminants. 3. Treat to reduce the quantity and toxicity of air contaminants released. (OAR 340-246-0050)
   e. **Other pollutants**: Effect of measure on criteria pollutant emissions, greenhouse gas emissions, and

emissions of other priority toxic substances on the DEQ Agency Wide Toxics List

2. **Implementability/Feasibility/Barriers**
   a. **Legal authority**: Does the measure fall under existing regulations or are new laws/ rules required? Does federal pre-emption preclude new laws/rules? Is/will the proposed measure be addressed through other planned Federal, state, or local rulemaking or other processes?
   b. **Technical feasibility**: How well will the emission reduction measure work from an engineering and/or logistical perspective? Is the technology or fuel readily available? (OAR 340-246-0170 4(f)). Is the technology EPA or third party verified/certified?
   c. **Funding**: What is the cost to DEQ or other agency to implement the measure? How could the agency cost be funded? How certain is the funding mechanism?
   d. **Implementation**: Is there a ready structure for implementation or ability to coordinate with existing programs?
   e. **Acceptance**: Is there public and stakeholder support for the measure?
   f. **Non-regulatory approaches**: Could the measure be implemented through incentives or education? Is there an opportunity to implement the measure through a community-based multi-stakeholder collaborative process? Could the measure begin as voluntary and later become mandatory as necessary in a contingency plan?

3. **Cost**
   a. **Cost**: What is the cost of emission reduction measure and implementation (OAR 340-246-0170 4(f))? If the measure is a regulation, what is the cost of compliance? If the measure is an incentive, what is the cost of the incentives?
   b. **Cost effectiveness**: What is the cost per unit of air toxics reduced?
   c. **Other environmental impacts**: Potential for the emission reduction measure to transfer pollutants to soil or water, or cause harm to human health or the ecosystem.
   d. **Energy**: Effect of measure on energy use.
   e. **Public safety**: What is the affect of the measure on public safety? For example, would emission reductions restrict activities related to adequate lighting, heat, ventilation, signage or access to emergency services?
   f. **Indirect economic costs**: What are the potential indirect costs to communities, the local economy or business sectors?

4. **Benefits**
   a. **Health**: What are the health benefits of meeting the benchmarks? This could be measured as the number of cancer cases avoided and/or value of statistical life and medical costs avoided.
   b. **Livability**: Improved quality of life associated with improved nuisance conditions such as odor or noise.
   c. **Indirect economic benefits**: What are the potential benefits to communities, the local economy or business sectors?

5. **Distribution of Benefits and Costs**
   a. **Risk distribution**: Could the measure change the social distribution of risk in the PATS area, i.e. sensitive populations and environmental justice communities?
   b. **Cost distribution**: Could the measure impose disproportionate costs or economic impacts to environmental justice communities in the PATS study area?

2.5 Next Steps and Implementation

2.5.1 The Plan is a Framework

The framework of the Portland Air Toxics Solutions plan relies on three action pathways that strategies and recommendations can follow. These are: (1) strategies that are ready to implement, (2) strategies that need refinement prior to implementation, and (3) strategies to improve the information for a pollutant. The three action pathways are described in detail below and illustrated in Figure 2 on page 13. For information on the prioritized source categories and recommended strategies, please refer to section 9, "Next Steps." Given the reality of implementation timeframes and resource limitations, DEQ will only be able to commence strategies as resources allow.

2.5.1.1 Ready to Implement Emission Reduction Strategies

These strategies are well defined, do not require additional development or rule authority, and can be implemented immediately or have begun and are directly related to PATS goals. Examples include:

- Point – The ESCO metal facility "alternatives analysis" process. ESCO negotiated directly with the Northwest District Association and Neighbors for Clean Air regarding a number of emission control improvements. The final negotiated improvements and implementation schedule were incorporated into ESCO's Title V permit renewal.
- Area – Area source NESHAPs (recently adopted), Heat Smart Rules (wood stove rules). With NESHAPs, there is a three-year duration for the NESHAP inclusion into the permit and compliance by the source.

2.5.1.2 Strategies That Need Refinement

This action pathway includes strategies need further scoping, rulemaking, funding, development, or data refinement. This also includes source categories where a strategy or strategies needs to be selected to achieve emission reductions. In many cases, DEQ will need to convene advisory committees related to the specific source sectors, and possibly the source categories themselves. The members of these committees may include members of PATSAC, in addition to technical support staff and local government staff. Each of these committees would be tailored to the expertise that would be most appropriate for aiding in the development or selection of the strategy. Examples include:

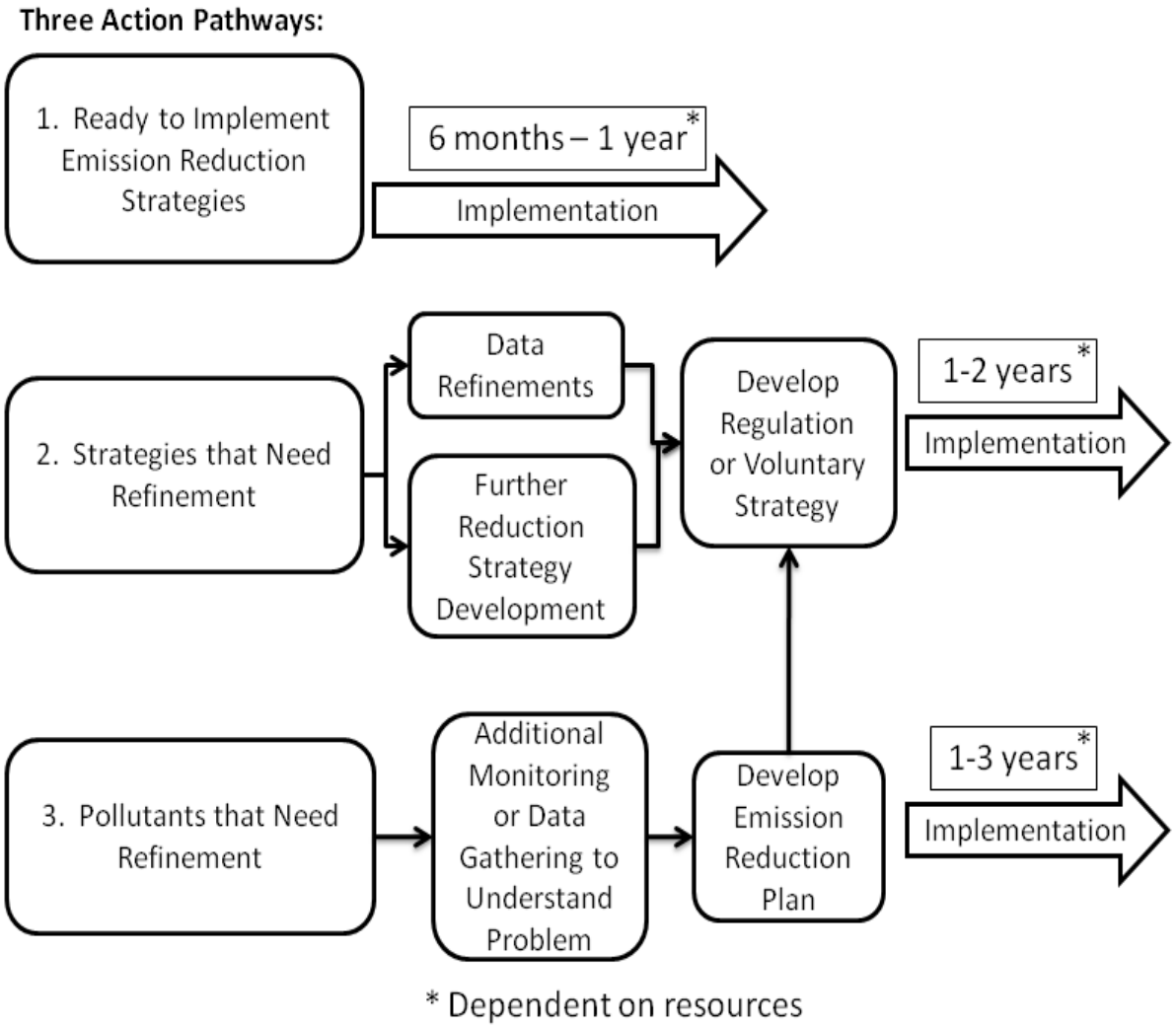
- Area – Strategy implementation of any rule or incentive program would require further development.
- Mobile – Vehicle miles travelled reduction strategies (Metro) are currently under development, but analysis will continue beyond 2011 (House Bill 2001).
- Point – The strategies will be identified here at the framework level, but will be referred to another advisory committee potentially resulting in a rule for the specific point source. It typically takes up to one year for data refinements, another year for the rule making, and up to a two additional years for compliance.

2.5.1.3 Pollutants That Need Refinement – Monitoring, Research, or Data Gathering to Understand Problem

This action pathway includes recommendations for additional monitoring or data gathering to understand various pollutants and problems. This implementation pathway is resource intensive, requiring analyses from agency staff as resources allow. Examples include:

- Methylene chloride – the emission factors from the EPA need refinement. DEQ will need to better understand how much methylene chloride is still in use in the Portland area.
- Cadmium – understanding emission sources in the PATS study area.

Figure 2: Three Action Pathways for PATS Recommendations



2.5.2 Environmental Quality Commission Approval and Public Comment

Following a notice and public comment period, DEQ will present the PATS air toxics emission reduction plan to the Environmental Quality Commission. Because the plan will address many pollutants from many source categories through many emission reduction strategies, it will serve as a framework for reducing air toxics within the PATS study area. If the Environmental Quality Commission approves the plan, DEQ will work with local governments, other state agencies, the Oregon Legislature, the federal government and others to develop the programs needed to implement the plan. This work will take additional time, and will include additional advisory committees engaged in recommending emission reduction strategies.

9. PATS Emission Reduction Plan, Next Steps

9.1 Introduction

The PATSAC provided DEQ with valuable input and a wide diversity of opinion on the developing PATS emission reduction plan. Committee members participated in many challenging discussions on emerging science, problem definition and potential solutions, and as a result have helped inform and contribute to the proposal for emission reductions and implementation stated in this section. DEQ fully considered input from PATSAC and incorporated much of the committee's input in the technical study and emission reduction plan. DEQ understands through comments received and group discussion that many PATSAC members support the next steps stated in this section. However, this section does not represent the views of all PATSAC members and DEQ in no way implies that is endorsed by all members. Written PATSAC comments including letters of support and opposition received during the committee process are in Appendix 10.13. DEQ will seek further comment from the public and stakeholders before finalizing this proposal for presentation to the Environmental Quality Commission.

This emission reduction plan is organized in the following sections: a ranking of 2017 total risk from categories area wide and locally, a list of recommended actions, including ongoing and imminent actions, a prioritized set of categories needing follow up action expressed as a short term and longer term plan, and future process recommendations for high priority categories in the short term plan.

The prioritized source categories will guide DEQ and actions of partners to reduce toxics; however DEQ and others may take advantage of additional emission reduction opportunities as they arise. For example, revisions to the federal ozone standard could cause additional ozone planning in the Portland area. Reducing ozone precursors will reduce multiple air toxics in the Portland area. It can also reduce precursors to secondary formation air toxics such as formaldehyde and acetaldehyde. Oregon DEQ can also work with Washington air agencies to address significant levels of background pollutants that are transported regionally, such as benzene. In addition, many efforts to reduce greenhouse gases will also reduce air toxics, and there are opportunities to maximize co-benefits through coordinated planning.

Because many air toxics emission reductions are achievable only through partnerships, PATSAC and DEQ respectfully request the assistance from agencies and partners named in this report. For each one of the priority source categories needing follow up action, DEQ or partners will conduct additional stakeholder consultation and outreach to the affected sectors and public. This follow up consultation will be more detailed for each category and give stakeholders a chance to refine data, further investigate and analyze emission reduction options, and apply the full spectrum of PATSAC considerations (Appendix 10.2.3) in evaluating reduction plans.

9.2 Ranked Source Categories based on Modeled Total Risk

Oregon air toxics regulations outlining requirements for a local emission reduction plan specify that the plan will address both area wide and localized risk from air toxics emissions. The modeling results, source category rankings and emission reduction targets for both area wide and local impacts are detailed in chapters 4, 5 and 6 of this report. To perform an initial ranking or prioritization of source categories area wide, DEQ analyzed 2017 projected total risk for all source categories at the 80th percentile of emission concentrations. This is shown in the first column of Table 44 below. The second column shows the white paper categories that match the ranked source categories. After each category the number in parentheses shows a total times above benchmarks for all pollutants from that category. For each significant category of air toxics emissions, DEQ with the assistance of contractor Eastern Research Group developed white papers to provide a survey of initial information on existing and potential emission reduction strategies. The white papers are summarized in chapter 7 and are available as links in Appendix 10.9.

In the PATS model estimated air toxics concentrations are distributed in different patterns throughout the region. Some pollutants are distributed uniformly; others track roadways or residential density to form zones of higher concentrations. In a few areas, the PATS model estimates higher concentrations of pollutants from industrial activities causing local impacts. In the Portland area, the unique local industrial impacts are limited to several metals related to casting and metal production. To perform an initial ranking of these localized impacts, DEQ analyzed total risk for metals that were present only in isolated groups of census blocks. This analysis was performed at the 98th percentile to generate point source emission reduction targets at the highest and closest impacted receptors for metal pollutants. The localized impact results are in Table 45 , showing the category of point sources followed by the white paper category of metals facilities. While on road mobile and residential wood emissions also showed localized impacts in the concentration maps, the model output did not provide enough information to formally delineate these impacts. On road mobile emissions, while distributed throughout the study area, can result in elevated localized impacts in areas with high volume and congestion. Residential wood combustion causes some of the highest risks throughout the study area and can cause high localized impacts in denser residential areas with less air circulation where many residents burn wood, especially in older uncertified stoves. Further investigation and data refinement will lead to greater understanding of all localized impacts.

Table 44: 2017 Total Risk for all Source Categories at the 80th Percentile Emission Concentrations

Area Wide All Pollutant Ranking (Times Above Benchmark 80th Percentile)	White Paper Category Detail (Times Above Benchmark 80th Percentile)
1. Residential Wood Combustion (38)	Residential Wood Combustion (38)
2. On Road Mobile (35)	1. On Road Mobile Gas (29) 2. On Road Mobile Diesel (6)
3. Area Other (24) Note: risk in this category is dominated by structural fires, most of which are accidental. As a result, this category is not a top priority.	1. Industrial Fuel Use (2) 2. Residential Heat Non Wood (1) 3. Asphalt Use (1)
4. Construction (12)	1. Construction Diesel (11.5) 2. Construction Gas (0.5)
5. Non Road Mobile Other (11)	1. Non Road Mobile Diesel (6) 2. Non Road Mobile Gas (5)
6. Lawn & Garden (10)	1. Non Road Mobile Diesel (9) 2. Non Road Mobile Gas (1)
7. Solvent Use (7)	1. Solvent-Coating (4) 2. Consumer Products (3)
8. Point (5)	Point (5)
9. Airport (3)	Airport (3)
10. Rail (2)	Rail (2)
11. Residential Open Burning (2)	Residential Open Burning (2)

Table 45: 2017 Total Risk from Metals for all Source Categories at the 98th Percentile Emission Concentrations

Localized Impact Pollutant Ranking (Times Above Benchmark 98th Percentile)	White Paper Category Detail (Times Above Benchmark 98th Percentile)
Point (5)	Metals Facilities (5)

9.3 Ongoing or Imminent Strategies

DEQ recognizes that government partners implement multiple measures that currently or imminently will reduce air toxics in the Portland Area. The following section lists many of the actions that more directly affect air toxics. DEQ supports the continued implementation of these measures. Appendix 11.12 provides additional detail on some of these measures.

9.3.1 Removal of Uncertified Woodstoves upon Home Sale

Heat Smart is a DEQ program that accelerates the change out rate for older more polluting woodstoves. As directed by Oregon's Legislature, homeowners are required to remove and destroy any uncertified woodstove when they sell their home. As housing stock turns over, uncertified stoves will be slowly removed. This regulation is part of a program to help protect Oregonians from uncontrolled wood smoke that results from the use of old, polluting and inefficient uncertified woodstoves. It was adopted to help meet the federal fine particulate air quality standard, but will also help reduce air toxics like 15 PAH and benzene.

9.3.2 Low Emission Vehicles

Oregon's Low Emission Vehicle (LEV) standards as adopted by DEQ took effect with the 2009 model year and will reduce greenhouse gas emissions from new light duty vehicles by 30% when fully effective in 2016. Reductions achieved a net savings to vehicle owners through improved fuel efficiency. The LEV rules also reduce traditional pollutants (VOC, NOx) and toxic air pollutants such as benzene, and include requirements for increasing numbers of Zero Emission Vehicles such as Battery Electric Vehicles and Plug-in Hybrids.

9.3.3 Oregon Low Carbon Fuels

Oregon statutes allow DEQ to adopt low carbon fuel standards, which would reduce the carbon intensity (i.e. greenhouse gas emissions per unit of fuel energy) of Oregon's transportation fuels by 10% over a 10-year period. DEQ convened an advisory committee to provide input on the structure and design of a low carbon fuel standard program. DEQ and the advisory committee evaluated various scenarios that represent different ways (traditional and cellulosic biofuels, compressed natural gas, electricity as a transportation fuel, etc.) the state could comply with a low carbon fuel standard. Depending on the mixture of fuels, especially electricity, there is potential for low carbon fuels standards to decrease air toxics in the Portland area. Rulemaking to implement this program may be considered during 2012.

9.3.4 Land Use and Transportation Planning

Metro is responsible for long-range land use and transportation planning for the region and sets policy for the Portland region in cooperation with local governments and transit providers who need to implement the policy. Updates occur through the Regional Transportation Plan (RTP), which identifies specific transportation projects to be built over the next twenty years. Metro will update the RTP in 2013-2014 and incorporate measures to reduce greenhouse gas emissions from vehicles. Those measures will also reduce mobile source air toxics. Metro is also interested in quantifying air toxics reductions. Transportation and land use objectives are interdependent and therefore the two planning processes are coordinated at both the regional and local levels. Metro's Regional Transportation Functional Plan and Urban Growth Management Functional Plan provide direction to local governments and other partners and are the basis for determining consistency with regional plans and policies. As a member of the Metro committee, DEQ participates in the transportation planning process.

Metro conducts many other activities that help reduce air toxics emissions by decreasing vehicle miles traveled, supporting transit use or tracking changes in air toxics emissions. These are summarized in Appendix 10.12, and include:
- The 2040 Growth Concept
- The Regional Travel Options Plan
- Metro's Transit Oriented Development Program
- The Regional Transportation Plan Update
- Drive Less Save More

TriMet, the region's transit authority, engages in transit planning through its Transit Investment Plan (TIP), a five year planning process updated annually on a rolling basis. TIP priorities help reduce air toxics emissions by increasing frequency, accessibility and connectivity of the regional transit system. The TIP describes the investments in service, capital projects and customer information necessary to meet regional transportation and livability goals. The TIP provides local governments with a guide for their planning processes so they can leverage TriMet's investment with transit-related infrastructure such as sidewalks and safe street crossings. The TIP includes the following four priorities:

1. Build the "Total Transit System" by enhancing customer information, access to transit, stop amenities, frequency, reliability, passenger comfort, safety and security;
2. Expand high-capacity transit by investing in light rail, commuter rail and streetcar service along key corridors to connect regional centers;
3. Expand Frequent Service by adding to TriMet's network of bus lines that run every 15 minutes or better;
4. Improve local service by working with local jurisdictions to improve transit service in specific local areas.

9.3.5 Oregon Greenhouse Gas Scenario Planning

The 2009 Oregon Legislature adopted HB 2001 which requires Metro to do greenhouse gas scenario planning. In 2010, the Legislature adopted SB 1059, a statewide, comprehensive bill aimed at reducing greenhouse gas emissions from transportation. This bill expanded voluntary scenario planning to the other five metropolitan planning organizations and required the Oregon Transportation Commission to adopt a statewide greenhouse gas strategy for transportation. The goal of Senate Bill 1059 is to set interim year 2035 goals to ensure that transportation and urban planning-related greenhouse gas reduction activities are on the trajectory to meet the statewide goal of reducing greenhouse gas emissions in the year 2050 by 75% of 1990 levels The Oregon Land Conservation and Development Department set light duty vehicle miles traveled reduction targets for the Metropolitan Planning Organizations in June 2011 in order to meet the 2035 goals. The strategies developed through greenhouse gas scenarios planning or the statewide greenhouse gas transportation strategy will likely have co-benefits for air toxics.

9.3.6 City of Portland and Multnomah County Clean Diesel Contracting Specifications

The City of Portland and Multnomah County are exploring opportunities to reduce diesel emissions associated with publicly funded construction projects. Potential strategies include financial incentives, as well as bid language and contract specifications encouraging private contractors working on City and County projects to utilize clean diesel equipment (e.g. new

engines, exhaust retrofits). The City and County are currently pilot testing a variety of approaches to clean diesel contracting. The County has piloted a clean diesel contracting requirement at its East County Courthouse project, a $19.5 million construction project in the Rockwood neighborhood in Gresham. The knowledge and experience gained through these pilot projects, as well as ongoing engagement with stakeholders in the construction community, is helping the City and County identify viable clean diesel contracting options for the future that: are cost effective; ensure a fair bidding process; and mitigate impacts on small subcontractors and minority, women and emerging small businesses.

9.3.7 TriMet Fleet Improvements

TriMet has and continues to improve the operation of their bus fleet by reducing diesel fuel consumption and emissions, including air toxics. See Appendix 10.12 for more information on TriMet fleet improvements.

9.3.8 Washington County

Washington County designs roads and bridges to optimize traffic flow to save gas, reduce air pollution, and shorten commute time by using low impact designs wherever possible. These measures also reduce air toxics. New highway projects always include significant bicycle and pedestrian facilities. Other measures include road recycling, roundabouts, signal and streetlight efficiency, and development for cyclists and pedestrians.

Washington County's Long Range Planning Division provides community land use planning for rural and unincorporated Washington County. With transit corridor and station area planning, and bike and pedestrian planning, it integrates a mix of land uses and densities that result in more complete communities with multiple transportation options that could reduce VMT and air toxics.

Washington County's Department of Land Use and Transportation (LUT), supported by a U.S. Department of Energy (DOE) Energy Efficiency Community Block Grant (EECBG), is conducting a process to evaluate its land use and building codes to identify how energy efficient and sustainable development may be better supported. Improvements in both of these areas could reduce air toxics. (Source: Washington County website: http://www.co.washington.or.us/Support_Services/Sustainability/)

9.3.9 Clackamas County

Clackamas County has upgraded many of its heavy duty diesel vehicles for road construction and maintenance. Clackamas County is deploying grant funds to retrofit solid waste and recycling collection vehicles operating in the region. The Clackamas County weatherization program decreases air toxics emissions from home heating.

9.3.10 Other Ongoing DEQ Actions

DEQ implements several other regulatory, outreach and incentive programs that reduce air toxics in the Portland area on an ongoing basis. They include implementation of:

- National Emissions Standards for Hazardous Air Pollutants (NESHAPS) for many categories of industrial and commercial activities including autobody shops, gas stations and dry cleaners (http://www.deq.state.or.us/aq/bap/neshap.htm)
- A Small Business Assistance Program (http://www.deq.state.or.us/aq/bap/index.htm)

- The Vehicle Inspection Program (http://www.deq.state.or.us/aq/vip/)
- The Employee Commute Option Program (http://www.deq.state.or.us/nwr/ECO/eco.htm)
- As part of the Portland Ozone plan, permit limits on volatile organic compounds which are ozone precursors, and many of which are air toxics
- Agency-wide toxics coordination, prioritization and reduction planning

9.4 Priority Categories for Emission Reductions

In collaboration with PATSAC, DEQ has prioritized five categories of emission sources shown below for near term follow up action, including stakeholder consultation, planning and emission reduction actions. This prioritization is based on the categories shown in Table 44 and Table 45 according to total modeled risk, practicability of emission reductions, and the directive in Oregon air toxics regulations to address both area wide and localized risk. Even though it ranked third in level of modeled risk, the category called "Area Other" was not included in the top five categories because most of the emissions are from structural fires, which are unpredictable and not practicable to control. In general, DEQ anticipates that emission reduction planning will occur in the near term categories in one to five years as resources allow.

The emission reduction plan also prioritizes remaining emission categories for longer term follow up action, including stakeholder consultation and emission reduction actions. These categories may contribute significant risk in various locations, but overall contribute much less risk than the five categories recommended for near term action. DEQ anticipates that emission reduction planning in the longer term categories will occur in five to ten years, as resources allow. This recommended prioritization is intended to guide the work of DEQ and partners. In no way is it intended to preclude development and implementation of important toxics and emission reduction opportunities as they arise or are initiated by partner agencies.

In the near term categories below, DEQ has designated "lead" and "support" agencies. A lead designation means an agency is recommended to convene the stakeholder process and follow up on emission reduction planning for the related category. Supporting agencies are recommended to work in partnership with the lead agency to assist with the stakeholder process and follow up.

9.4.1 Near Term Plan

- Residential Wood Combustion (DEQ lead with city and county support)
- On Road Mobile Light Duty (Metro lead on VMT reductions, DEQ lead on cleaner vehicles)
- On Road Mobile Heavy Duty (DEQ lead)
- Construction (DEQ lead with local government support)
- Industrial Metals (DEQ lead)

9.4.2 Longer Term Plan

- Non Road Mobile Other
- Lawn and Garden
- Solvent Use
- Area Other
- Point
- Airport
- Rail

- Residential Open Burning

9.5 Future Process for Near Term Categories

9.5.1 Residential Wood Combustion (DEQ lead with city and county support)

9.5.1.1 Risk contributed by the category

Residential wood combustion emits 75% of 15 PAH within the PATS area and contributes to both area-wide risk and localized impacts. The target reduction for 15 PAH from this category is 97%. Approximately half of this target can be achieved by implementation of the strategies where emission reductions have been quantified. Strategies where the emission reductions are unknown could reduce this gap.

9.5.1.2 Emission reduction plan

9.5.1.2.1 General

- With city and county support DEQ will convene a stakeholder process to identify and evaluate strategies to achieve the maximum feasible emission reductions, and recommend specific actions consistent with the PATSAC considerations, including cost effectiveness, feasibility and benefits analysis and options for ongoing improvement. This process will consider all of the recommendations to follow in this category, with the purpose of further exploring, evaluating and selecting actions for implementation.
- Conduct a residential wood heating activity survey targeted to the Portland Metro area.
- Following validation of the wood heating activity survey, develop a targeted regional campaign to raise awareness that RWC is a significant contributor to air toxics risk in the Portland region.
- Improve implementation of the uncertified woodstove change out program including improved outreach and incentives or requirements for replacement appliances.

9.5.1.2.2 Cleaner Fuel, Cleaner Burning

The following actions are recommended to achieve cleaner fuel and cleaner burning:

- DEQ and partners to develop community-based education efforts (e.g. Clean Burn Ambassadors) to train residents to reach neighbors on clean-burn techniques (certify them to assess opacity, educate on wood moisture, etc.) and communicate voluntary curtailment days during stagnant air episodes as a routine component of local weather reporting.
- DEQ to evaluate effectiveness of other jurisdictions' opacity regulations.

9.5.1.2.3 Cleaner Appliances

The following actions are recommended to achieve cleaner appliances:

- Government and private partners to create a stable long term fund for replacement of uncertified wood stoves, with emphasis on funding replacement in affected environmental justice communities.
- DEQ to coordinate with partners to advocate for funding assistance for wood stove replacements and weatherization programs, with emphasis on assistance to affected environmental justice communities.

- DEQ to advocate for strong national standards for new wood heating devices based on the best current technology and performance. If EPA standards are not adequate, DEQ to adopt more stringent state standards for new wood heating devices.

9.5.1.2.3 Less Wood Burning

The following actions are recommended to achieve less wood burning:

- DEQ and partners to assess the need for and access to weatherization programs and incentives for those who frequently (or primarily) heat with wood. If needed, develop new funding or target existing funding to weatherize homes that primarily or frequently heat with wood, with emphasis on weatherization in affected environmental justice communities.

9.5.1.3 Issues

Future consideration of emission reduction in this category will include the following issues:

- More information is needed to evaluate whether fuel quality and opacity requirements would effectively reduce wood burning emissions.
- Because there is a large gap between the emission reduction target and achievable reductions for this category, once the initial feasible strategies are implemented, DEQ and partners will need to establish a follow up process to revisit strategies and recommend implementation of technological advances.

9.5.1.4 Stakeholders and Partners

Stakeholders and partners in this category will include citizens, realtors, developers, wood burning and other heating appliance vendors, oil, electric and natural gas companies, city and county government, including health departments, building code agencies and planning departments.

9.5.1.5 Data and white paper refinement needs

The following actions are recommended for data refinement:

- DEQ to develop more complete emission inventory information about PAH emissions from fireplace use.
- DEQ to develop more information on the composition of and emissions from artificial logs.

9.5.2 On Road Mobile Light Duty (Metro lead on VMT reductions, DEQ lead on cleaner vehicles)

9.5.2.1 Risk contributed by the category

The pollutants contributing the majority of the risk from this category and their associated on road mobile contributions are 15 PAH (10%), benzene (14%), 1, 3 butadiene (64%), arsenic (28%) and chromium (59%).

The target reductions for this category are 15 PAH 95%, benzene 86%, 1,3, butadiene 88%, arsenic 64% and chromium 24%. PATS modeling shows that emissions in this category contribute to concentrations above benchmarks area-wide, are higher in distinct zones near busy

roadways, and present localized impacts in areas of the highest traffic volume and congestion. The reductions available for this category are complex and difficult to quantify at this time.

9.5.2.2 Emission reduction plan

9.5.2.2.1 General

Because Metro currently leads regional transportation planning in coordination with government partners and affected parties, the stakeholder process for this category can be conducted through existing committees and procedures.

- Metro and DEQ to identify authorities, roles and responsibilities for implementing cleaner vehicles, cleaner fuels and decreasing VMT. In evaluating various strategies, Metro and DEQ to determine the most effective ways to coordinate and utilize authorities to implement air toxics reduction strategies.

9.5.2.2.2 Reduced VMT from light duty vehicles

The following actions are recommended to achieve reduced VMT from light duty vehicles:

- State agencies, Metro, and other public and private partners to identify sustainable funding to reduce VMT from light duty vehicles.
- Metro and the Joint Policy Advisory Committee on Transportation (JPACT) to incorporate air toxics reductions into existing VMT reduction planning, including greenhouse gas scenario planning required by HB 2001 and the Regional Transportation Plan.
- Under state greenhouse gas planning scenarios, Metro and JPACT to strive to achieve a per capita reduction of 20% of air toxics emissions from light duty vehicles by 2035, considering all of the recommendations in this section, with the purpose of further exploring, evaluating and selecting them for implementation. Metro and JPACT to select strategies consistent with the PATSAC considerations including cost effectiveness, feasibility, benefits analysis and options for ongoing improvement (Note: this target is consistent with the per capita target for greenhouse gas reduction adopted by the Land Conservation and Development Commission. For a link to statewide greenhouse gas reduction targets see Appendix 10.12.2)
- In developing corridor plans, ODOT, Metro and JPACT to seek additional VMT reduction (or offsetting air toxics reductions) in localized air toxics corridors identified in Section 6 of this report.
- Metro, ODOT, cities and counties and other partners to implement transportation demand management and system operation improvements (traffic incident management, electronic traveler information, traffic signal coordination, etc.)
- Metro to integrate public health, environmental, and environmental justice considerations early in the metropolitan planning process (e.g. evaluating and developing transportation and land-use plans and projects),
- ODOT to integrate public health, environmental, and environmental justice considerations early in the statewide transportation planning process with FHWA
- Metro and JPACT in consultation with TriMet to assess the following specific VMT reduction measures, and incorporate into the RTP as appropriate:
    - A transit service standard based on a needs assessment of transit dependent communities

- Programs and fare incentives to increase use of public transportation, including finding sustainable funding for the youth pass transit program in Multnomah County, which influences the next generation's transit choices;
- Stronger Employee Commute Options incentives, regulations or other programs to reduce home to work trips;
- Funding operating costs to increase service by allowing more flexible use of state and federal capital resources.

9.5.2.2.3 Cleaner vehicles

The following actions are recommended to achieve cleaner vehicles:

- DEQ to advocate for EPA adoption of strong national air toxics reductions in the next phase of light duty vehicle standards (Tier 3) covering 2017 to 2025.
- DEQ to adopt California's LEV III standards for the same period as a backup to federal standards in coordination with Washington.
- DEQ in cooperation with ODOE and ODOT to promote and facilitate development of infrastructure for low emitting vehicles.

9.5.2.2.4 Cleaner fuel

The following actions are recommended to achieve cleaner fuel:

- DEQ to evaluate life cycle air toxics from low carbon fuels (eg, biofuels, electric) and encourage fuels with co-benefits.
- DEQ to evaluate air toxics reduction potential, co-benefits with ozone precursors, cost-effectiveness, and legal authorities for reformulated gasoline in Western Oregon, Western Oregon-Washington, or statewide Oregon-Washington.
- State agencies, Metro and other public and private partners to promote and facilitate development of infrastructure for low emitting vehicles.

9.5.2.3 Issues

Future consideration of emission reduction in this category will include the following issues:

- Consider full life-cycle impact of electric vehicles (source of electricity, mining impacts, etc.)
- Account for air toxics reductions needed from metals associated with wear and tear during vehicle operation.
- Update the emission inventory to include current Metro transportation modeling, including the final configuration for the Columbia River Crossing bridge
- Review and consider recent developments with low carbon fuel standards and biofuel requirements.
- Review and consider co-benefits and potential conflicts of measures to reduce greenhouse gases and toxics, and to increase use of biofuels.

9.5.2.4 Stakeholders and Partners

Stakeholders and planning partners include the 25 cities, three counties and affected special districts of the Portland region, Oregon Department of Transportation (ODOT), DEQ, The Port of Portland, South Metro Area Regional Transit (SMART), TriMet, automotive, trucking, business, freight, transit rider organizations and other interested community representatives. Metro also coordinates on bi-state issues with the City of Vancouver, Clark County Washington, the Port of Vancouver, the Southwest Washington Regional Transportation Council (RTC), C-Tran, the Washington Department of Transportation, the Southwest Washington Clean Air Agency (SWCAA) and other Clark County governments.

9.5.3 On Road Mobile Heavy Duty (DEQ lead)

9.5.3.1 Risk contributed by the category

Most pollutants emitted by on-road heavy duty engines are risk drivers for the PATS study area as a whole, and diesel particulate is the main risk driver for this category. The target reduction for diesel particulate from heavy duty on road engines is 91%. With the maximum amount of engine turnover and alternate fuel engines, along with other strategies identified in the white paper in Appendix 10.9.1, it would be technologically possible to achieve almost all of this target reduction. However, engine turnover and retrofit solutions are costly and funding is not currently available.

9.5.3.2 Emission reduction plan

9.5.3.2.1 General

- DEQ will convene a stakeholder process to identify and evaluate strategies to achieve the maximum feasible emission reductions, and recommend strategies consistent with the PATSAC considerations including cost effectiveness, feasibility, benefits analysis and options for ongoing improvement. This process will consider all of the recommendations to follow in this category, with the purpose of further exploring, evaluating and selecting them for implementation.
- DEQ and partners to identify authorities, roles and responsibilities for implementing cleaner vehicles, cleaner fuels and using less fuel. In evaluating various strategies, DEQ and partners to determine the most effective ways to coordinate and utilize authorities to implement air toxics reduction strategies.
- DEQ and partners to identify opportunities for financial support of clean diesel activities.
- DEQ and partners to identify what role education and outreach can play in building acceptance of and action toward clean diesel projects, including building citizen and consumer demand for clean diesel.

9.5.3.2.2 Burn Fuel Cleaner

The following actions are recommended to burn fuel cleaner:

- DEQ and partners to develop a strategy to accelerate engine turnover, repowering and retrofit. DEQ and partners to assess the feasibility and effectiveness at all levels of government to incent or require clean diesel fleets for publically funded projects, including

franchised or contracted fleets. Important considerations include procurement and contracting rules, policy adoption processes, financial resources, and effects on small businesses.

9.5.3.2.3 Burn Cleaner Fuel

The following actions are recommended to burn cleaner fuel:

- DEQ and partners to evaluate alternatives and where effective, evaluate strategies to increase the fleet mix of alternative fuels and fuel engines.
- DEQ and partners to evaluate need for a technical clearinghouse on environmental benefits and effects of alternative fuels. See links in Appendix 10.11.

9.5.3.2.4 Burn Less Fuel

The following actions are recommended to burn less fuel:

- DEQ and partners to evaluate ways to increase efficiency on a gallons per ton mile or gallons per hour basis. This could include improving logistical and physical efficiency, for example Smartway, aerodynamics, scheduling and delivery, network efficiencies, truck only lanes, choice of other transportation modes.
- DEQ and partners to evaluate implementation of House Bill 2081 idling restrictions. If potential improvements are identified, DEQ and partners to present them to the Oregon Legislature for consideration.
- DEQ and partners to evaluate private and other jurisdictions' idle reduction programs that reduce air toxics concentrations in affected environmental justice communities.

9.5.3.3 Issues

Future consideration of emission reduction in this category will include the following issues:

- Upgrading older engines represents a very cost effective public health and environmental protection measure, but cost to individuals and businesses can be prohibitively high.
- With more advanced engines, maintenance is of increasing importance.

9.5.3.4 Stakeholders and Partners

Further work on this sector will require active participation and involvement by business and industry associations including the Oregon Trucking Association and Associated General Contractors, public health advocates, citizens and government, including ODOT, DEQ, the State Health Authority and local health agencies.

9.5.3.6 Data and white paper refinement needs

The following actions are recommended for data refinement:

- DEQ and partners to better understand the determinants of truck and vehicle turnover per duty cycle and application, e.g. medium versus heavy duty vehicles, drayage and short haul trucks, transit buses, school buses, specialty vehicles like refuse hauler trucks and cement trucks.
- DEQ and partners to evaluate the need for refinement of on road diesel data, including transit information.

9.5.4 Construction (DEQ lead with local government support)

9.5.4.1 Risk contributed by the category

Most of the risk from this category comes from diesel particulate and PAH. The reduction target for diesel particulate for this category is 92%. If every potential strategy were implemented, there would be no gap between the target and achievable reductions. However, engine turnover and retrofit solutions are costly and funding is extremely limited.

9.5.4.2 Emission reduction plan

9.5.4.2.1 General

- DEQ proposes that it will convene a stakeholder process to identify and evaluate strategies to achieve the maximum feasible emission reductions, and recommend strategies consistent with the PATSAC considerations including cost effectiveness, feasibility, benefits analysis and options for ongoing improvement. DEQ proposes that this process consider all of the recommendations to follow in this category, with the purpose of further exploring, evaluating and selecting them for implementation.
- DEQ and partners to identify and communicate authorities, roles and responsibilities for implementing cleaner engines, cleaner fuels and using less fuel. In evaluating various strategies, DEQ and partners to determine the most effective ways to coordinate and utilize authorities to implement air toxics reduction strategies.
- DEQ and partners to conduct a survey of construction equipment in the Metro area to better define the quantity, age activity levels and locations of each type of equipment. DEQ to use this information to improve the emission inventory and modeling, as appropriate, as well as target future emission reduction strategies.
- DEQ and partners to evaluate the design and effectiveness of a registration system to identify the use of equipment or construction projects within the Metro area.
- DEQ and partners to research the impact of high emitting used equipment that may be imported from California as a result of California's construction fleet emission standards. If this concern is significant, DEQ to identify options to address it.
- DEQ and partners to identify opportunities for financial support of clean diesel activities.
- DEQ and partners to identify what role education and outreach can play in building acceptance of and action toward clean diesel projects, including building citizen and consumer demand for clean diesel.

9.5.4.2.2 Burn Fuel Cleaner

The following actions are recommended to burn fuel cleaner:

- DEQ and partners to develop a strategy to accelerate engine turnover, repowering and retrofit.
- DEQ and partners to identify funding options in addition to DERA and Oregon tax credits, to retrofit and repower equipment and accelerate turnover to new equipment.
- DEQ and partners to assess the feasibility and effectiveness at all levels of government to incent or require clean diesel fleets and equipment for publically funded projects, including franchised or contracted fleets and equipment. Important considerations include procurement and contracting rules, policy adoption processes, and financial resources.

9.5.4.2.3 Burn Cleaner Fuel

The following actions are recommended to burn cleaner fuel:

- DEQ and partners to evaluate alternatives and where effective, evaluate strategies to increase the fleet mix of alternative fuels and fuel engines.
- DEQ and partners to evaluate the need for a technical clearinghouse on environmental benefits and effects of alternative fuels. See links in Appendix 10.11.

9.5.4.2.4 Burn Less Fuel

- DEQ proposes the following actions to burn less fuel: DEQ and partners to evaluate and assess the feasibility of idle reduction for construction equipment.
- DEQ and partners to evaluate private and other jurisdictions' idle reduction programs that reduce air toxics concentrations in affected environmental justice communities.
- DEQ and partners to explore options to reduce emissions per unit of work accomplished with efficiency measures.
- DEQ and partners to explore and communicate best practices with regard to operating and maintaining heavy equipment.

9.5.4.3 Issues

Future consideration of emission reduction in this category will include the following issues:

- There is uncertainty about emissions because of lack of information about equipment; an improved emission inventory is needed for this category.
- Most emissions in this category come from construction equipment with a slow turnover rate.
- With more advanced engines, maintenance is of increasing importance.
- Strategies involving use of biodiesel need to account for manufacturer warrantee restrictions.
- Contractors' equipment is tied to the valuation of their businesses so any measures need to consider effects on business valuation.
- Emission reduction strategies must consider special needs of small businesses.

9.5.4.4 Stakeholders and Partners

Further work on this sector will include active participation and involvement by business and industry associations and experts including the Associated General Contractors, construction, state and local government agencies, public health, neighborhood, and public interest representatives.

9.5.5 Industrial Metals Facilities (DEQ Lead)

9.5.5.1 Risk contributed by the category

Metals facilities account for essentially all of the manganese, nickel and lead, and most of the cadmium projected in 2017 concentrations that contribute to benchmark exceedances in localized impact areas. Other pollutants, such as arsenic, benzene, hexavalent chromium, and naphthalene emitted by metals facilities may be potential risk drivers in their immediate vicinity. Cadmium and arsenic are two pollutants with incomplete emission inventory data and in need of further refinement as described in 9.7. Depending on the local modeled impacts and varying between

facilities, the target metals reductions from metals facilities are 39% to 91% for manganese, 72% for nickel, 49% for lead, 89% to 95% for chromium, and 94% to 96% for cadmium. (See Section 6 on emission reduction targets.) Based on the current analysis, technically feasible options for reducing these metals can achieve reductions of emissions that are between ten and thirty percent of the targets. (See Section 7 on the overview of white papers.)

9.5.5.2 Emission Reduction Plan

The following actions are recommended for the Industrial Metals Category:

- DEQ to refine emission estimates for metals facilities that modeled over or near benchmarks for 2017, using facility-specific models, improved emissions characteristics and more detailed receptor locations.
- DEQ to encourage facilities with modeled impacts above benchmarks to make voluntary early reductions.
- DEQ to convene a stakeholder process to identify, evaluate and recommend strategies to achieve the maximum feasible emission reductions, including facility or category specific strategies consistent with PATSAC considerations. These strategies should encourage ongoing improvements in emission reductions, and, where appropriate, performance-based approaches.

9.5.5.3 Issues

Future consideration of emission reduction in this category will include the following issues:

- Because there are significant gaps between targets and feasible reductions, there is a need for more information on potential emission reduction technologies.
- The follow up process for this category should include additional modeling designed for industrial facilities.

9.5.5.4 Stakeholders and Partners

The future process for this category will include technical experts, representatives from the affected facilities, neighbors and affected public, health authorities, local government and DEQ.

9.6 Milestones and Contingency Plans

Milestones for PATS will help to identify the stages of completion for the various phases of work necessary to achieve the ambient benchmark concentrations. A contingency plan for PATS will be any plan designed to respond to changes in conditions that will affect meeting milestones. Because this phase of PATSAC recommendations contains priority categories and considerations rather than imminent emission reduction actions, milestones and contingency plans will be developed in the next phase of planning to address the priority categories.

DEQ will strive to develop milestones and contingency plans for each priority source category strategy. Milestones will be based on a ten year timeframe. They may be linked to DEQ's three year emission inventory updates or other relevant planning and assessment cycles. Milestones may be procedural at first, e.g. surveying emissions or activity levels, but will ultimately relate to targeted emission reductions for risk driver pollutants in each priority category. Upon completion of each three year emission inventory cycle, DEQ may assess the projected modeled emissions

reductions against the 10-yr goals for each priority category in the PATS project. Milestones will also be evaluated by analyzing any relevant monitoring data. Lack of progress in achieving emission reductions could result in re-convening PATSAC or other stakeholder group for re-evaluation of technical and planning assumptions.

A contingency plan may be designed to take effect at any time during PATS implementation, but at a minimum should be triggered during the sixth year of a ten year reduction plan based on lack of progress in reducing emissions or meeting milestones. Contingency plans will be developed in conjunction with milestones during development of emission reduction plans for each priority category. When developing contingency plans, government partners and stakeholders should consider the range of realistically possible scenarios including:

- What events may occur that require a response?
- What is the worst case scenario of events for the situation?
- What event would cause the greatest disruption of current activities and plans?
- What happens if changes occur that affect feasibility, for example changes in cost or technology?
- What happens in the event of change to an organization implementing parts of the emission reduction plan?

An example of an Ozone maintenance contingency plan triggered by an increase in vehicle miles traveled in the Portland region may be found at:
http://www.deq.state.or.us/aq/planning/docs/portlandSalemOzone.pdf.

9.7 Pollutants/Problems Needing Refinement

The PATS technical study highlighted several areas in need data refinement for better understanding of emissions, potential risks and possible emission reduction strategies. With assistance from EPA and other state and local partners, DEQ will follow up on developing more accurate information in the following areas:

9.7.1 Methylene Chloride

DEQ will work with EPA and stakeholders to develop a more accurate emission inventory for methylene chloride. This activity is linked to the DEQ 2011 air toxics emission inventory.

9.7.2 Secondary Formation Pollutants

DEQ will research literature on acrolein, formaldehyde and acetaldehyde to gain a full understanding of precursor chemicals and secondary formation of these pollutants in the PATS study area. In coordination with the Portland Ozone plan, DEQ will assess the effectiveness of reducing precursors to both ozone and secondary formation air toxics. DEQ will use the MOVES mobile source model for additional refinements for mobile source pollutants.

9.7.3 Cadmium

DEQ will use additional monitoring data, meteorological data and source data to better identify the sources of cadmium emissions in the PATS Study Area, especially in North Portland where monitoring data shows higher levels that do not correspond to modeled concentrations. See Model to Monitor Comparisons in Section 3.6.2 above. Once sources have been identified, additional cadmium reduction efforts may be included in the relevant source category follow up actions.

9.7.4 Arsenic

DEQ will use additional monitoring data, meteorological data and source data to better identify the sources of arsenic emissions in the PATS Study Area, especially in North Portland where levels are somewhat under predicted compared to monitoring data. See Model to Monitor Comparisons in Section 3.6.2. Once sources have been identified, additional arsenic reduction efforts may be included in the relevant source category follow up actions.

9.7.5 Additional Monitoring Studies

DEQ will continue to seek grant and other funding for additional air toxics monitoring to better characterize parts of the PATS study area and establish a more complete baseline for tracking future emission reductions.

9.8 Addressing Growth and Reduction Target Gaps

In discussion with PATSAC, DEQ has recognized several important future considerations for implementing emission reduction strategies. For many categories of emissions there are common potential future needs: 1) for continuous improvement in achieving emission reductions, 2) to respond to growth in emissions, 3) to provide the best quality information about air toxics, and 4) to mitigate exposures in ways that complement reduction strategies.

9.8.1 Reassess/Review Feasibility of Reductions to Address Gaps

In the categories of residential wood combustion and industrial metals emissions, technically feasible emission reduction measures were not sufficient to achieve reduction targets. While sufficient reductions are technically feasible in other categories, not all of these reductions may be consistent with the PATSAC considerations. However, through improved technologies additional reductions may be possible in the future. Methods to implement continuous improvement are therefore important to reach PATS emission reduction goals. Therefore, each strategy developed to reduce emissions from priority categories identified in section 9.3 will include a specific process for periodic review of improved technologies to address any gap between the target and the combined reduction actually achieved by all strategies for that category.

9.8.2 Address Growth that Exceeds 2017 Projections

The projected 2017 emissions inventory was created utilizing Metro growth factors. DEQ will need to periodically re-assess the actual growth and how that level of growth impacts emissions.

9.8.3 Improve Data and Access to Data on Source Contributions and Cumulative Impacts

DEQ used the best available technical information to estimate emissions from all sources in the Portland area. However the data contained many assumptions and in some cases was less certain. Along with partners, DEQ will work to improve the PATS emission inventory especially for priority categories with low quality and incomplete information. In addition, as more information and methods become available to assess cumulative impacts and risk from multiple air toxics, DEQ will use them to update the PATS technical study.

9.8.4 Find Opportunities to Mitigate Air Toxics Emissions

For some categories of emissions, stakeholders may want to consider mitigation measures to supplement emission reduction strategies. In general mitigation measures can include any actions that do not achieve quantifiable emission reductions but may decrease exposure or the impact of

emissions. Examples of these actions are adjusting activity or production schedules to times when fewer people would experience exposures, planting trees that would potentially decrease exposures, and land use or other planning that would increase the distance between emissions and people.