Technical Review of Eastern Research Group's (ERG) Report "Environmental Justice and Economic/Market Information on Emissions-Intensive, Trade-Exposed (EITEs) Facilities in Washington"

Prepared for Western States Petroleum Association

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September 2, 2025

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1. EXECUTIVE SUMMARY

The Washington Climate Commitment Act (CCA), enacted in 2021, established the Cap-and-Invest program to reduce greenhouse gas (GHG) emissions from large industrial facilities in the state, referred to as "covered facilities." To prevent GHG emissions leakage from Emissions-Intensive, Trade-Exposed (EITE) facilities, the CCA currently provides "no-cost" GHG allowances, covering 100% of reported facility emissions. These no-cost allocations are scheduled to decline to 97% from 2027 through 2030 and then to 94% from 2031 to at least 2034.

It has not yet been established if there will be changes in the manner in which no-cost allowances are allocated to EITE facilities during the period from 2035 to 2050. As a result, the Washington Department of Ecology (Ecology) has been directed to prepare a report for the Washington Legislature that assesses the issue and provides recommendations on the most appropriate approach to allocating no-cost allowances to EITE facilities beginning in 2035.

As part of this process, Ecology contracted Eastern Research Group (ERG) to assess the potential environmental and economic impacts of different no-cost allowance allocation approaches by analyzing the expected impacts of the 6% reduction scheduled for 2034 (from 100% to 94% no-cost allocation). The ERG report, *"Environmental Justice and Economic/Market Information on Emissions-Intensive, Trade-Exposed (EITEs) Facilities in Washington,"* was published on June 30, 2025, and is publicly available on the Washington State Department of Ecology's website[1]. The report focuses on the following environmental issues:

- The estimated contribution of EITEs to total emissions of criteria air pollutants (CAPs), hazardous air pollutants (HAPs), and GHGs
- The projected health benefits from reductions in EITE-related CAP emissions resulting from the 2034 reduction in no-cost allowance allocations to EITE facilities
- The estimated monetary value of GHG emission benefits resulting from the 2034 reduction in no-cost allowance allocations to EITE facilities

In addition, the ERG report presents three case studies intended to address air quality issues in select counties with higher numbers of EITE facilities.

At the request of the Western States Petroleum Association (WSPA), Trinity Consultants, Inc. (Trinity) has conducted a technical review of the ERG report's methodologies, assumptions, and findings related to the environmental issues listed above. In summary, Trinity identified the following major flaws and shortcomings and has determined that in addition to providing poorly documented analyses the ERG report:

- Improperly assumed that reductions in no-cost GHG allowance allocations to EITE facilities would lead to directly proportionate reductions in CAP emissions.
- Did not identify any meaningful air quality issues associated with CAP and HAP emissions from EITEs, or discuss any substantial air quality benefits that would be expected from the 6% reduction in no-cost

[1] Eastern Research Group. 2025, June 30. Environmental Justice and Economic/Market Information on Emissions-Intensive, Trade-Exposed (EITEs) Facilities in Washington (Publication No. 25-14-057). Washington State Department of Ecology. https://apps.ecology.wa.gov/publications/documents/2514057.pdf

GHG allowances to EITE facilities, whether considered statewide, in overburdened communities, or in counties with higher numbers of EITE facilities.

- Failed to properly conduct the analysis of potential health benefits from assumed CAP reductions resulting from the 6% reduction in no-cost GHG allowances to EITE facilities, rendering the results of that analysis meaningless.

- Failed to accurately compute the monetary value of GHG reductions expected to result from the 6% reduction in no-cost GHG allowances to EITE facilities, reducing the health benefits from the stated $2.6 billion to the Trinity-calculated $213 million.

2. INTRODUCTION

One element of the Washington Cap-and-Invest program, established under the Climate Commitment Act (CCA) in 2021 and implemented in 2023, is intended to reduce greenhouse gas (GHG) emissions from large industrial facilities in the state. The law sets a declining cap on emissions and requires major emitters to obtain tradable allowances, with targets of reducing GHG emissions to 45% below 1990 levels by 2030, 70% below 1990 levels by 2040, and 95% below 1990 levels by 2050, at which point "net-zero" carbon emissions are to be achieved. One concern addressed during the development of the Cap-and-Invest program[2] was to ensure that leakage of GHG emissions from Emissions-Intensive, Trade-Exposed (EITE) facilities did not occur and that the facilities were not adversely impacted by the CCA. Under the CCA, EITEs are facilities that are energy intensive and have significant exposure to trade and are defined as facilities in the following sectors, including but not limited to those specifically listed:

- Building Product, Electronics, and Aerospace Manufacturing
- Food Processing and Manufacturing
- Petroleum Refining and Chemical Manufacturing
- Primary Metals and Glass Manufacturing
- Pulp, Paper, and Cement Manufacturing

The issue of concern with EITEs is that CCA requirements mandating GHG emission reductions would economically disadvantage in-state facilities, likely leading to a decline in in-state manufacturing, which would be offset by increased production and emissions at out-of-state facilities to meet existing product demand, a dynamic commonly referred to as "leakage."

To address the risk of leakage, the Washington CCA's Cap-and-Invest program provides "no-cost" GHG allowances to EITE facilities, allowing them to comply with program requirements without experiencing significant adverse economic effects. Under the current requirements, no-cost allowances are allocated to EITEs based on a baseline for facility emissions established using actual emissions from 2015 to 2019, as follows:

- 100% no-cost allowances from 2023 through 2026
- 97% no-cost allowances from 2027 through 2030
- 94% no-cost allowances from 2031 through 2034

The legislation and current WAC rules do not specify the manner in which no-cost allowances will be allocated to EITE facilities during the period from 2035 to 2050. As a result, the Washington Department of Ecology (Ecology) has been directed to prepare a report for the Washington Legislature, providing an assessment of the issue and recommendations on how best to proceed with no-cost allowance allocation to EITEs beginning in 2035.

As part of its process to develop this report for the Legislature, Ecology contracted Eastern Research Group (ERG) to assess the potential environmental and economic impacts of no-cost allowance allocation choices by analyzing the expected impacts of the 6% reduction scheduled for 2034 (from 100% to 94% no-cost allocation). The ERG report documenting this work, titled "*Environmental Justice and Economic/Market Information on Emissions-Intensive, Trade-Exposed (EITEs) Facilities,*" presents the following findings:

[2] RCW 70A.65.005(6) states: "The legislature intends to create climate policy that recognizes the special nature of emissions-intensive, trade-exposed industries by minimizing leakage and increased life-cycle emissions associated with product imports."

- The estimated contribution of EITEs to total statewide emissions of criteria air pollutants (CAPs), hazardous air pollutants (HAPs), and GHGs is less than 1% for most CAPs, 9% for NO_x, and 21% for SO_2, less than 0.4% for HAPs, and 13.3% for GHGs.

- The projected health benefits from reductions in EITE-related CAP emissions as a result of the 2034 reduction in no-cost allowance allocations to EITE facilities are $30.4 to $50.2 million.

- The estimated monetary value of GHG emission benefits expected from the 2034 reduction in no-cost allowance allocations to EITE facilities is $2.6 billion.

In addition, the ERG report also addresses the locations of EITE facilities relative to overburdened communities and presents three case studies focused on air emissions issues in select counties with larger numbers of EITE facilities.

At the request of the Western States Petroleum Association (WSPA), Trinity Consultants, Inc. (Trinity) conducted a technical review of the ERG report's methodologies, assumptions, and findings related to the environmental issues listed above. The results of Trinity's review are presented in this report.

3. CRITERIA AIR POLLUTANT (CAP) EMISSIONS

The ERG report assumes that the 6% reduction in GHG emission allowances will directly result in proportional reductions of criteria air pollutants (CAPs). This assumption is flawed for multiple reasons as described in Section 4 of this report. CAPs are compounds for which health-protective National Ambient Air Quality Standards (NAAQS) have been established or are precursors to pollutants for which NAAQS exist.

The CAPs addressed in the ERG report that have established NAAQS are:

- Carbon monoxide (CO)
- Sulfur dioxide (SO_2)
- Particulate matter with diameters of 10 micrometers or less (PM_{10})
- Particulate matter with diameters of 2.5 micrometers or less ($PM_{2.5}$)
- Nitrogen dioxide (NO_2)

The CAPs addressed in the ERG report that are precursors to compounds with established NAAQS are:

- Volatile organic compounds (VOC) – precursors to ozone formation
- Oxides of nitrogen (NO_X – including NO_2) – precursors to both ozone formation and $PM_{2.5}$
- SO_2 and Ammonia (NH_3) – precursors to $PM_{2.5}$ formation

The NAAQS for ozone were established because ozone is an oxidant and the primary compound associated with smog. As noted, VOC and NO_X emissions are precursors to the formation of ozone in the atmosphere, which results from photochemical reactions. Similarly, substantial portions of $PM_{2.5}$, and to a lesser degree PM_{10}, can be formed as a result of various atmospheric processes involving NO_X, SO_2, and NH_3. Importantly, according to Ecology's attainment status data[3], and with the recent redesignation of Whatcom County to attainment for SO_2[4], all areas of Washington currently comply with all NAAQS.

CAP Selection

The ERG report focuses its environmental analysis on certain CAPs but provides no explanation as to why these CAPs were selected. The selection of CO is particularly surprising, as the last Washington area out of compliance with the CO NAAQS came into attainment in the early 2000s, and all subsequent monitoring across the state has shown levels well below the standard. Similarly, the selection of SO_2 does not appear justified, given that only one area near the aluminum smelter in Whatcom County was in non-attainment with the SO_2 NAAQS, but that area was redesignated as attainment in January 2025. Statewide monitoring data show that SO_2 concentrations are now consistently far below the NAAQS. Inclusion of NO_X is more reasonable, given the need to maintain compliance with the ozone and $PM_{2.5}$ NAAQS, which is generally a regional issue. However, NO_2 emissions are also well below NAAQS, as discussed in the next section.

[3] Washington State Department of Ecology. 2025. Areas Meeting and Not Meeting Air Standards. https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards

[4] EPA. 2024. Designation of Areas for Air Quality Planning Purposes; Redesignation Request and Associated Maintenance Plan for Whatcom County, WA 2010 SO_2 Nonattainment Area. Federal Register, 89 (FR 101896), pp. 101896–101901. Environmental Protection Agency. https://www.federalregister.gov/d/2024-29575

CAPs and Air Quality

The ERG report presents ambient air quality data for the years 2020 through 2023 for NO_2, CO, SO_2, and ozone in Table 6 of their report, while providing minimal context. The reader is required to find "Comparison Values" (each pollutant's NAAQS) and compare those with "Design Values" (monitored concentrations in the form of each pollutant's respective NAAQS), some of which are presented in different units (e.g., CO values are presented in both ppm and ppb).

To assist in putting air quality data into perspective, Trinity prepared Figure 1 and Figure 2, which show that NO_2 and CO concentrations are far below the respective NAAQS values. Ozone concentrations are shown in Figure 3, and while they appear closer to NAAQS levels, it is important to note that the data used in the ERG report are not corrected for exceptional events (wildfire days). For ozone, Table 6 of the ERG report is also missing data for several sites that were reported by Ecology Network Plan; these missing 2023 design values are included in Figure 3 below based on Ecology's 2024 publication.[5] According to the Puget Sound Clean Air Agency[6], the 2023 ozone design value for the Enumclaw site, when wildfire smoke-impacted days are excluded, is 0.067 ppm, rather than the 73 ppb (0.073 ppm) reported by ERG. Since the current ozone NAAQS is 0.070 ppm (70 ppb), the difference between these values is critical for determining attainment status[7]. In addition, the Figure 3 chart appears to indicate there may be an increasing trend in ozone at the Enumclaw site; however, the 3-year design values are highest in 2022 and 2023 because they are most influenced by the wildfire years in 2021 and 2022 (2022 and 2023 are the two years that included both 2021 and 2022 in the 3-year average). The 4th highest 8-hour concentrations in 2023 and 2024 were lower than those measured in previous years at the site.[8]

Table 6 in the ERG report includes SO_2 design values for year 2020 and only from the Ferndale monitors, which were impacted by the now-closed aluminum smelter (which was not an EITE facility). The design value for those sites is now 3 ppb in contrast to the 68 and 89 ppb reported by ERG for the two Ferndale monitors. In addition, ERG did not report SO_2 data from ambient air quality monitoring conducted at three other Ecology monitoring sites (Anacortes, Cheeka Peak, and Seattle-Beacon Hill in Skagit, Clallam, and King counties, respectively) during all four years. The SO_2 design values ranged from only 1 to 3 ppb in 2023 compared to the NAAQS of 75 ppb, which is why Trinity did not prepare a figure presenting those data (i.e., the measured values are so far below the NAAQS that the bars would be indistinguishable from zero).

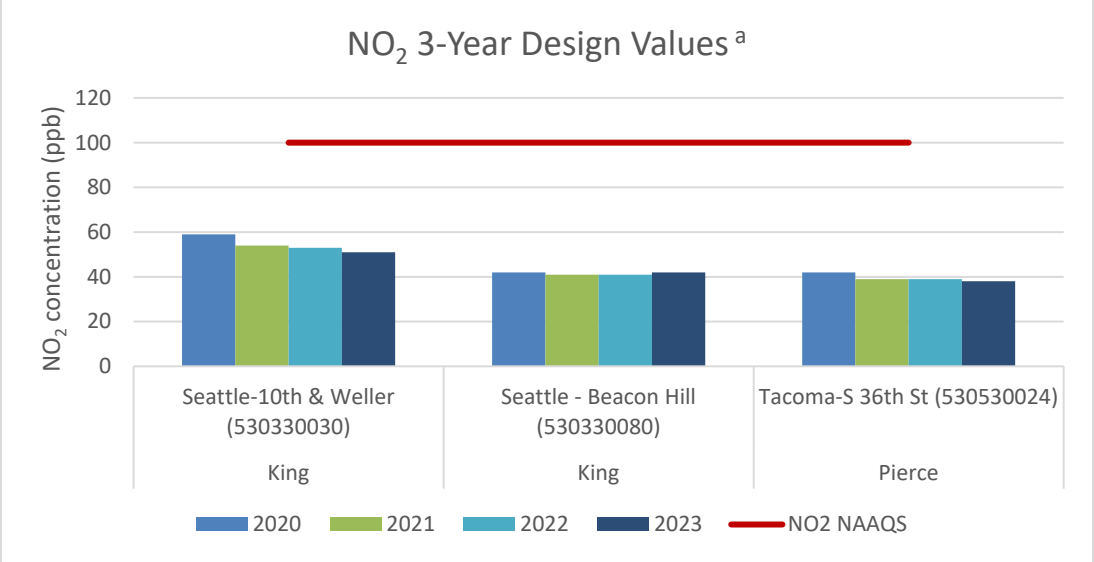
[5] Washington State Department of Ecology. 2024. Ambient Air Monitoring Network Plan 2024 (Publication No. 24-02-017). Washington State Department of Ecology. https://apps.ecology.wa.gov/publications/documents/2402017.pdf

[6] Puget Sound Clean Air Agency. 2024. 2023 Air Quality Data Summary (Air Quality Report). https://www.pscleanair.gov/DocumentCenter/View/5649/Air-Quality-Data-Summary-2023?bidId=

[7] U.S. Environmental Protection Agency. 2024. NAAQS table (Criteria Air Pollutants). https://www.epa.gov/criteria-air-pollutants/naaqs-table

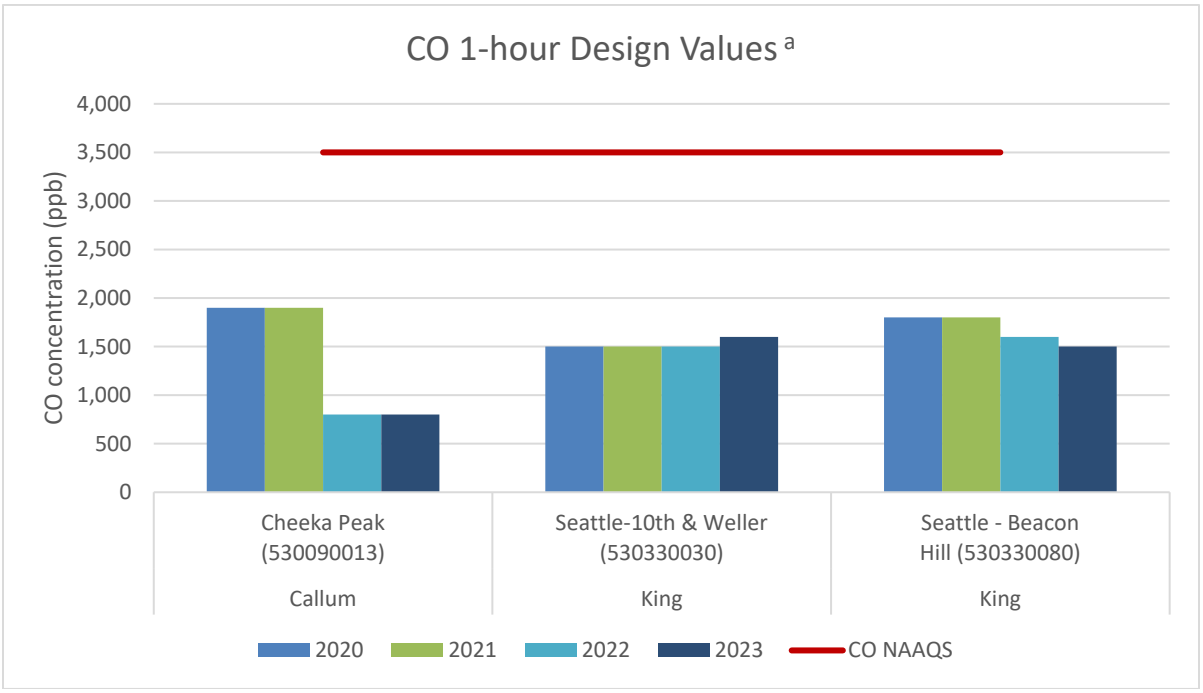
[8] Puget Sound Clean Air Agency. 2025. 2024 Air Quality Data Summary (Air Quality Report). https://pscleanair.gov/DocumentCenter/View/6035/2024-Data-Summary?bidId=

Figure 1. Comparison of NO_2 Design Value [a] Data Presented by ERG to the NAAQS Level.



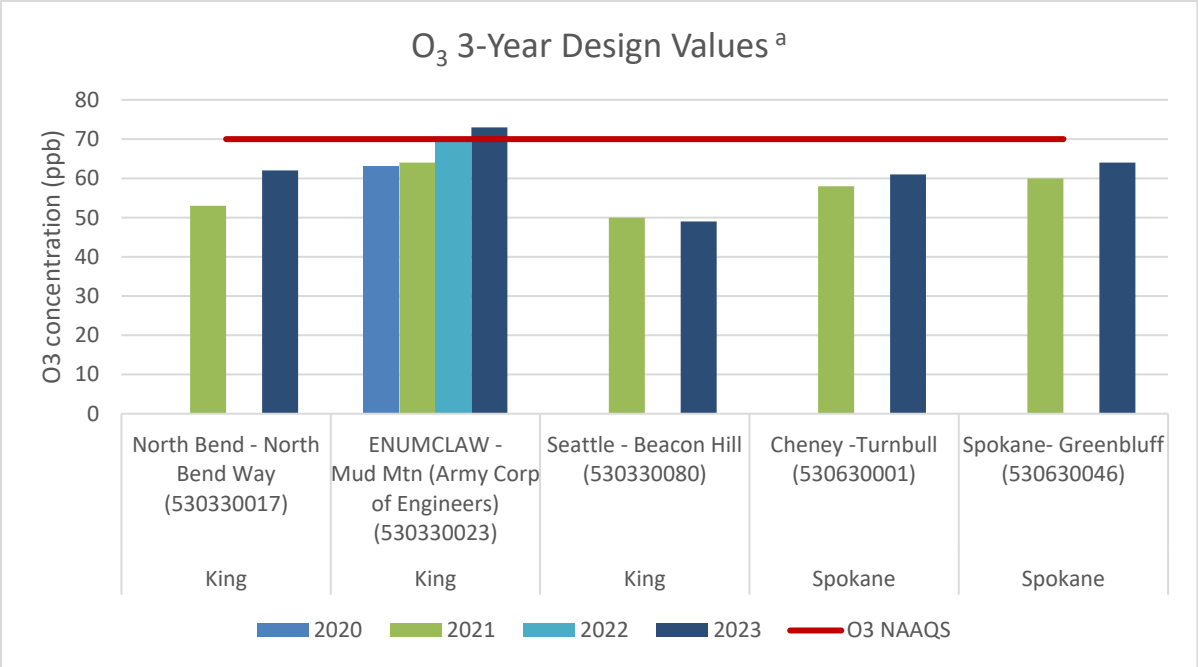
a. The NO_2 1-hour NAAQS design value is the 3-year average of 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

Figure 2. Comparison of CO Design Value [a] Data Presented by ERG to the NAAQS Level.



a. The CO 1-hour NAAQS design value is the 2nd highest 1-hour average value in each year (not averaged over 3 years).

Figure 3. Comparison of Ozone (O_3) Design Value [a] Data Presented by ERG to the NAAQS Level.



a. The ozone 8-hour NAAQS design value is the 3-year average of annual 4th highest daily maximum 8-hour concentrations.

EITEs and Statewide Inventory

The ERG report's assessment of CAPs relies on 2022 emissions inventory data in Table 2 (page 6 of the ERG report), which shows the total contribution of CAP emissions from EITEs to total statewide CAP emissions. According to the ERG report, EITEs contribute less than 1% of total statewide emissions of each CAP, with the exception of NO_X and SO_2. For NO_X, total EITE emissions are about 9% of total statewide emissions, and for SO_2, EITE emissions represent about 21% of total statewide emissions. Recall that the Design Values for SO_2 are orders of magnitude below the NAAQS, indicating minimal benefit of any subsequent reductions. Overall, the fact that air quality in the state of Washington complies with all federal NAAQS, and that EITEs contribute little to total statewide CAP emissions, except for SO_2, which is now significantly below NAAQS, suggests that there is not a pressing need for emissions reductions from EITEs beyond those already required under federal, state, and local regulations.

The ERG CAP assessment continues with reporting of total emissions inventory data for CO, NO_X, and SO_2 for 15 of Washington's 39 counties with EITEs in 2022, along with the percentage of county-level totals emitted by EITEs. As shown in Table 3 of the ERG report, in 9 of these 15 counties, EITE emissions accounted for 5% or less of total county-level emissions of each pollutant. The maximum contributions of EITEs to total emissions of CO, NO_X, and SO_2 were about 11%, 47%, and 96.4%, respectively.

Unfortunately, the ERG report does little to put these results into proper context, given that regardless of the contribution of EITEs to total emissions, pollutant concentrations do not violate the federal NAAQS.

In summary, nothing presented in the sections of the ERG report discussed above suggests that reductions in EITE emissions, resulting from reductions in no-cost GHG allowance allocations, would improve air quality in Washington.

4. HEALTH RISK ASSESSMENT

The ERG report does attempt to link reductions in CAP emissions from EITEs to health benefits. The report's analysis involves the use of U.S. EPA's CO-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA)[9]. The ERG report notes on page 22 that COBRA:

> *"...can be utilized to better understand how changes in air pollution from clean energy and fuel programs can impact human health."*

According to the ERG report, COBRA results indicated that a 6% reduction in CAP emissions from EITEs in 2034 would correspond to a total monetary health benefit of $5.5 to $8.5 million per year in the counties where EITE facilities are located, and a statewide benefit of $34 to $50 million. The ERG report also notes that about 95% of these monetary benefits are due to a reduction in mortality of 0.3 to 0.4 people in EITE counties and 1.6 to 2.4 people statewide. To put these mortality rates into perspective, the state of Washington reported[10] 66,062 deaths statewide in 2023, which means even the upper bound mortality reduction of 2.4 reported by the ERG report translates to an overall reduction of 0.004% in statewide deaths.

Additionally, Trinity's review shows that there are a number of flaws in the way the ERG report applied the COBRA model, and that these flaws caused the ERG report to overstate the health benefits associated with the assumed reduction in CAP emissions.

COBRA Model Use

The ERG report failed to appropriately characterize the COBRA model, which could lead the reader to inappropriately rely on the information presented as authoritative rather than recognize its modeling results as a preliminary screening, especially since dollar values are presented for the estimated health benefits.

The ERG report does not include or even mentions U.S. EPA's disclaimers,[11] which state:

> *"COBRA does not replace regulatory quality analyses. COBRA serves as a preliminary screening tool to identify those scenarios that might benefit from further evaluation with the more sophisticated air quality modeling approaches that are currently available."*

[9] U.S. Environmental Protection Agency. 2024. CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool. https://www.epa.gov/cobra

[10] Washington State Department of Health. (n.d.). All Deaths – County and State Dashboards [Data dashboard]. Washington State Department of Health. https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/death/county-all-deaths-dashboard

[11] U.S. Environmental Protection Agency. 2025. Why Use COBRA? https://www.epa.gov/cobra/why-use-cobra-0

CAP and GHG Correlation

Further, the ERG analysis inappropriately correlates the reduction in CAPs with GHG emission reductions. On page 2, the ERG report notes that COBRA was used to:

> *"…estimate the potential health benefits associated with EITE emission reductions in Washington. The analysis outlines the potential health benefits associated with a six percent reduction in criteria air pollutants (CAPs) from the 2023 baseline by 2034. This assumes the reduction in CAPs aligns with the GHG emission reductions."*

The ERG report assumes that the 6% reductions in EITE emissions of the CAPs VOC, NO_X, $PM_{2.5}$ and SO_2 would result from a 6% reduction in no-cost GHG allowance allocations – presumably because the report assumes EITE activity would decrease by 6%. There is clearly no technical basis for this assumption, given that GHG reductions needed for compliance with the CCA could be achieved by EITEs through specific GHG control strategies such as carbon capture and sequestration (CCS) or the use of renewable fuels for process energy, which may or may not result in proportional reductions in CAPs.

Interestingly, even the ERG report acknowledges that its assumption is invalid, as stated in footnote 17 (bottom of page 21 of the ERG report):

> *"The correlations between EITE facility GHG emissions and CAP emissions between 2012 and 2023 are 0.698 for SO2, 0.868 for NO_X and 0.588 for CO. However, for the purpose of this analysis, we assume a 1 to 1 relationship between reductions in GHG emissions and reductions in CAP emissions."*

This acknowledgement, which makes sense given the regulatory requirements and emissions control systems already in place to reduce CAP emissions, means that the ERG report overstated the reduction in CAPs, given that the 6% reduction applies specifically to GHG emissions. This also means that the health benefits are also overstated. Further, the relatively poor correlation values between CAPs and GHGs reported by ERG demonstrate that any meaningful effort to estimate CAP reductions from EITE facilities due to reductions in no-cost allowances should be performed on a facility specific basis using detailed information about how facility operations would be changed.

Modeling Methodology

In addition to the above, there are other serious flaws with ERG report's overall modeling methodology to assess health benefits associated with presumed reductions in CAPs. Although ERG states (pages 21 to 26 of the report) that its results represent the benefits that would result from the assumed reductions in CAP emissions from EITEs, the description provided in Appendix A for Table A.12 states:

> *"Table A. 12 outlines each EITE's county, sector, and changes in emissions that ERG input into COBRA. In COBRA, the selected county and sector dictate the emissions baseline. Given that some baseline emissions were less than the reduction amount, ERG input the change in emissions as an increase and then used the absolute value of the results. When emissions were not provided by Ecology, "N/A" is presented."*

In other words, the ERG report treated the health impacts of increased CAP emissions as equal in magnitude to the health benefits of decreased CAP emissions. This approach assumes a strictly linear relationship between emission changes and health outcomes in the COBRA model. The ERG report did not provide support for this assumption, even though it is well known that many atmospheric processes modeled by COBRA are non-linear — for example, the effects of changes in VOC and NO_X emissions on ozone levels.

As stated in the ERG report, the reason why the health impacts of assumed reductions in EITE CAP emissions were modeled as increases instead of reductions is that total EITE emissions (in tons per year) in that sector and for a given county were smaller than the assumed ton-per-year reductions in CAP emissions. As a result, applying those assumed reductions in EITE CAP emissions would have eliminated all EITE CAP emissions in that sector for that county from the COBRA modeling. However, the ERG report's choice to model emission reductions as emissions increases is, quite simply, incorrect.

The root of the problem is that the 2023 baseline emissions inventory in the COBRA model used to assess health impacts is fundamentally different than the 2023 Ecology baseline emissions inventory used by ERG to compute the assumed reductions in EITE CAP emissions. This mismatch creates a complete inconsistency between the 2023 baseline inventory and the modeled EITE CAP emissions reductions.

This issue can be easily illustrated through examination of the 2023 baseline emissions inventory for the Petroleum and Related Industries sector, which is split into three subsectors in the COBRA model: Asphalt Manufacturing, Oil and Gas Production, and Petroleum Refineries and Related Industries. COBRA contains emissions only for the Petroleum Refineries and Related Industries subsector, which is essentially the five petroleum refineries located in Washington[12] and all of which are EITEs. The ERG report also provides total 2023 CAP baseline emission estimates for all five of these petroleum refineries, as well as the assumed 2034 CAP reductions due to the 6% reduction in no-cost GHG allowance allocations to the refinery facilities. The baseline 2023 COBRA and ERG report inventory values are presented in Table 1.

As shown, the ERG report's baseline inventory ton-per-year values are about 3.5 to 8 times higher than the COBRA baseline inventory ton-per-year values, depending on the pollutant. As a result, when the ERG report assumed in its baseline inventory that a 6% reduction in no-cost GHG allowances would result in a 6% reduction in CAP emissions, the outcome was a much larger percentage of the COBRA baseline inventory. This is also shown in Table 1, where the results of the ERG report's methodological error led it to model a 21 to 47% increase in refinery CAP emissions instead of 6%. Clearly, this error dramatically inflated the magnitude of the apparent changes in EITE emissions and also resulted in a dramatic overstatement of the magnitude of the health impacts.

[12] BP Cherry Point Refinery, HF Sinclair Puget Sound Refinery, Marathon Anacortes Refinery, Phillips 66 Ferndale Refinery and U.S. Oil and Refining Co.

Table 1. COBRA and ERG 2023 Washington Petroleum Sector Emissions (tons per year)

	VOC	NO_X	$PM_{2.5}$	SO_2
COBRA Baseline	618	707	141	286
ERG Baseline	2485	5491	483	998
ERG 6% Reduction	149	329	29	60
Ratio ERG Baseline to COBRA Baseline	4.0	7.8	3.4	3.5
Ratio ERG 6% Reduction to COBRA Baseline	0.24	0.47	0.21	0.21
Effective Change in Sector Emissions Used by ERG in COBRA Modeling	+24%	+47%	+21%	+21%

While Trinity has not investigated every sector in the ERG report's assessment, it is highly likely that similar problems with inventory discrepancies exist in those sectors as well. This is evidenced by the ERG report's own statement that emission increases had to be used instead of decreases because the magnitude of the 6% reductions calculated in the ERG report was greater than the COBRA baseline emissions. It should also be noted that, as indicated in the COBRA user's manual, the ERG report could have input a custom emissions inventory baseline, just as it did for the human population estimates by county.

In summary, notwithstanding its modeling limitations, the ERG report had two options to properly exercise the COBRA model. The first was to use the COBRA baseline inventory and implement appropriate assumptions for emission reductions in each sector on a percentage basis rather than the ton-per-year basis. The second was to input the ERG baseline inventory as a custom emissions inventory. The ERG report did neither. Instead, it computed emission changes in tons per year using its own baseline and then applied those to the COBRA tons per year baseline, thereby inflating the actual magnitude of the emissions change.

The fact that CAP emission reductions were modeled as increases, coupled with the failure to recognize the fundamental inconsistencies between the COBRA baseline inventory and the ERG report baseline inventory, renders the ERG report's health impact assessment and associated cost benefit results meaningless. Again, it should be stressed that proper analysis will likely result in dramatically lower health impact values, even when using the COBRA model.

5. GHG EMISSIONS AND SOCIAL COST OF CARBON

The ERG report presents very little information related to overall GHG emissions in Washington or those specifically associated with EITEs. In the Executive Summary and the GHG Emissions section of the report (pages 4 and 5), ERG states that in 2023, based on data collected by Ecology, there was a total of 90.8 million metric tons of CO_2-equivalent emissions reported under Washington's GHG Reporting Program. It also states that, in 2023, the 39 identified EITEs accounted for 13.3% of the total reported emissions. Table A1 in Appendix A of the report presents annual GHG emissions in terms of CO_2 equivalents for each of the 39 EITEs over the period from 2012 through 2023.

The ERG report then discusses the benefits of GHG reductions that would result from the 6% reduction in no-cost allowance allocation to EITEs in 2034, expressed in terms of the social cost of carbon (pages 26 and 27). The extremely brief description of the methodology mentions that a social cost of carbon value for 2034 was interpolated from data presented in U.S. EPA's 2023 Report on the *Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*.[13] However, the actual value used for the social cost of carbon is not provided by ERG.

Next, the ERG report indicates that it determined the GHG reductions as follows:

> *"Using the 2023 covered emissions as a baseline, we assumed a six percent reduction in covered greenhouse gas emissions by 2034, in line with the no-cost allocation for EITEs in 2034."*

While not specifically discussed, it appears that ERG then multiplied the social cost of carbon in 2034 by 6% and, after accounting for inflation, arrived at an estimate of $2.6 billion as the total benefit of the GHG emission reductions resulting from the 6% decrease in no-cost allowance allocation to EITEs. Results for specific EITE sectors are presented in Table 13 of the ERG report. It is important to note that the report contains no details of how this value was calculated, as it does not provide the value of the 2034 social cost of carbon used, the 2034 GHG emission reductions assumed to result from EITEs, or the value of the adjustment to convert from 2020 dollars to 2024 dollars.

Given the lack of detail provided in the ERG report regarding its social cost of carbon calculation, Trinity attempted to replicate it. Trinity first estimated the GHG emission contribution of EITEs in the state of Washington by multiplying the total 2023 covered emissions of 90.8 million metric tons of CO_2-equivalent emissions by 13.3% as follows:

Total GHG emissions from EITEs = 0.133 x 90,800,000 metric tons of CO_2-equivalent emissions

The result is 12.1 million metric tons of CO_2-equivalent emissions. Next, the emission reductions from the 6% reduction in no-cost allowance allocations in 2034 are estimated as follows:

2034 GHG reductions from EITEs = 0.06 x 12,100,000 metric tons of CO_2-equivalent emissions

[13] U.S. Environmental Protection Agency. 2023. EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (Supplementary Material for Regulatory Impact Analysis). https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf

The result is 0.73 million metric tons of CO_2-equivalent emissions. It should be noted that this reduction represents less than 1% of the assumed 90.8 million metric tons of covered GHG emissions.

Next, Trinity obtained the 2034 social cost of carbon value of $245 per metric ton of CO_2 emissions[14] from Table A.5.1 of the 2023 EPA report referenced above, using the 2% discount rate in line with the ERG report. Trinity then adjusted the cost from 2020 dollars for inflation, applying a CPI index of 1.19, and arrived at $292 per metric ton of CO_2 emissions in 2024 dollars. Finally, Trinity calculated the value of the 2034 GHG reductions from EITEs as follows:

Value of 2034 GHG reductions from EITEs = $292 per metric ton x 730,000 metric tons

The result was $213,160,000 or about 8% of the $2.6 billion value from the ERG report. To put this in perspective, the social cost of carbon used in the ERG report would have to be about $3,600 per metric ton of CO_2, which is completely inconsistent with the values presented in the EPA report. Unfortunately, given the lack of information provided in the ERG report, the source of the discrepancy between the ERG report's calculations and Trinity's calculations cannot be identified.

It is also important to note that the estimated monetary value of GHG reductions obtained using the social cost of carbon values from the referenced U.S. EPA report represents global impacts, not impacts in the geographic region where the GHG reductions occur. This means that only a very small fraction of the $213 million in benefits would actually be realized in the state of Washington, in contrast to the full economic impacts, which would directly affect the state.

[14] The EPA report presents social cost values for methane and nitrous oxide. However, because the ERG report expresses GHG emissions in CO_2 equivalents, the differing global warming potentials of these gases have already been accounted for, and the use of the social cost of CO_2 is appropriate.

6. HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS ASSESSMENT

The ERG report also presents an assessment of hazardous air pollutant (HAP) emissions from EITEs relative to HAP emissions from other sources. As noted by ERG in Table 1 (page 4), HAPs are: "p*ollutants that are known or suspected to cause cancer or other serious health effects."* and that *"Washington state regulates over 430 toxic air pollutants from industrial and commercial sources."* The ERG report also notes on page 15 that there are 188 HAPs and indicates in Table A.9 that emission inventory values contained in the report were developed by U.S. EPA as part of the National Emissions Inventory.[15]

HAPs and Air Quality

The ERG report presents an analysis of total HAP concentration data based on ambient air quality monitoring. These results, which do not differentiate between HAPs emitted by EITE facilities and all other sources of HAPs, are presented in terms of monitor locations where the cancer risk posed by all HAPs exceeds 1 in a million (see Table 7 of the ERG report). In addition, specific compounds are identified where monitoring data shows a Noncancer Hazard Quotient equal to or greater than 1 (Table 8), or where monitored concentrations exceed Acceptable Source Impact Level (Table 9). However, no differentiation is made between emissions of HAPs from EITEs and emissions from other sources, so reported data reflect contributions from all HAP sources and do not represent potential impacts from EITEs.

In contrast, a technically sound assessment of potential HAP impacts from EITEs would need to apportion the sources of HAPs observed at each monitor and determine the fraction of the measured concentration attributable to EITE facilities in the area. Similarly, to assess the impacts of a reduction in EITE HAP emissions resulting from reductions in no-cost GHG allocations, one would need to evaluate whether any reductions in HAPs would occur, model those reductions on a facility-specific basis, and then apply pollutant-specific toxicity data to assess health benefits.

HAPs and Statewide Inventory

In addition to the above, the large number of HAPs (and TAPs) regulated by the state of Washington have a wide range of potential health effects and potencies. However, in the ERG report, HAPs are summed together and reported in terms of their total mass. Tables 4 and 5 (pages 7 and 8 of the ERG report) indicate that total HAP emissions from all EITEs represented only 0.4% of the total statewide HAP inventory in 2022. Total HAP emissions in the 15 counties where EITEs are located accounted for as little as 0.005% and up to 8.3% of total HAP emissions, depending on the region analyzed. Although the ERG report performs no analysis of the impact of reductions in no-cost GHG emission allowances on EITE HAP emissions, if the same (unsupported) correlation approach is applied to HAP emissions as the ERG report implemented during the CAP-based health benefits assessment, the reductions would amount to only a 0.024% reduction in total statewide HAP emissions and about a 0.5% reduction in HAP emissions in those counties where EITEs make the greatest contributions.

In summary, given the lack of a technically sound analysis, the ERG report does not provide meaningful insight into HAP or TAP impacts from EITE facilities or from possible reductions in emissions of those compounds. Based on the information presented, the ERG report should have concluded that the HAP

[15] U.S. Environmental Protection Agency. 2025. 2022v1 Emissions Modeling Platform. https://www.epa.gov/air-emissions-modeling/2022v1-emissions-modeling-platform

emissions from EITEs are too small to warrant a detailed analysis, or that HAP concentrations are already below levels of concern.

7. REVIEW OF ERG'S CASE STUDIES

The ERG report also presents what are described as "Case Studies" of Cowlitz, King, and Skagit counties (see pages 57-89), which were selected because *"…they host a large number of EITEs and have high levels of GHG emissions from EITEs."* The report indicates that the number of EITE facilities is seven in Cowlitz county, four in King county, and four in Skagit county. No explanation is provided for how these case studies are relevant to the report's findings.

In each case study, the amount of GHG emissions from EITEs is presented along with comparisons to total county GHG emissions from all facilities covered by the CCA. The report then notes that EITEs account for a substantial portion of each county's covered GHG emissions. However, there is no discussion on what conclusions, if any, should be drawn from these findings. Their inclusion may imply that reductions in GHG emissions from EITE facilities would produce some sort of localized air quality benefits. If so, it should be noted that there is no technical basis for this conclusion, since GHG emissions are global in scale and do not provide localized benefits in and of themselves except through unproportional "co-benefits" such as potential reductions in CAPs and HAPs.

Similar discussions are presented for EITE contributions to CAP and HAP emissions in each county, using data generally already included in the broader CAP and HAP sections of the ERG report. Again, the ERG report is silent on how these county-level results are relevant to the report's overall conclusions.

Nothing in the ERG report's case studies suggests that, even in counties with higher numbers of EITE facilities, EITE emissions contribute substantially to an identified air quality issue, or that potential reductions in EITE emissions resulting from reduced no-cost GHG allowance allocations would provide a meaningful air quality benefit.

8. OVERBURDENED COMMUNITIES

The ERG report also discusses EITEs in relation to their proximity to Overburdened Communities (OBCs) and OBCs "Highly Impacted by Air Pollution." In its Executive Summary, the ERG report states:

> ***"Twenty EITEs are located within overburdened communities in Washington State and 10 EITEs are located within overburdened communities highly impacted by air pollution, as defined by the Department of Ecology. Seven EITEs are located in or near Tribal Lands."***

However, the ERG report does not provide any assessment of the actual impacts of EITEs on OBCs, nor does it evaluate the impacts that reductions in GHGs, CAPs, or HAPs from decreased no-cost allocations of GHG allowances to EITE facilities would have on these communities. Instead, the report only notes the geographic proximity of some EITEs to OBCs.

Presumably, the ERG report's consideration of OBCs is related to the Revised Code of Washington (RCW) Section 70A.65.020, which requires that the CCA achieve reductions in criteria pollutants as well as greenhouse gas emissions in overburdened communities highly impacted by air pollution. A map showing the location of OBCs with the highest cumulative air pollution levels, developed by Ecology,[16] is presented in Figure 4 below, along with Figure 5, which shows the locations of EITEs in relation to OBCs highly impacted by air pollution and is from the ERG report (reference Figure 33). As shown, the communities shown in Figure 4 developed by Ecology generally align with the OBCs highly impacted by air pollution identified in the ERG report in Figure 5, and it does appear, based on Figure 5, that ten EITEs are located in OBCs highly impacted by air pollution. This means that the other twenty-nine of the total of 39 EITEs (or roughly 75%) in Washington are located outside of OBCs that are highly impacted by air pollution. Figure 5 also shows that OBCs highly impacted by air pollution cover only a relatively limited portion of the state.

[16] Washington State Department of Ecology. (n.d.). Improving Air Quality in Overburdened Communities. https://ecology.wa.gov/air-climate/climate-commitment-act/overburdened-communities

Figure 4. Washington communities with the highest cumulative air pollution levels.

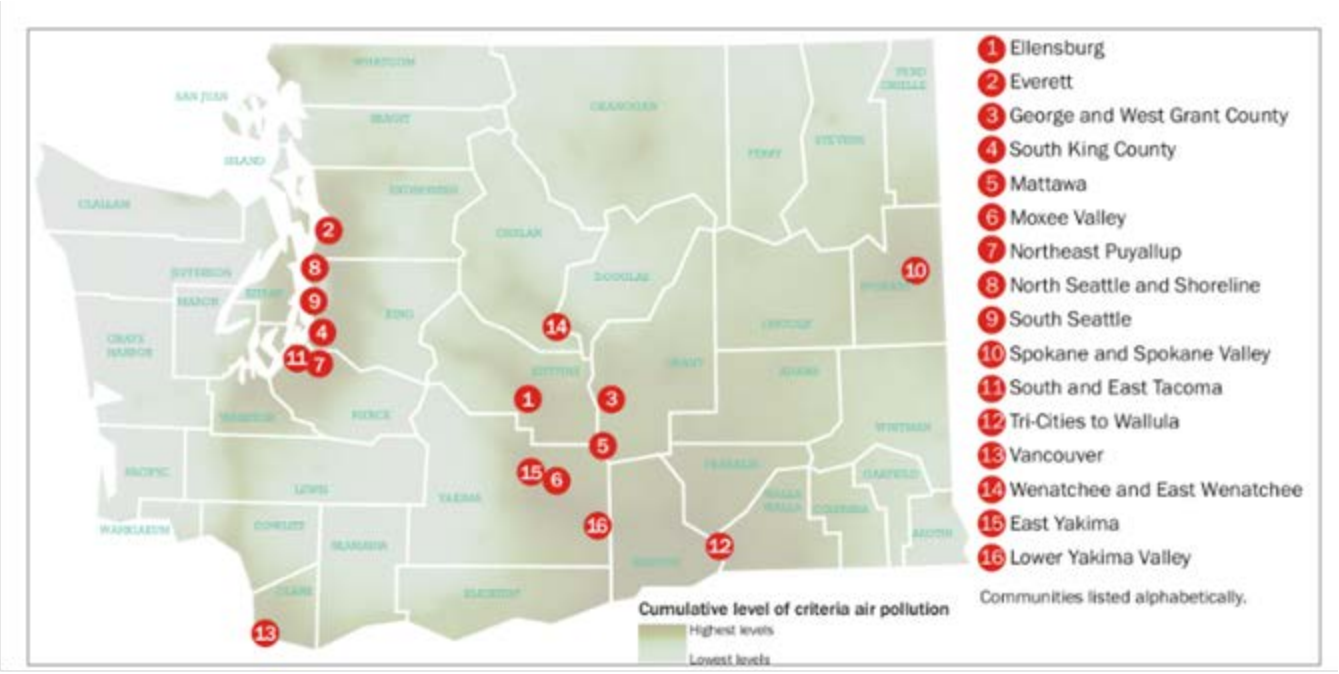


Figure 5 (ERG Figure 33). Map of EITEs and OBCs highly impacted by air pollution.

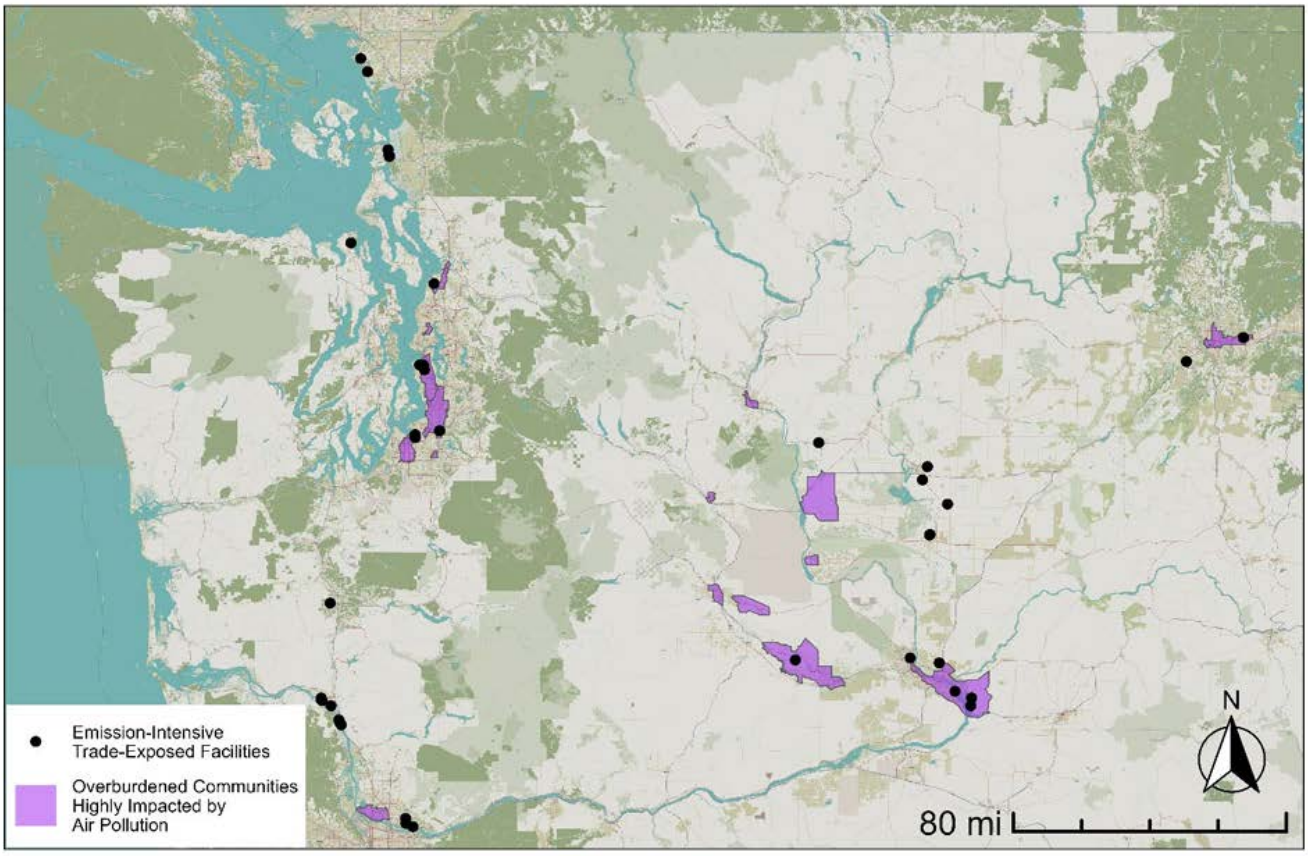


Figure 33. Map of EITEs and OBCs highly impacted by air pollution.

A similar map is presented in Figure 6 (Figure 34 of the ERG report), showing the location of EITEs relative to Tribal Reservations. This figure again is consistent with the ERG finding that seven EITEs are located on or near tribal lands. However, ERG fails to make it clear which EITEs are both located in OBCs highly impacted by air pollution and also located on or near tribal lands. Again, the ERG report provides no analysis or data on the impact of total EITE emissions, or reductions in EITE emissions, on Tribal Reservations due to reductions in no-cost GHG allowances to EITE facilities.

Figure 6 (ERG Figure 34). Map of EITE locations and Tribal Reservations.

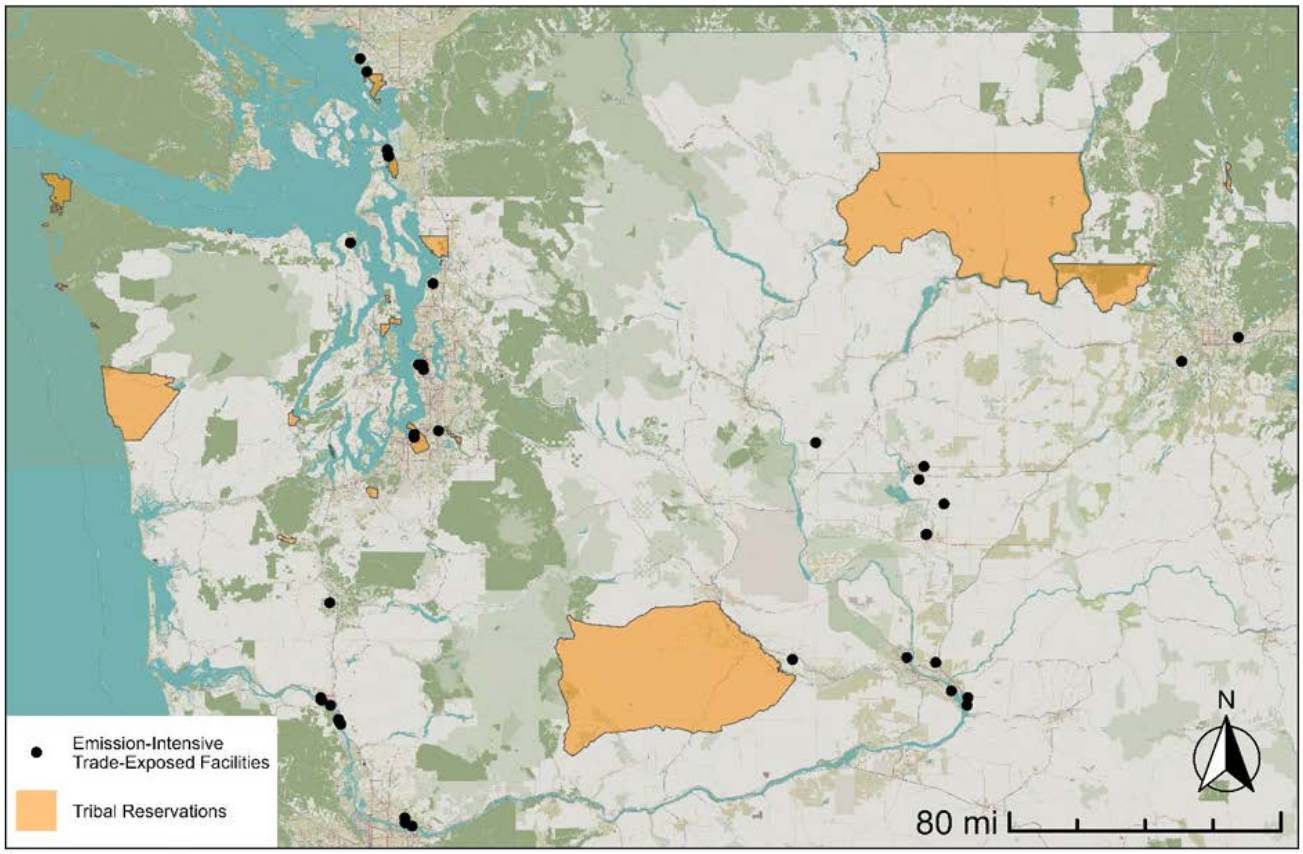


Figure 34. Map of EITE locations and Tribal Reservations

Interestingly, the ERG report also includes another map in Figure 32 (referenced as **Figure 7** in this report), which shows EITE locations and apparently the locations of all overburdened communities in Washington, from which ERG reaches the conclusion listed below:

> ***"There are 20 EITEs located within overburdened communities in Washington State, and an additional 15 EITE facilities located nearby (within three miles) of overburdened communities (see Figure 32)."***

There are a number of issues raised by ERG's Figure 32. First, ERG provides no explanation of why the location of EITEs in or near OBCs that ***are not*** highly impacted by air pollution is relevant. Second, ERG again provides no analysis or data that addresses either the direct impact of EITEs on these OBCs or how a reduction in the no-cost allocation of GHG allowances would affect any of these communities. Finally, although unstated by ERG, the point of Figure 32 seems to be to show that 35 of 39 EITEs in Washington are in or near OBCs (which are shown to cover roughly half of Washington's geographic area) and to imply a linkage between EITEs and OBCs, even if the OBCs are not highly impacted by air pollution.

Figure 7 (ERG Figure 32). Map of overburdened communities and EITE facilities.

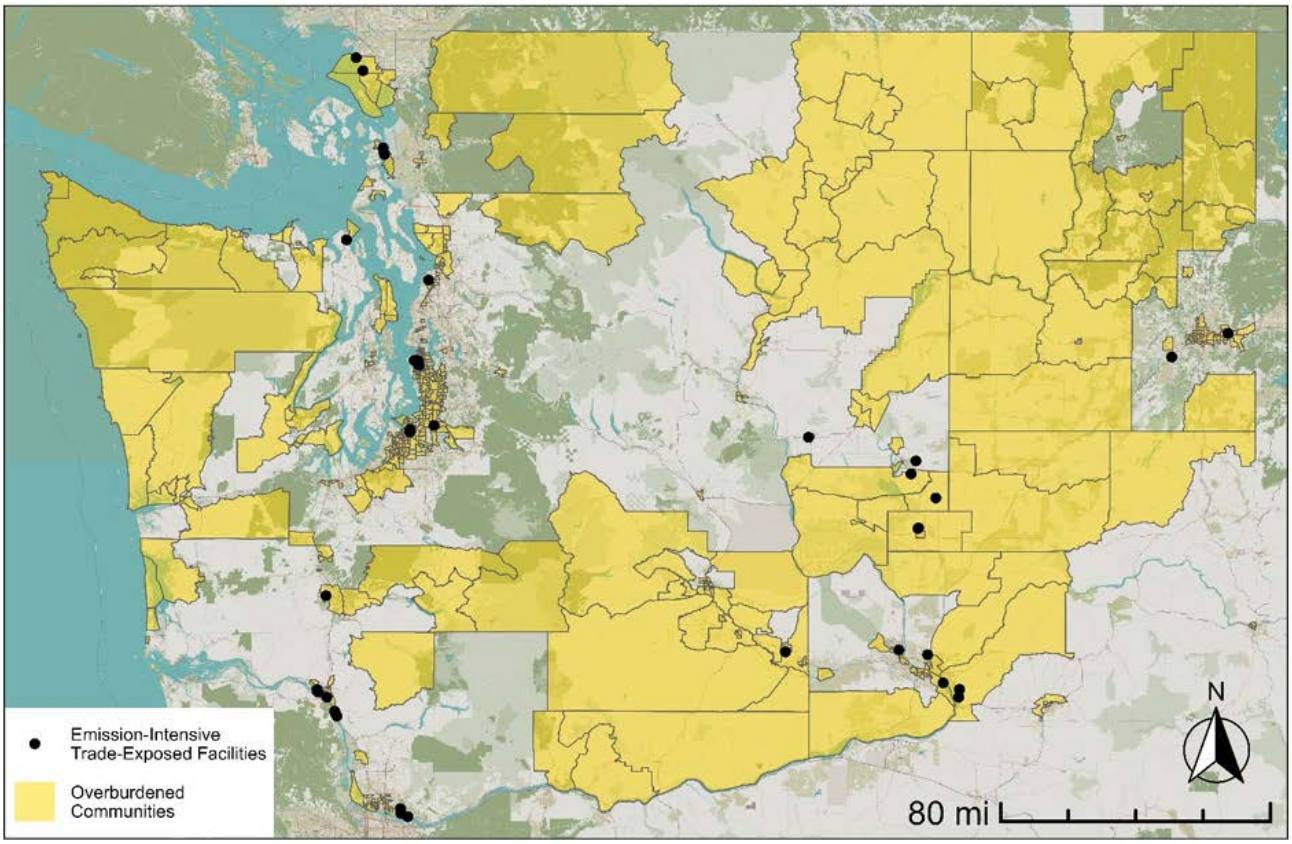


Figure 32. Map of overburdened communities and EITE facilities.