State of Oregon Department of Environmental Quality

Cleaner Air Oregon

Draft Fiscal Impact Statement

Fee Analysis

New fees are required to implement Cleaner Air Oregon. These fees would be paid by all currently permitted air quality sources and some currently unpermitted sources that would be required to get toxic air contaminant permits because of Cleaner Air Oregon.

Affected party involvement in fee-setting process

DEQ and OHA worked with a rules advisory committee that also served as the fiscal advisory committee in the fee-setting process. Representatives of both large and small businesses were on the fiscal advisory committee.

The fees were designed to generate the revenue necessary to support staffing resources authorized by the Legislature in SB 1541 (2018) for five years. These fee-funded positions would supplement existing staff resources, all of which are general fund funded. Cleaner Air Oregon cannot be implemented as proposed in this rulemaking without the fee revenue generated by the fees proposed in this rulemaking.

The budget report accompanying SB 1541 (2018) authorized eleven new positions, outlined in the table below, within DEQ to implement the Cleaner Air Oregon rules and program. The budget report also authorizes a fee revenue transfer to OHA to support 2.56 FTE.

Classification	Description of work	Positions	FTE 2017-19	FTE 2019-21
Environmental Engineer 3	Lead technical staff and permit writer. Leads TBACT analyses, coordinates regional permitting activities, reviews and approves permit attachments, develops internal training plan.	1	0.5	1.0
Natural Resource Specialist 4	Develops permit attachments in coordination with EE3 and regional permitting staff and conducts other Cleaner Air Oregon permitting functions as required.	3	1.5	3.0
Natural Resource Specialist 4	Provides technical assistance to sources on health risk assessment protocol development, reviews and approves health risk assessments.	1	0.5	1.0
Natural Resource Specialist 4	Provides technical assistance to sources on risk assessment modeling protocol	1	0.5	1.0

	development, reviews and approves risk assessment modeling protocols, and reviews and approves risk assessment modeling results.			
Natural Resource Specialist 4	Provides technical assistance to sources on air monitoring plan development, and reviews and approves air monitoring results.	1	0.25	0.5
Program Analyst 2	Provide specialized technical assistance to impacted parties (regulated entities and communities) on Cleaner Air Oregon regulations, and coordinates community engagement and notification functions.	2	1.0	2.0
Program Analyst 3	Lead staff on developing and implementing the area risk pilot program.	1	0.5	1.0
Information Systems Specialist 6	IT support (permit database updates integration and maintenance)	1	0.25	0.5
		11	5.0	10.0

Proposed fees

The agencies propose a fee structure with two elements; base and activity fees. The two elements correspond to input received from fee-paying stakeholders that the fees be predictable on a year-to-year basis *and* that the fees reflect that certain facilities (i.e., those actively working through the requirements) are receiving a higher level of service from the agencies.

In addition to fees that are part of this rulemaking, the 2018 Legislature authorized DEQ to collect a one-time supplemental fee to cover expenses of DEQ and EQC in developing and implementing Cleaner Air Oregon. The fees apply to any source required to obtain an air permit and is based on a percentage of the existing fees a permittee paid in 2017. Permittees will be invoiced for this fee in late summer of 2018.

Annual Base Fee: The proposed annual base fee would be assessed on all sources who currently hold an air permit (state Air Contaminant Discharge Permit or federal Title V permit). Base fees differ based on a facility's existing permit class. The proposed base fees are listed in detail below in Tables 1 and 2. While the dollar amount varies based on existing permit type, the Cleaner Air Oregon base fee would be *proportionately* equivalent (approximately 35% of existing fees in 2018) across permit categories. Note that Title V permit holders would pay a flat fee and an emissions-based (per-ton) fee. This is consistent with the existing approach to Title V permit fees.

Activity Fees: A schedule of one-time fees that correspond to elements of the draft rules that require agency review and/or approval. A "call-in" fee is levied on all sources at the time they are called in to the program and covers some of the agencies' costs associated with orienting a source to the program, reviewing risk assessment protocols and providing technical assistance. Additional activity fees are collected at the time a facility is seeking approval of risk assessment work and/or other approvals described in rule (e.g., risk reduction plan review, Toxics Best Available Control Technology review, monitoring protocol review etc.). Compared to draft fee

structures previously shared with stakeholders, the current proposed version separates the risk assessment fees from the risk management fees. This separation has made the fees additive. For example, if an owner or operator must do a Level 4 risk assessment and must reduce risk, the owner or operator will pay the Level 4 risk assessment fee, the risk reduction plan fee, the community engagement fee and possibly the case-by-case TBACT fee. If the owner or operator chose to do ambient monitoring or if DEQ required the owner or operator to do ambient monitoring, the owner or operator would be required to pay the Cleaner Air Oregon Monitoring Plan fee also. Community engagement fees have also been updated in response to legislative direction provided by SB 1541 that DEQ must hold any public meetings that are required.

Because the type of risk assessment method used is at the discretion of the facility and because subsequent approvals needed are based on the results of those risk assessments, activity fee revenue forecasting has more uncertainty than base fee revenue. Assumptions used in forecasting activity fee revenue are described in the next section.

The various risk assessment methods and other permit approvals each have activity fees that are based on a workload analysis performed by DEQ. The workload analysis estimates the number of work hours (by position classification) needed for the review and approval of each activity. The complete activity fee schedule can be found below in Table 3.

Assumptions

- DEQ assumed that the first sources that will be called in would be required to submit the most complex Risk Assessments because their risk is estimated to be the highest of all permitted sources. The most complex Risk Assessments have the highest fees associated with their review.
- Agency staff, in consultation with staff from states who operate similar programs, have developed estimates of the number and types of activity fees that the first facilities will be required to pay. Those estimates, and the associated activity fee revenue are displayed in the attached "Activity Fee Revenue Projections" document. In summary, it is estimated that:
    - 35 facilities will meet their compliance obligation through a level 3 risk assessment.
    - 10 facilities will meet their compliance obligation though a level 4 risk assessment.
    - 15 facilities will meet their compliance obligation through a risk reduction plan.
    - 5 facilities will meet their compliance obligation through a risk reduction plan and a TBACT plan.
    - 1 facility will meet their compliance obligation through Cleaner Air Oregon ambient monitoring.

Considerations

In developing fee structures, DEQ considered and acknowledged that risk-based air quality permitting is new in Oregon and as such there are uncertainties in terms regarding its implementation.

During the public comment period, DEQ seeks additional feedback on funding proposals to implement Cleaner Air Oregon.

The Oregon Environmental Quality Commission approval of this rule proposal would establish new fees. EQC authority to act on the proposed fees is in ORS 468.020, 468.065, 468A.040, 468A.050, and 468A.315.

Stakeholder engagement during the fee proposal development

The agencies discussed program implementation, staffing models and proposed fee structures with the Rules Advisory Committee in July and August 2017. Stakeholders provided the following verbal input during the meeting, which has been incorporated into the proposal:

- The program should be implemented in a tiered-approach, starting with facilities that have the potential to pose the most risk to the greatest number of people.
- The agencies should include a position in the staffing model responsible for providing technical assistance to individuals or organizations that would be impacted by the program. This includes entities regulated by the program who are in the process of being "called in" and entities who are seeking to better understand their compliance obligations if/when they are called in. This also includes community groups and members of the public interested in learning about community outreach requirements.
- The agencies should develop a fee structure that is predictable to fee-payers.
- The agencies should develop a fee structure acknowledging that the facilities actively working through the requirements will be receiving a higher level of service from the agencies.

In addition to advisory committee meetings, the agencies have had direct conversations with fee paying stakeholders to further describe and discuss the fee proposal.

How long will the proposed fee sustain the program?

The proposed annual base fee, call-in fee, and specific activity fees would sustain the program for five years, until the year 2023.

Table 1
Cleaner Air Oregon Annual Fees for Air Contaminant Discharge Permittees

a. Basic ACDP		$151.00
b. General ACDP	(A) Fee Class One*	$302.00
	(B) Fee Class Two	$544.00
	(C) Fee Class Three	$786.00
	(D) Fee Class Four	$151.00

Table 1 Cleaner Air Oregon Annual Fees for Air Contaminant Discharge Permittees		
	(E) Fee Class Five	$ 50.00
	(F) Fee Class Six	$ 101.00
c. Simple ACDP	(A) Low Fee	$806.00
	(B) High Fee	$1,613.00
d. Standard ACDP		$3,226.00

*The fee classes are defined in OAR 340-216-0060 for the different types of General Permits.

Table 2 Cleaner Air Oregon Annual Fees for Title V Permittees
The specific activity fees under OAR 340-220-0050(4):
(a) The annual base fee of $2,804; and
(b) The annual emission fee of $22 per ton of each regulated pollutant for emissions during the previous calendar year, up to and including 7,000 tons of such emissions per year. The emission fee will be applied to emissions based on the elections made according to OAR 340-220-0090.

Table 3 Cleaner Air Oregon Specific Activity Fees					
#	ACTIVITY	Permit Type			
		Title V	Standard	Simple	General/Basic
1	Existing Source Call-In Fee	$10,000	$10,000	$1,000	$500
2	New Source Consulting Fee	$12,000	$12,000	$1,900	$1,000
3	Document Modification Fee	$2,500	$2,500	$500	$250
	Risk Below Risk Action Levels				
4	Level 1 Risk Assessment - de minimis (no permit attachment required)	$1,500	$1,500	$1,000	$800
5	Level 1 Risk Assessment - permit attachment required	$2,000	$2,000	$1,500	$1,100
6	Level 2 Risk Assessment - de minimis (no permit attachment required)	$3,100	$3,100	$2,300	$2,000
7	Level 2 Risk Assessment - permit attachment required	$3,600	$3,600	$2,800	$2,300
8	Level 3 Risk Assessment - de minimis (no permit attachment required)	$8,800	$8,200	$5,300	$4,500
9	Level 3 Risk Assessment - permit attachment required	$19,900	$11,300	$7,700	$6,300
10	Level 4 Risk Assessment - de minimis (no permit attachment required)	$21,400	$18,500	$11,700	NA
11	Level 4 Risk Assessment - permit attachment required	$34,600	$25,800	$15,500	NA
	Risk Above Risk Action Levels				
12	Risk Reduction Plan Application Fee	$6,700	$6,700	$2,600	$2,600
13	Cleaner Air Oregon Monitoring Plan Fee	$25,900	$25,900	NA	NA
14	Postponement of Risk Reduction Application Fee	$4,400	$4,400	$4,400	$2,000
15	TBACT/TLAER Analysis (per Toxic Emissions Unit)	$3,000	$3,000	$1,500	$1,500
	Other Fees				
16	TEU Risk Assessment Fee (no permit attachment mod)	$1,000	$1,000	$500	$500
17	TEU Risk Assessment Fee (permit attachment mod)	$4,000	$4,000	$2,000	$1,000
18	Level 2 Modeling review (TEU approval)	$1,900	$1,300	$800	$700
19	Level 3 Modeling review (TEU approval)	$3,800	$3,800	$3,500	$3,500
20	Community Engagement Meeting Fee	$10,800	$10,800	$10,800	$10,800
21	Source Test Review Fee (plan and data review)	$5,900	$5,900	$5,900	$5,900

Proposed fees

Table 4 Proposed Fees		
Expected change in revenue (+/-)	$60,000	N/A (new fee/program)
Main General Fund required by statute/rule to fund program	$0	0%
Proposed fee allows General Fund replacement	$0	0%
Expected effective date	Upon rule adoption	

Transactions and revenue

Table 5 Transactions and Revenue				
Biennium	**Number of transactions**	**Number of fee payers**	**Impact on revenue (+/-)**	**Total revenue (+/-)**
Current* biennium	6	6	$60,000	$60,000
Next biennium	54,970	2,473	$5,359,718	$5,359,718

*Annual base fees proposed in this rulemaking would first be collected in the 2019-21 biennium. Facilities may begin being called-in by the program between rule adoption and the end of the 2017-19 biennium.

Statement of fiscal and economic impact

Background

DEQ held a public comment period on a first draft of Cleaner Air Oregon rules between October 2017 and January 2018. DEQ received many comments which we have read and carefully considered. In March 2018, the Oregon Legislature passed Senate Bill 1541, a law that provides funding for completing the rulemaking and supporting program implementation through fees on industry. The bill also sets certain program requirements that must be reflected in the draft rules. As a result of SB 1541, consideration of comments to date and ongoing staff work, DEQ has developed a second draft of the rules. This fiscal impact statement describes the fiscal and economic impacts of the May 2018 second draft of the Cleaner Air Oregon proposed rules. Senate Bill 1541 passed by the 2018 Oregon legislature set benchmarks for excess lifetime cancer risk and noncancer risk (defined as Risk Action Levels in the Cleaner

Air Oregon proposed rules) in statute at levels higher than what DEQ and OHA originally proposed. Based on those higher risk levels, there will be potentially less impact on regulated businesses and potentially less benefit to public health since not as much risk reduction will be realized. As stated below, quantifying the exact fiscal impact is extremely difficult to do without detailed facility-specific data from regulated businesses, which has not been submitted, and data on health effects which is not available.

During the first public comment period, DEQ received a comment on the first fiscal impact statement from a consulting firm representing an industrial interest group. DEQ has updated this fiscal impact statement with the pollution control equipment cost information provided as part of that comment. However, DEQ has not updated this fiscal impact statement with other information in the comment that we have determined to be based on assumptions that are not clear or fully documented, overly speculative, or not required to meet the goals of a fiscal impact analysis and statement under ORS 183.335. DEQ will provide a response to comments on the fiscal analysis in the full response to comments document included with the staff report on Cleaner Air Oregon to the Environmental Quality Commission.

Methodology for this analysis

The following analysis describes the fiscal impacts to business, government and the public. For regulated businesses, the analysis focuses on the fiscal impacts associated with performing risk assessments at different levels, potential emission reduction methods, the range of costs for the emission reduction methods and the fees for Cleaner Air Oregon permitting. For government, the analysis describes potential impacts on government owned facilities and fiscal impacts to the agencies administering the new regulations. For the public, the analysis describes potential benefits to the service and consulting sector and using example pollutants and associated illnesses, potential general fiscal benefits from decreasing health risks. All estimates in this analysis are bounded by important caveats and limitations. Any use or consideration of fiscal impact estimates in this analysis should be accompanied by relevant caveats and limitations to avoid inaccurate assumptions or conclusions.

In November 2016 DEQ sent a request to all permitted facilities that may be subject to Cleaner Air Oregon rules to report on their air toxics emissions. Facilities have submitted emission data and at the time of this draft analysis, DEQ is still working with facilities to check for quality, refine and revise their information. DEQ does not have complete emissions or risk information for facilities that could be impacted by Cleaner Air Oregon. Even after DEQ has completed its analysis of the industrial air toxics emission inventory, each affected facility will need to go through the proposed risk screening and assessment process to gain accurate knowledge about risk posed and regulatory requirements. Some businesses will "screen out" at more simple assessment levels and will have little to no fiscal impacts, while others will be required to implement more complex and costly steps to assess potential health risks from air emissions. Without a facility proceeding through the full steps of risk screening and assessment, it is not possible to predict with any accuracy how much any particular business would have to spend to comply with risk reduction requirements, or how much

benefit from reduction of associated air toxics risk could occur for people living nearby. Looking at larger scale modeling information on a small set of pollutants (such as the Portland Air Toxics Solutions Study) to estimate toxic air contaminant source contributions and exposures does not accurately show neighborhood level risk from industrial emissions that will be analyzed through Cleaner Air Oregon.

With SB 1541 risk benchmarks set higher than DEQ proposed in the first draft of the rules, more facilities will screen out and avoid fiscal impacts. Historically, some businesses have sought to avoid being subject to regulations ahead of effective dates by voluntarily making changes to reduce their emissions. Each owner or operator will have to make individual decisions about whether to voluntarily reduce risk so that they screen out at the simplest assessment level.

Because of the high level of uncertainty about who will be affected and how, this fiscal analysis addresses potential ranges of impact for business, government and the public, rather than develop extremely speculative and likely inaccurate scenarios for all 2,563 facilities that could be affected by Cleaner Air Oregon rules. (The Lane Regional Air Protection Agency has approximately an additional 200 existing facilities that will be evaluated in their area of jurisdiction, but those are not specifically included in this fiscal impact statement.) An approach to generate scenarios for the 2,563 potentially affected facilities would also require additional research and modeling work, for which resources are not currently available.

DEQ also considered analyzing Cleaner Air Oregon fiscal impacts by creating models or scenarios for specific facilities, assuming various levels of emissions, risk analysis, required emission control, and potential impact on populations living nearby. While this approach would have the advantage of providing an opportunity to estimate both cost and benefit impacts based on the same scenarios, it was ultimately rejected because of the high potential to inaccurately represent actual conditions, and because a financial cost benefit analysis is not required in a rulemaking fiscal analysis.

Who would experience fiscal and economic impacts?

The proposed rules would have fiscal and economic impacts on businesses, state and federal agencies, units of local governments and the public. Fiscal impacts can be positive or negative to those affected. As examples, reducing health costs to the public would be a positive impact, and increasing costs of regulatory compliance for businesses would be a negative impact.

Owners and operators of facilities that currently require an air quality permit would incur costs of program permit fees, described above, and be required to analyze whether emissions from their operations are below Risk Action Levels set under the Cleaner Air Oregon rules. This includes public entities who manage facilities or operations requiring an air quality permit. Cost estimates for these analyses are included in Table 6 below, Emissions Analysis and Risk Assessment Costs. The owners and operators of some facilities that are required to go through a more complex permitting process would also incur costs to participate in community engagement. Some facilities with emissions resulting in health risks above Risk Action Levels would incur costs to reduce those emissions.

People who are exposed to toxic air contaminants at sufficient concentrations and durations have an increased chance of getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing toxic air contaminants, some toxic air contaminants, such as mercury, can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. The proposed rules may result in reduced toxic air contaminant emissions and less exposure to toxic air contaminants by people who live and work in proximity to facilities that emit toxic air contaminants. Less exposure to toxic air contaminants will result in fewer premature deaths and illnesses allowing Oregonians to experience longer lives, better quality of life, lower medical expenses, fewer work and school absences, and better worker productivity.

Table 6
Emissions analysis and risk assessment costs

Task	Simple	Complex
Emissions inventory	$0*-$5,000	$60,000
Level 1 Assessment – Lookup Table Calculation Using Stack Heights and Exposure Location Distance	$100	$5,000
Level 2 Assessment – Screening modeling	$5,000	$35,000
Level 3 Assessment – Refined modeling	$5,000	$100,000
Level 4 Assessment – Health Risk Assessment	$5,000	$500,000

*DEQ is doing the emissions inventory for all of the approximately 2,200 sources that have Basic and General Air Contaminant Discharge Permits.

Statement of cost of compliance

State agencies

The majority of state agencies and local governments should be minimally or not directly impacted by the proposed rules because the rules predominantly regulate process emission sources, many of which are related to manufacturing. State agencies and local governments holding permits may be required to reduce toxic air contaminant emissions if the predicted risk exceeds Risk Action Levels. If owners or operators choose to install pollution control equipment, Table 7 below shows what the range of estimated costs could be. As of August 31, 2017, state agencies own 23 permitted facilities, federal agencies own 5 permitted facilities, and local governments own 62 permitted facilities. Currently there are no tribal owned permitted facilities. Cleaner Air Oregon base and activity fees would affect these permit holders directly. Changes to fees could affect these agencies indirectly if businesses change the price of goods and services to offset any increased costs from paying a permit fee.

Local government may also be consulted in land use issues potentially affected by facilities emitting toxic air contaminants.

DEQ and OHA will see an increase in workload as a result of the proposed rules. Implementation of a new permitting program will require additional resources. DEQ has completed a workload analysis to estimate the cost of different levels of risk assessment and the number of additional resources needed. DEQ will permit facilities subject to Cleaner Air Oregon with the aid of OHA staff in areas of health risk assessment, community engagement, and risk communication. DEQ and OHA workloads would initially increase as staff becomes familiar with the proposed rules and a new program and could level off after the first tier of implementation.

Having the Cleaner Air Oregon toxic air contaminant program in place may also reduce DEQ and OHA's workload in some instances, by reducing the need for the agencies to respond on a facility by facility basis to public concerns about toxic air contaminant emissions that are not currently covered by a regulatory structure.

Table 7 Pollution control equipment for toxic air contaminant emissions*						
Control Device Type	Types of Pollutants it can reduce	Examples of facilities where this is used	Initial costs		Annual Operating Costs	
			low	high	low	high
Fabric filter (baghouse)	Particulate matter (PM), hazardous air pollutant (HAP) PM	Asphalt batch plants, concrete batch kilns, steel mills, foundries, fertilizer plants, and other industrial processes. Colored art glass manufacturers.	$360,000 - $18,500,000		$180,000 - $6,200,000	
Electrostatic precipitator (ESP)	PM, HAP PM	Power plants, steel and paper mills, smelters, cement plants, oil refineries	$320,000 - $7,100,000		$100,000 - $7,600,000	
Enclosure	Fugitive PM or volatile organic compounds (VOCs)	Any process or operation where total emissions capture is required, i.e., printing, coating, laminating	$14,000 - $420,000		$400 - $10,000	
HEPA filter	Chrome emissions	chrome plating	$13,000 - $240,000		Application specific	

Control Device Type	Types of Pollutants it can reduce	Examples of facilities where this is used	Initial costs		Annual Operating Costs	
			low	high	low	high
Wet scrubber (packed towers, spray chambers, Venturi scrubbers)	Gases, vapors, sulfur oxides, corrosive acidic or basic gas streams, solid particles, liquid droplets	Asphalt and concrete batch plants; coal-burning power plants; facilities that emit sulfur oxides, hydrogen sulfide, hydrogen chloride, ammonia, and other gases that can be absorbed into water and neutralized with the appropriate reagent.	$25,000 - $750,000		$19,000 - $830,000	
Thermal oxidizer	VOCs, gases, fumes, hazardous organics, odors, PM	Landfills, crematories, inks from graphic arts production and printing, can and coil plants, hazardous waste disposal. semiconductor manufacturing	$17,000 - $6,200,000		$3,500 - $5,200,000	
Regenerative thermal oxidizer	VOCs	Paint booths, printing, paper mills, municipal waste treatment facilities	$940,000 - $7,700,000		$110,000 - $550,000	
Catalytic reactor	VOCs, gases	Landfills, oil refineries, printing or paint shops	$21,000 - $6,200,000		$3,900 - $1,700,000	
Carbon adsorber	Vapor-phase VOCs, hazardous air pollutants (HAPs)	Soil remediation facilities, oil refineries, steel mills, printers, wastewater treatment plants	$360,000 - $2,500,000		Not available	

Control Device Type	Types of Pollutants it can reduce	Examples of facilities where this is used	Initial costs		Annual Operating Costs	
			low	high	low	high
Biofilter	VOCs, odors, hydrogen sulfide (H_2S), mercaptans (organic sulfides)	Wastewater treatment plants, wood products facilities, industrial processes	$360,0000 - $3,600,000		Not available	
Fume suppressants	Chromic acid mist, chromium, cadmium and other plating metals	Chromic acid anodizing and chrome plating operations	Up to $122,000		Not available	

*Costs are from examples in the EPA Air Pollution Control Cost Manual, Report No. 452/B-02-001, EPA Air Pollution Control Technology Fact Sheets, and information provided by permitted facilities

Local governments

As noted above, local governments own or operate 62 facilities currently requiring an air quality permit. Minimally, those local government agencies would be impacted by the proposed fee structure for Cleaner Air Oregon which includes an annual base fee assessed on all current air quality permit holders. In addition, local governments who operate these facilities would be required to assess the risk that the facility's emissions pose and in some cases may be required to reduce that risk.

Large businesses

DEQ anticipates the proposed rules, when fully implemented, could have fiscal and economic impacts on approximately 1,360 large businesses holding air quality permits and an unknown number of businesses that are not currently required to have air permits. If the cancer or noncancer risk from a facility exceeds the Risk Action Levels, the facility would be required to take action to reduce toxic air contaminant emissions or show that the best available control technology for toxic air contaminants (TBACT) is already being achieved. The proposed rules would allow facilities flexibility in choosing a method to reduce emissions through the application of pollution prevention or pollution control equipment. If owners or operators choose to install pollution control equipment, Table 7 above shows what the range of estimated costs could be. Small businesses may also incur these costs if required to install pollution control equipment. As required by SB 1541, the second draft proposed rules allow that facilities (major sources of hazardous air pollutants that emit 10 tons/year of one hazardous air pollutant or 25 tons/year of combined hazardous air pollutants) complying with federal toxic air contaminant standards known as National Emission Standards for Hazardous Air Pollutants (NESHAPs) will under certain conditions be presumptively complying with TBACT requirements. Although specific numbers or situations will not be known until sources proceed

through the screening and analysis process, this requirement will decrease fiscal and economic impacts for many sources of toxic air contaminants. Many facilities already complying with NESHAPs would not need to reduce their risk unless they exceed a level of 200 in a million excess cancer risk and a hazard quotient of 10. This is higher than the originally proposed levels of 25 in a million and a hazard quotient of 1, and is expected to result in a lower fiscal impact than the October 2017 proposed rules.

DEQ has received input from one commenter during the first comment period that fiscal impacts on businesses may be significantly higher than estimated in Table 7 and other parts of this analysis based on other assumptions and projections. While that may be the case, DEQ is not able to substantiate these higher estimates and has determined that certain assumptions are flawed or speculative. The commenter acknowledges that their analysis is not based on any specific Oregon facilities, and that they lack information to know whether specific facilities will incur increased costs or the magnitude of the costs. Because DEQ lacks both specific facility information and information on specific health impacts near these facilities, a traditional cost-benefit analysis is not possible for proposed Cleaner Air Oregon regulations.

Pollution prevention

In EPA's and DEQ's hierarchy of pollution management strategies (acceptable ways to reduce pollution), pollution prevention, also known as source reduction, is preferred over the addition of pollution controls and treatment whenever feasible (see Pollution Prevention Act of 1990, https://www.epa.gov/p2/pollution-prevention-act-1990)[1] Pollution prevention has been implemented successfully for cleaning operations (e.g., metal parts), coating and painting (e.g., marine anti-fouling, wood preservation), lubricants and process fluids (e.g., loss lubrication, mold release agents), and dry cleaning of clothes. In evaluating the costs of pollution prevention, DEQ considers not only the cost of replacing one solvent for another, but also capital costs, energy differences, labor costs, waste disposal and quality control considerations. In many instances involving both large and small businesses, DEQ has found that pollution prevention can decrease costs for a facility owner, rather than increase them. Short-term investments in pollution prevention measures can result in savings that can pay for the initial investments over time.

Reporting

All currently permitted sources report to DEQ annually so their reporting requirements for Cleaner Air Oregon will be in addition to existing reporting requirements. Some facilities that aren't required to have air permits under current regulations require may be required to have

[1] Pollution prevention is generally preferred because it results in less pollution to control, treat, or dispose of. Pollution controls can generate wastes or contaminated equipment that require end-of-life management. Reducing pollution at the source means fewer hazards posed to the public and the environment. In addition, pollution controls can fail and toxic substances can be used in unintended ways. Reducing the use of those toxic substances at the source avoids those potential risks.

them under Cleaner Air Oregon, and in that case the requirement to report annually would be new. Some facilities already report emissions of Hazardous Air Pollutants (187 pollutants out of approximately 600 toxic air contaminants) annually. Under the proposed regulations, all facilities that emit toxic air contaminants must report emissions to DEQ a minimum of every three years. Facilities that have permit requirements to limit toxic air contaminant emissions must report compliance annually or semi-annually. The initial emissions inventory created the greatest workload for facilities, so updating this inventory should involve minimal costs. DEQ anticipates that the additional reporting requirements for Cleaner Air Oregon cost facilities approximately $120 to $1,200 per year.

Source testing

Source testing is currently not required as a part of Cleaner Air Oregon, but some facilities may choose to do source testing to more accurately estimate emissions. Source testing may be required to determine compliance with Cleaner Air Oregon permit conditions but DEQ anticipates that will be the case for very few sources. Cost for source testing for toxic air contaminants depends on the toxic air contaminant to be tested. Source testing for some toxic air contaminants, such as hexavalent chromium, is relatively complex and therefore expensive. Source test costs range from $7,500 for a single toxic air contaminant that is easy to test to $35,000 for multiple toxic air contaminants that are more difficult to test. Businesses already required to perform periodic compliance source testing could save money if the toxic air contaminant and criteria pollutant tests could be aligned.

Community engagement

SB 1541 requires that DEQ rather than facilities, as proposed in the first draft of the rule, provide community engagement. This decreases community engagement costs for facilities, but fees assessed to facilities support this activity by DEQ staff. If the risk from a new or an existing facility is greater than the Community Engagement Risk Action Level, DEQ will provide Community Engagement for that facility. As part of community engagement, DEQ will notify the community within the area of impact when a permit attachment application is submitted, hold one public meeting to describe the risks, and solicit input on ways to reduce the risks.

Small businesses

The proposed rules would require that the facility owner or operator of a small business demonstrate that the risk posed by the facility's air emissions would not exceed the proposed Risk Action Levels. This compliance demonstration can be accomplished using any of the levels of risk assessment, 1 through 4.

In addition to the fiscal and economic impact described under the section above “Large businesses - businesses with more than 50 employees,” the proposed rules could have the following impacts on small business:

Estimated number of small businesses and types of businesses and industries with small businesses subject to proposed rule

The proposed rules could affect approximately 1,090 small businesses. These businesses include asphalt plants, auto body shops, chromium electroplaters, dry cleaners, ethylene oxide sterilizers, grain elevators, gas stations, lumber mills, metal fabricators, metal foundries, and surface coaters. If any of these businesses had Cleaner Air Oregon permit conditions, they would have additional compliance requirements over existing permit requirements. In addition there may be an unknown number of additional facilities that are currently not required to get permits under the existing air quality permitting program but may be required to get permits and pay fees because of the Cleaner Air Oregon rules.

Many of the small businesses subject to the Cleaner Air Oregon rules would only be required to submit triennial reports of toxic air contaminant emissions. Some small businesses may be required to reduce toxic air contaminant emissions through either permit limits, pollution prevention or pollution control equipment if cancer risk, chronic noncancer risk or acute noncancer risk is above Risk Action Levels.

Projected reporting, recordkeeping and other administrative activities, including costs of professional services, required for small businesses to comply with the proposed rule

Small businesses that must meet Cleaner Air Oregon permit requirements would have increased recordkeeping and reporting requirements. Administrative activities, including costs of professional services, required for small businesses to comply with the proposed rule may increase in a range from $100 to $500,000 above current costs if the small business is required to perform computer modeling or a health risk assessment if cancer risk, chronic noncancer risk or acute noncancer risk is above Risk Action Levels.

Projected equipment, supplies, labor and increased administration required for small businesses to comply with the proposed rule

Depending on the size and nature of a small business's operation, pollution control costs could be much less than, or in some cases the same as, the cost ranges for different types of control equipment found in Table 7, above. Summarizing from Table 7, if a small business's cancer risk, chronic noncancer risk or acute noncancer risk were above Risk Action Levels, the proposed rules could result in additional costs ranging from approximately $13,000 to $18,500,000 for initial equipment including purchase and labor, and ranging from approximately $400 to $7,600,000 in annual operating costs. The same decrease of costs that apply to large businesses resulting from higher risk action levels required in SB 1541 will apply to smaller businesses. Smaller businesses are even more likely to screen out of more costly Cleaner Air Oregon requirements at risk levels of 50 in a million and a hazard quotient of 5.

Because of existing regulatory coverage and generally low risk estimates for gas stations and dry cleaners, DEQ proposes to exclude them from risk screening, risk assessment and risk reduction requirements. These facilities would need to pay small fees to be tracked and evaluated by DEQ, but generally would not bear the costs of additional reporting, risk analysis or emission reductions.

How DEQ involved small businesses in developing this proposed rule

DEQ notified small businesses during rule development by email, announcements on the DEQ website, advisory committee meetings, and through Twitter and Facebook. Small business representatives were on the rules advisory committee during rule development. At the onset of the first public comment period, DEQ notified small businesses by email, and notices in the Secretary of State Bulletin.

Impacts on the public

The proposed Cleaner Air Oregon rules are intended to assess and decrease risk above Risk Action Levels for people living near industrial and commercial facilities. The Risk Action Level analysis would be based on many factors, including the best available science regarding toxicity of regulated toxic air contaminants, as proposed in the risk-based concentrations. Cleaner Air Oregon toxic air contaminant reductions that decrease cancer risk, chronic noncancer risk or acute noncancer risk could create positive economic benefits and improvements in public health and welfare statewide. The rules could also have negative economic effects on the public. In analyzing potential positive and negative effects on the public of the proposed Cleaner Air Oregon rules, DEQ has consulted with OHA and relied upon information provided by them.

Positive impacts on the public

The proposed Cleaner Air Oregon rules have the potential to meaningfully impact public health in the state by reducing toxic air contaminant emissions. The toxic air contaminants that would be regulated by Cleaner Air Oregon rules are known to increase risk of a wide range of health outcomes including cardiovascular and respiratory illness, lung disease, cancers, birth defects, premature births, developmental disorders, central nervous system damage, intellectual disability, and premature death.

Based on a preliminary analysis of a subset of emissions inventory data using proposed screening tools and Risk Action Levels, DEQ and OHA have determined that a number of toxic air contaminants are most likely emitted at concentrations whose risk exceeds the proposed Risk Action Levels. Information from EPA's National Air Toxics Assessment supports this initial analysis. The impact of toxic air contaminants on health depends on people's exposure. DEQ and OHA do not currently have enough information about how many people are exposed to specific concentrations of industrial and commercial toxic air contaminant emissions or about the relative actual contribution of toxic air contaminants to disease to know how reducing emissions will translate to improved public health in quantitative terms. As Cleaner Air Oregon regulations are implemented, the emissions inventory and the permitting process will improve DEQ and OHA's understanding of Oregonians toxic air contaminant exposures. This is especially true for public health risk from toxic air contaminants in neighborhoods close to industrial facilities, where risk may never have been specifically or accurately assessed. National and local air toxics models show that non industrial emissions from vehicle engines, wood burning and atmospheric formation of toxic air contaminants combine to contribute significantly to public health risk. However these models cannot be used to estimate risk for people living nearby industrial facilities because they are on a coarse scale, do not factor in where people are actually exposed, do not include

all facilities, do not assess the number of pollutants proposed for Cleaner Air Oregon, and do not include risk from acute exposures.

In this analysis it is not possible to predict the total reduced medical costs that would result from the proposed rules. However, it is possible to describe the range of health outcomes associated with toxic air contaminants currently emitted in Oregon and to describe the economic burden of medical treatment for a subset of those health effects. This section also points to national analyses that estimate the fraction of certain diseases that are due to environmental exposures.

Health effects caused by toxic air contaminants commonly emitted by facilities in Oregon

DEQ and OHA summarized the health effects associated with 15 of the toxic air contaminants to be regulated under Cleaner Air Oregon. This information is summarized in Table 8 below. This summary illustrates the range of health effects that may be caused by this small subset of 15 toxic air contaminants. Many more of the toxic air contaminants to be regulated under Cleaner Air Oregon are associated with these and other health effects.

Table 8
Examples of health effects associated with a subset of 15 toxic air contaminants

Type of Toxicity	Toxic air contaminants associated with these health outcomes
Respiratory Effects Includes asthma and asthma symptoms (difficulty breathing, shortness of breath, coughing, wheezing, chest pain), reduced lung function, respiratory irritation, and other respiratory conditions	formaldehyde*, cobalt*, hexavalent chromium*, cadmium*, chlorine*, acrolein*, hydrogen fluoride*, naphthalene*, PAHs, manganese, arsenic
Cancer includes lung, respiratory, leukemia, lymphoma, liver, kidney and gastrointestinal cancers	arsenic*, hexavalent chromium*, cadmium*, formaldehyde*, PAHs*, benzene*, trichloroethylene*, lead*, dioxins*, naphthalene*
Heart Disease includes hypertension, arrhythmia, heart attack	arsenic, PAHs, lead, acrolein, hydrogen fluoride
Kidney Function includes reduced kidney function, kidney stones	cadmium*, lead, trichloroethylene, hydrogen fluoride
Liver Disease includes reduced liver function, fatty liver disease	dioxin*, trichloroethylene, hydrogen fluoride

Type of Toxicity	Toxic air contaminants associated with these health outcomes
Neurological Effects includes effects on motor function, balance, vision, hearing, cognition, memory, anxiety, focus or behavior following exposure as an adult or during brain development	lead*, arsenic*, manganese*, cadmium, PAHs, benzene, trichloroethylene, formaldehyde, cobalt
Fetal Development includes low birth weight, pre-term birth, miscarriage, and birth defects following exposure to mothers during pregnancy	arsenic*, PAHs*, trichloroethylene*, formaldehyde, cadmium, benzene, trichloroethylene, lead, dioxins
Impaired Fertility includes damage to male or female reproductive organs, reduced sperm counts, altered sex hormones, and infertility	manganese, PAHs, hexavalent chromium, dioxins, trichloroethylene
Blood Regulation includes impaired bone marrow function, anemia	benzene*, lead, naphthalene, cobalt
Immune Function includes allergic responses, reduced immune function	trichloroethylene*, benzene*, dioxins, PAHs

*For these chemicals, the associated health effect serves as the basis for Risk Action Levels proposed in Cleaner Air Oregon. Inclusion of all other chemicals is based on studies referenced in EPA, ATSDR, or OEHHA documents. The magnitude of and certainty around these associations varies.[2]

Information needed to quantify economic impact of health improvements

Oregon currently lacks the data necessary to quantify total potential health cost savings from Cleaner Air Oregon because of the lack of information about how many people are exposed to specific concentrations of industrial and commercial toxic air contaminant emissions and the relative actual contribution of toxic air contaminants to disease. Just as a lack of information about individual facility risk assessment and emission reduction outcomes prevents DEQ from

[2] EPA Integrated Risk Information System. https://www.epa.gov/iris

ATSDR Toxic Substances Portal. https://www.atsdr.cdc.gov/toxprofiles/index.asp

California Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels. Dec, 2008 https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-technical-support-document-derivationadoption-air-toxics-hot-spots-program-technical-support-document-derivation

quantifying specific fiscal impacts to businesses, a lack of health information also prevents DEQ from quantifying specific positive fiscal impacts from potential Cleaner Air Oregon emission reductions. The health impact of reducing emissions depends on the specific chemicals that are being reduced, the health risks those chemicals influence, the relationship between exposure and health, and the extent to which emissions are reduced. Defining the economic impact of improved health further requires knowledge of the portion of cases that are related to toxic air contaminant exposures, prevalence of health outcomes in the state, and the cost of medical treatment for each case.

Table 9 summarizes data limitations for the different types of information that would be necessary to assess health effects.

Table 9
Availability of Data Needed to Quantify Economic Impact of Health Improvements

Information Type	Current availability of data
Health risks associated with each chemical	Some chemicals are well characterized while toxicity data is missing or incomplete for others. There is some information about toxicity for all chemicals with proposed RBCs. The amount of information and level of certainty around the association with health effects varies.
Relationship between exposure and health	Even when health effects are identified, it can be difficult to quantify the amount of risk expected a specific level of exposure; This relationship is well characterized for some chemicals and not available for others. There is little information on how multiple chemicals may interact to impact health. This makes it difficult to evaluate the cumulative health impact of reducing exposure to multiple air toxics.
Level of current exposure	Information from existing DEQ air permits and EPA's National Air Toxics Assessment provide some information on potential exposures, but these do not cover all sources of industrial air toxics. The emissions inventory will provide a clearer picture of current potential exposures once it is complete. As CAO is implemented and facilities go through the new permitting process, we will have a more accurate picture of emissions.
Percent of each health outcome that is attributable to air toxics	This is determined based on what we know about the relationship between exposure and effect, the extent to which exposure to each chemical occurs, and the extent to which other factors are known to contribute to health risk. Previous analyses of the environmental contribution to disease have weighed these factors to identify the percent of each health outcomes that is due to an environmental exposure. This is referred to as the "environmentally attributable fraction". Typically, this is presented as a range rather than a specific percentage to

	demonstrate the extent of uncertainty around each estimate. Existing estimates for "environmentally attributable fractions" of specific diseases are not directly applicable to the set of chemicals covered in Cleaner Air Oregon
Prevalence of each health outcome in Oregon	OHA tracks incidence of several health outcomes that may be impacted by air toxics, including cancer, adverse birth outcomes, asthma, and heart disease. Baseline data is not as readily available for conditions related to brain development, neurological outcomes, infertility, allergy, immunity, and other health outcomes that may be impacted by air toxics.
Economic burden of each case	Economic costs can be measured in different ways. Some estimates focus on direct medical costs of disease. Others account for indirect costs such as missed days of work and school. For some health outcomes these metrics have been established by the CDC or in published literature, while for other health outcomes data on economic burden is less easily accessible. Social costs such as social isolation, time spent by unpaid caretakers, and emotional burden of premature death are important to consider but difficult to quantify.
Predicted reduction in exposure	This will depend on which facilities are included in the first tier of implementation and which air toxics they emit. Without complete information on current emissions, it is difficult to know how much emissions of each air toxic will be reduced in order to bring facilities into compliance

Costs of chronic diseases in Oregon

Toxic air contaminants included in Cleaner Air Oregon are associated with increased risk of four of the top five leading causes of death in Oregon (heart disease, stroke, respiratory disease, and cancer).[3] DEQ and OHA don't know what portion of these may be attributable to industrial and commercial toxic air contaminants, but data clearly show that chronic diseases have a substantial social and economic impact in Oregon. OHA uses Center for Disease Control and Prevention data to estimate the cost of certain chronic diseases in Oregon. If even a small fraction of these chronic health outcomes is attributable to toxic air contaminants, reducing emissions could prevent substantial health costs. The total estimated costs of chronic diseases tracked in Oregon are summarized in Table 10.

[3] OHA. 2016. Leading Causes of Death http://public.health.oregon.gov/ProviderPartnerResources/PublicHealthAccreditation/Documents/indicators/leadingcausesofdeath.pdf)

Table 10 Total Estimated Cost of Chronic Diseases that are Tracked in Oregon				
Health Outcome	Description	Average Annual Cost of Each Case	Estimated Annual Medical Costs in Oregon[A]	Examples of toxic air contaminants that may contribute to health risk
Asthma	Estimates include adults and children	$2,740	$411 million	formaldehyde, cobalt, hexavalent chromium, cadmium, PAHs, manganese, arsenic
Cancer	Estimates are based on adult cancer treatment only	$11,410	$1.9 billion	arsenic, hexavalent chromium, cadmium, formaldehyde, PAHs, benzene, trichloroethylene, lead, dioxins, naphthalene
Cardiovascular disease	Estimates are for adults only and include hypertension, stroke, coronary heart disease, congestive heart failure, and other heart disease	$2,220-$16,760 (disease-specific)	$3.6 billion[B]	arsenic, PAHs, lead, acrolein, hydrogen fluoride

[A] Calculated using the CDC Chronic Disease Cost Calculator [4] based on 2008 prevalence and cost statistics and 2010 census data. Estimates are limited to medical expenditures and do not include indirect costs such as missed days of work and school.
[B] This cost estimate integrates costs of all cardiovascular disease without double counting costs of treatments for comorbid cardiovascular conditions.

Oregon Health Authority also tracks cases of pre-term birth, low birth weight, miscarriage, and some birth defects. There are no existing estimates of the direct medical costs associated with these adverse birth outcomes in Oregon, but there is potential for substantial economic and social impact. The total incidence of selected adverse birth outcomes in Oregon are summarized in Table 11. While several toxic air contaminants are associated with increased risk for these adverse birth outcomes, the portion of cases attributable to exposure to toxic air contaminants is unknown.

[4] OHA, 2010. Estimated medical treatment costs of chronic diseases, Oregon 2010. http://www.oregon.gov/oha/PH/DISEASESCONDITIONS/CHRONICDISEASE/DATAREPORTS/Documents/datatables/__CDCC_2010.pdf

Table 11 Adverse Birth Outcomes in Oregon			
Health outcome	Total number of pregnancies impacted by each health outcome in OR 2009-2013[A]	Potential Economic and Social Costs	Examples of toxic air contaminants that may contribute to health risk
Low birth weight[B]	14,239	Costs depend on degree of prematurity/weight but can include direct medical costs associated with neonatal ICU treatment, increased risk of neonatal infections, increased risk of developmental disabilities, predisposition to disease later in life, parental stress, and costs of parents' missed days of work.	arsenic, PAHs, formaldehyde, cadmium, benzene, trichloroethylene
Pre-term birth[C]	17,442	Costs depend on degree of prematurity/weight but can include direct medical costs associated with neonatal ICU treatment, increased risk of neonatal infections, increased risk of developmental disabilities, predisposition to disease later in life, parental stress, and costs of parents' missed days of work.	lead, formaldehyde
Miscarriage[D]	978	Costs include direct medical costs, genetic testing/placental virus testing to determine the cause, parents' missed days of work, and emotional trauma to parents.	PAHs, lead, formaldehyde, arsenic, dioxins, trichloroethylene
Birth anomalies[E]	2,831	Costs are highly variable depending on the type and severity of the anomaly, but may include neonatal surgery, follow-up surgeries and medical costs throughout childhood and into adulthood, long-term disability, parents' missed days of work, and stress to families	dioxins, arsenic, trichloroethylene, benzene

A There were 228,115 total live births in Oregon 2009-2013.
B <2500 grams birth weight. Source: Vital records
C <36 weeks' gestation at birth. Source: Vital records

D Fetal deaths at or after 20 weeks of gestation. Any spontaneous pregnancy losses earlier in gestation are not recorded. Source: Oregon Vital Records http://www.oregon.gov/oha/PH/BIRTHDEATHCERTIFICATES/VITALSTATISTICS/Pages/index.aspx
E Birth anomaly numbers are limited to cases of 12 "core" birth anomalies that have been tracked historically in the Oregon Birth Anomalies Surveillance System (anencephalus, cleft lip alone, cleft palate, gastroschisis, hypoplastic left heart syndrome, hypospadias, limb deficiencies, spina bifida, tetralogy of fallot, transposition of the great arteries, and trisomy 21). Oregon has recently started tracking a broader set of birth anomalies but data are not yet available. National Birth Defects Prevention Network, 2016 https://www.nbdpn.org/docs/bdra23587-sup-0001-_suppinfo01_2016DEC16.pdf

Estimates of the portion of health effects caused by pollution

Several analyses have estimated the portion of a given disease that is attributable to environmental exposures. Because there is often uncertainty around the complex ways that genes, nutrition, social factors, behavior, and chemical exposures interact to influence health, the environmentally attributable fraction is often presented as a range rather than a specific number.

These estimates of the environmentally attributable fraction are not specific to the set of toxic air contaminants included in Cleaner Air Oregon. Therefore, these numbers cannot be directly applied to estimate the contribution of toxic air contaminants to health risks in Oregon. Rather, they provide an indication of the potential magnitude of the contribution of pollution to disease. The most comprehensive assessment of the contribution of pollution to disease is a 2002 study drawing on 1997 data (dollar figures are 1997 dollars). The findings are summarized below.

- Asthma. Researchers estimate that 10-30% of asthma is attributable to outdoor air pollution (including both industrial and non-industrial sources). The yearly fraction of asthma cases that could be attributed to environmental factors cost the US between $0.7 and $2.3 billion. These cost estimates account for direct medical costs and lost productivity due to asthma-related premature deaths.5
- Cancer. Researchers estimate that between 2-10% of childhood cancer is attributable to environmental factors, accounting for nationwide costs ranging from $132-663 million a year. These cost estimates account for direct medical costs, costs associated with secondary cancers, lost productivity associated with treatments and premature death.[5]
- Neurodevelopmental disorders. Researchers estimate that 5-20% of neurodevelopmental disorders such as ADHD, autism, and mental retardation may be attributable to environmental factors (excluding lead which was considered separately), costing the US between $4.6-18.4 billion a year. Cost estimates in this study were based on direct costs of medical care, long-term care, and lost productivity.[5] Another study estimated that

[5] Landrigan PJ, Schechter CB, Lipton JM, Fahs MC, Schwartz J. Environmental pollutants and disease in American children: estimates of morbidity, mortality, and costs for lead poisoning, asthma, cancer, and developmental disabilities. Environ Health Perspect. 2002 Jul;110(7):721-8

developmental delays caused by exposure to polycyclic aromatic hydrocarbons in New York City alone cost $13.7 million.[6]

- Lead Poisoning. Researchers estimated that the total cost of childhood lead poisoning in the US was 43.4 billion yearly. All cases of lead poisoning are attributed to lead exposure, but the relative contribution of different sources of exposure to lead is not well established.

Living near industrial and commercial sites is associated with increased risk of illness

Several national studies, most published in the past five years, have found that living near industrial and commercial sites increases risk for several health conditions that are common in Oregon. The specific health impacts that are observed depend on the kinds of chemicals industries are using. Taken together, these studies suggest that reducing industrial and commercial exposure to toxic air contaminants could improve health.

- Mortality. A national study found that counties with higher rates of toxic air and water emissions also had increased rates of adjusted mortality.[7]
- Cardiovascular disease. A national study found that counties with higher emissions of carcinogens, metals, or hazardous air pollutants saw significantly higher rates of mortality from cardiovascular disease.[8]
- Autism. A national study found that children living close to industrial and commercial facilities releasing arsenic, lead or mercury into the air are significantly more likely to be diagnosed with autism spectrum disorder.[9]
- Asthma. A nationwide evaluation of National Air Toxics Assessment data performed by CDC scientists found a correlation between modeled acrolein exposure and prevalence of asthma attacks in census tracts across the US. [10]
- Cancer. A national study found that living close to industrial and commercial facilities releasing chemicals known to cause cancer is associated with significantly higher rates of cancer hospitalizations. The authors estimated that in 2009, excess cancer risk

[6] Weiland K, Neidell M, Rauh V, Perera F. Cost of developmental delay from prenatal exposure to airborne polycyclic aromatic hydrocarbons. J Health Care Poor Underserved. 2011 Feb;22(1):320-9. doi: 10.1353/hpu.2011.0012

[7] Hendryx M, Fedorko E. The relationship between toxics release inventory discharges and mortality rates in rural and urban areas of the United States. J Rural Health. 2011 Winter;27(4):358-66. doi: 10.1111/j.1748-0361.2011.00367.x

[8] Hendryx M, Luo J, Chen BC. Total and cardiovascular mortality rates in relation to discharges from Toxics Release Inventory sites in the United States. Environ Res. 2014 Aug;133:36-41. doi: 10.1016/j.envres.2014.05.010.

[9] Dickerson AS, Rahbar MH, Han I, Bakian AV, Bilder DA, Harrington RA, Pettygrove S, Durkin M, Kirby RS, Wingate MS, Tian LH, Zahorodny WM, Pearson DA, Moyé LA 3rd, Baio J. Autism spectrum disorder prevalence and proximity to industrial facilities releasing arsenic, lead or mercury. Sci Total Environ. 2015 Dec 1;536:245- 51. doi: 10.1016/j.scitotenv.2015.07.024.

[10] deCastro BR. Acrolein and asthma attack prevalence in a representative sample of the United States adult population 2000-2009. PLoS One. 2014 May 9;9(5):e96926. doi: 10.1371/journal.pone.0096926. eCollection 2014.

associated with these industrial and commercial exposures cost an estimated $902.8 million in treatment costs.[11]

Improved air quality can improve public health

There are several examples of clear public health improvements observed in response to improvements in air quality:

- In Southern California, air pollution control efforts were accompanied by meaningful improvements in children's respiratory health. As air quality improved, the percent of children with decreased lung function was cut in half,[12] and children with asthma were 30% less likely to experience symptoms of bronchitis.[13]
- The temporary closure of a steel mill in Utah Valley was linked to temporary improvements in birth outcomes and respiratory health. One study found that rates of premature birth were significantly lower among women who were pregnant while the mill was closed than among women who were pregnant before or after the closure.[14] Another study found that children's hospital admissions for pneumonia, bronchitis and asthma were two to three times higher when the mill was opened than when it was closed.[15]
- Federal regulations on leaded gasoline resulted in a dramatic decrease in blood lead levels in children across the country.[16] The Center for Disease Control and Prevention has concluded that there is no safe level of lead exposure due to its impacts on brain development. Because lead exposure comes from many sources, scientists were not sure of the extent to which lead from paint and gasoline were responsible for high blood lead levels in children until they were able to observe the effect of these regulations.

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[11] Hendryx M, Luo J. Cancer hospitalizations in rural-urban areas in relation to carcinogenic discharges from Toxics Release Inventory facilities. Int J Environ Health Res. 2013;23(2):155-69. doi: 10.1080/09603123.2012.708919

[12] Gauderman WJ, Urman R, Avol E, Berhane K, McConnell R, Rappaport E, Chang R, Lurmann F, Gilliland F. Association of improved air quality with lung development in children. N Engl J Med. 2015 Mar 5;372(10):905-13. doi: 10.1056/NEJMoa1414123

[13] Berhane K, Chang CC, McConnell R, Gauderman WJ, Avol E, Rapapport E, Urman R, Lurmann F, Gilliland F. Association of Changes in Air Quality With Bronchitic Symptoms in Children in California, 1993-2012. JAMA. 2016 Apr 12;315(14):1491-501. doi: 10.1001/jama.2016.3444.

[14] Parker JD, Mendola P, Woodruff TJ. Preterm birth after the Utah Valley Steel Mill closure: a natural experiment. Epidemiology. 2008 Nov;19(6):820-3. doi: 10.1097/EDE.0b013e3181883d5d.

[15] Pope CA 3rd.Respiratory disease associated with community air pollution and a steel mill, Utah Valley. Am J Public Health. 1989 May;79(5):623-8.

[16] EPA, History of Reducing Air Pollution from Transportation in the United States https://www.epa.gov/air-pollution- transportation/accomplishments-and-success-air-pollution-transportation

Other considerations

In attempting to estimate the economic and health burden of toxic air contaminant emissions in Oregon, there are several additional points worth considering:

- A portion of the health costs of toxic air contaminant emissions are currently externalized. People who are not employed by a facility, but who live, go to school, or work near a facility emitting pollutants above proposed Risk Action Levels may bear the health burden of pollution exposure without experiencing the economic benefit a facility may have from exceeding Risk Action Levels.
- Many of the broader social costs of disease are particularly difficult to quantify. For example, indirect costs of asthma hospitalization include missed days of work and school; indirect costs of neurodevelopmental delays include lost lifetime earning potential, social isolation, and caregiver time; indirect costs of fetal heart malformation often include increased risk of secondary health effects.
- Risk-based toxic air contaminant permitting regulations could also significantly improve the health of workers, resulting in lower health care costs and more productive workers. Workplace exposure standards are typically not entirely health-based.

Negative impacts on the public

The proposed rules could have negative economic effects on the public if facilities providing jobs and contributing to local economies were to curtail production or close in response to regulatory requirements. Because employment plays a key role in the public health, proposed Cleaner Air Oregon regulations include many provisions to allow flexibility for regulated businesses which would decrease the chances of closures in direct response to regulations. Under the draft rules, facilities above Risk Action Levels may wait for effective control technologies to develop if none are available at the time of permitting, unless their risk is above the Risk Reduction Level. Facilities demonstrating lack of financial ability to install the needed controls at the time required could postpone installation of controls to reduce risk. The proposed tiered implementation plan will delay potential impacts to many facilities. However, business decisions are influenced by many factors, and DEQ therefore lacks information to predict specific potential impacts to employment.

The proposed rules could affect the public indirectly if businesses alter the price of goods and services in response to increased base or activity permit fees or the cost to comply with Cleaner Air Oregon rules. DEQ expects any such price increases to be small, but lacks available information to estimate potential increases accurately.

Citizens and local government representatives, such as city or county health or planning staff and elected officials may also be impacted by the need to participate in public meetings, including time to research and understand potential toxic air contaminant health concerns and risk assessment and permitting issues, and time spent preparing communications and attending meetings. DEQ is not able to quantify the time and fiscal impact on public process participants, but recognizes that time spent may impact local government budgets and for members of the public may require time away from work, childcare, travel or other expenses.

Impacts on the environmental services sector

The direct cost of complying with regulations can result in increased employment. For example, an environmental regulation could mean more jobs for those engaged in pollution abatement. Further, it is possible that regulations may produce more labor-intensive production processes. Studies of national air quality regulations have shown positive effects on overall economic health. The Clean Air Act's public health safeguards encourage technology investments that can have positive economic effects on the public. Although in the short term new environmental regulations can have some positive and negative impacts on employment in different sectors, studies indicate that those impacts are limited and that the overall effect of environmental regulations on reported job shift events are extremely minor compared to other factors, such as overall economic growth, business cycles, and changes in technology.[17]

A peer-reviewed study by economists at Resources for the Future, a nonpartisan Washington, D.C. think tank, examined the impact of environmental compliance costs on employment in four regulated industries (pulp and paper, refining, iron and steel, and plastics). They concluded that increased environmental spending generally does not cause a significant change in employment. [18] Another peer-reviewed study published in the Journal of Public Economics found no evidence that stringent local air quality regulation substantially reduced employment in the Los Angeles basin over a 13-year period of "sharply increased" regulation.

Housing cost

To comply with ORS 183.534, DEQ determined the proposed rules may have an effect on the development cost of a 6,000-square-foot parcel and construction of a 1,200- square-foot detached, single-family dwelling on that parcel. The costs of additional permits, pollution control or process equipment, and compliance could be passed through by businesses providing products and services for such development and construction. The possible impact of these proposed changes appears to be minimal. DEQ cannot quantify the impact at this time because the available information does not indicate whether the costs would be passed on to consumers and any such estimate would be speculative.

[17] http://econweb.ucsd.edu/~elib/berman_bui2001
[18] https://www.epa.gov/clean-air-act-overview/clean-air-act-and-economy#_edn10

Documents relied on for fiscal and economic impact

Document title	Document location
Air Contaminant Discharge Permits – Table 1	http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/_340_tables/340-216-_0020_10-24.pdf
Air & Waste Management Association Fact Sheet: Air Pollution Emission Control Devices for Stationary Sources, April 2007	http://events.awma.org/files_original/ControlDevicesFactSheet07.pdf
EPA Air Pollution Control Cost Manual, Report No. 452/B-02-001, December 1995, Section 5, Chapter 1, SO2 and Acid Gas Controls	http://www.epa.gov/ttn/catc/dir1/cost_toc.pdf
EPA Air Pollution Control Cost Manual, Report No. 452/B-02-001, January 2002, Section 6, Chapter 1, Baghouses and Filters	http://www.epa.gov/ttn/catc/dir1/cost_toc.pdf
EPA Air Pollution Control Cost Manual, Report No. 452/B-02-001, September 1999, Section 6, Chapter 3, Electrostatic Precipitators	https://www3.epa.gov/ttn/ecas/docs/cs6ch3.pdf
EPA Health and Environmental Effects of Hazardous Air Pollutants	https://www.epa.gov/haps/health-and-environmental-effects-hazardous-air-pollutants
EPA Technical Bulletin Choosing an Adsorption System for VOC: Carbon, Zeolite, or Polymers? May 1999	https://www3.epa.gov/ttncatc1/cica/files/fadsorb.pdf
EPA Pollution Control Technology Fact Sheet Spray-Chamber/Spray-Tower Wet Scrubber, EPA-452/F-03-016	https://www3.epa.gov/ttncatc1/cica/files/fsprytwr.pdf
EPA Air Pollution Control Technology Fact Sheet Catalytic Incinerator, EPA-452/F-03- 018	https://www3.epa.gov/ttncatc1/cica/files/fcataly.pdf
EPA Air Pollution Control Technology Fact Sheet Regenerative Incinerator, EPA- 452/F-03-021	https://www3.epa.gov/ttncatc1/cica/files/fregen.pdf
EPA Air Pollution Control Technology Fact Sheet Thermal Incinerator, EPA-452/F-03- 022	https://www3.epa.gov/ttncatc1/cica/files/fthermal.pdf
EPA Air Pollution Control Technology Fact Sheet, Paper/Nonwoven Filter – High Efficiency Particle Air (HEPA) Filter, EPA-452/F-03-023	https://www3.epa.gov/ttncatc1/cica/files/ff-hepa.pdf

EPA Pollution Control Technology Fact Sheet Fabric Filter – Mechanical Shaker Cleaned Type, EPA-452/F-03-024	https://www3.epa.gov/ttncatc1/cica/files/ff-shaker.pdf
EPA Air Pollution Control Technology Fact Sheet Dry Electrostatic Precipitator (ESP) – Wire-Plate Type, EPA-452/F-03-028	https://www3.epa.gov/ttncatc1/cica/files/fdespwpl.pdf
EPA Air Pollution Control Technology Fact Sheet Permanent Total Enclosures (PTEs), EPA-452/F-03-033	https://www3.epa.gov/ttncatc1/cica/files/fpte.pdf
EPA The Clean Air Act and the Economy	https://www.epa.gov/clean-air-act-overview/clean-air-act-and-economy#economy
Analytical Components of the Benefits and Costs of the Clean Air Act 1990-2020, the Second Prospective Study	https://www.epa.gov/clean-air-act-overview/analytical-components-benefits-and-costs-_clean-air-act-1990-2020-second
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