BY EMAIL

August 30, 2018

Ms. Khamly Chuop
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Port of Oakland
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RE: Comments on Draft Seaport Air Quality 2020 and Beyond Plan

Environmental Defense Fund (EDF) respectfully submit these comments regarding the Draft Seaport Air Quality 2020 and Beyond Plan released in June 2018.

EDF is an environmental advocacy organization with more than two million members and expert staff working across multiple disciplines and sectors. EDF has been working on air quality issues, particularly in the goods movement sector, green supply chain and smart energy systems for more than two decades. Our representative staff has served as a member of the Port's Maritime Air Quality Improvement Plan (MAQIP) task force since 2007 and continues to be engaged.

We appreciate the Port's effort to begin developing this forward-looking plan early to allow a smooth transition from the current MAQIP which expires in 2020. While the implementation of MAQIP has led to notable emission reductions over the past ten years, the impacts of the Port's operations on local air pollution and health of the residents of the West Oakland Community remain. We support the Port's vision toward becoming a zero-emission seaport with this draft plan and we offer our comments and recommendations to support a robust plan that will accomplish the long-term vision while also ensuring real, significant emissions reductions and better air in the West Oakland neighborhood in the more immediate term.

STAKEHOLDER ENGAGEMENT, TRANSPARENCY & ACCOUNTABILITY

1. **Commitment to Real Engagement Plan with Stakeholders** – The timeline and commitment for ongoing collaboration with stakeholders is vague, and what is described is not adequate. We determine that five-year report-outs are insufficient measures to engage with stakeholders. We recommend holding at least annual meetings for stakeholders to provide input and receive updates on progress, annual emissions inventory updates, and health risk assessment updates annually until health risks are resolved.

2. **Concrete and Legitimate Public Engagement Processes** - There is no evidence in the draft plan that input received during public engagement meetings has been addressed comprehensively. After asking for input at the two previous meetings, we have not seen systematic response from the Port to public input. Assurances and responses to concerns are vague and unsubstantiated by action. For example, that Port has not provided a substantive response – either in a modified plan, or a point-by-point response – to written comments submitted by EDF on March 16, 2018. We recommend more concrete and organized responses to public engagement efforts and suggest that the Port host all public comments as well as responses to comments on their website. As such, we request that the Port respond to our comments here point-by-point.

3. **More Responsive Timeline** – The aim to update the plan in five years is too long, especially as the intention is to focus on Near-Term Actions. Clean technologies are advancing rapidly and many will become available and affordable in the near future. We recommend that there be annual review of the plan in the first few years so that additional actions can be added to the Near-Term plan as new technologies and funding become available.

4. **Annual Implementation Actions** – Related to the point above, in a future draft, implementation actions should be broken down by year. This annual breakdown should include greater specificity on expectations for emissions trends and measured air quality improvement. In addition, the final plan should specify who is responsible for taking action, and where the funding will come from.

5. **Technology Transition Needs to be Transparent -** *The Port should be fully transparent about the equipment, infrastructures, and fuel options that it plans to invest in in the near- and intermediate-term and the implications for, and potential hindrance to, the adoption of cleaner alternatives in the future.* We recommend that part of the feasibility criteria and/or capital investment plan include assessment on useful life of each investments and whether and how future cleaner alternatives can be integrated. One specific element that should be very transparent is if the Port decides to pursue any natural gas projects as this commits the Port to a long-term pathway that stakeholders should know about.

GOALS & METRICS

6. **Emissions Reduction Goals** - There are insufficient metrics for measuring progress and success. We ask the Port to clarify emissions reduction goals – for both GHG and criteria pollutants. These goals should be the basis for developing metrics and reporting to stakeholders so that progress can be tracked.

    a. The draft plan states “the Port will report reductions in GHG emissions compared to regulatory and policy targets”. We would like to understand how the Port will translate state-level goals to Port’s specific goals. Additionally, as California is ahead of its 2020 GHG target, what implications does this have for the Port in setting its own reduction goals?

b. Similarly, as the Port signed onto the City's Energy and Climate Action Plan, we would like to understand how the City's emissions limits schedule is taken into account in the Blueprint plan.

7. **Expanding Adoption Criteria** - The existing adoption criteria focus solely on technical feasibility and finances. We recommend creating adoption criteria that includes community impact in order to more fully capture and mitigate all potential risks and benefits.

8. **Refining Emissions Inventory Methodology** – At the request of EPA, EDF has drafted comments for updates to EPA's guidance on port-related emission inventory best practices. We've attached our letter of recommendations to EPA here for your reference and consideration. Our comments to EPA are based on a review of emission inventories prepared by several ports in the US and look to assess the uncertainties surrounding inventory data sources and methodologies employed by a number of different ports in the U.S. Below are some recommendations that are particularly pertinent to the Port of Oakland. We urge the Port to consider adopting these measures as tools in emissions inventory reporting going forward.

    a. Automated data collection that can capture detailed activity data is available across most vehicle and equipment types and should be leveraged to improve the accuracy of emission estimates. These include telematics/fleet software that use Global Positioning Systems (GPS) and tap into the Engine Control Module (ECM) for trucks, Automatic Information Systems (AIS) for harbor craft and OGV, and for CHE, non-road OEMs are making available telematics and fleet software similar to on-road OEMs.

    b. Expand the geographic scope of each emission source mode to the first intermodal transfer point and in a way that reflect the mode footprint. For instance, the boundary for calculating truck emissions is currently limited to road links to freeway interchanges and rail yards just beyond port gates. However, a local traffic study (BAAQMD Truck Survey 2009) and the Port's guide for trucks (Port of Oakland, n.d.) both show that port-associated drayage trucks drive on local roads beyond those included in the inventory.

    c. Apply sensitivity analysis to account for uncertainty and improve accuracy. Sensitivity analysis helps surface the variability and uncertainty inherent in data, particularly considering the many different ways of data collection, as well as model approaches. For instance, studies have shown that short-term and extended idle can have substantially different emission factors. By assuming a fixed total idle time, idle-related emissions are likely to be underestimated. A simple analysis that includes proportional idle time between short vs. extended idling can generate a more accurate estimate. In relation to point 7a, data from automated systems can also enable sensitivity analysis and other refinements to emission calculations.

    d. Continue to calculate total emissions from sources. We see many ports are showing how emissions on a per unit basis (TEU or cargo ton) are decreasing; however with rising throughput, their total emissions will increase. We appreciate that the Port of Oakland is

tracking total emissions which should continue to be used as the key metric for the drive toward zero-emission goal and to minimize impact on the community.

IMPLEMENTING ACTIONS & FUNDING

9. **Develop a Real and Tangible Plan to Fund AQ Mitigations** - Under the current draft, the original problem of insufficient commitment to funding mitigations persists. As per comments of interagency stakeholders in the original process, EPA, local air district, and local health agencies wrote, "it is very important for the Port Commission to take some additional concrete steps to make the MAQIP a plan that clearly demonstrates the Port's strong commitment to improving air quality and the health of Oakland residents who live near the Port." The missing component is a realistic strategy to fund emissions mitigations adequately. Unfortunately, the prior MAQIP suffered from the same limitation, and thus leads EDF to ask if the Port is truly committed to seeing thru improved air quality and associated health. This broad concern leads to several additional questions pertaining to the current proposal:

    a. The draft plan highlights implementing actions for the near-term. Have these actions been incorporated into the Port's capital investment plan already? Recognizing that the Port has a five-year capital investment plan through 2022, what mechanism will be used to incorporate implementing actions into the existing plan? Similarly, the Port submitted a draft budget for 2018-2020 to the Board in July, how will actions identify in the Blueprint be included, if not already?

    b. To demonstrate commitment to actions, we also recommend that the Port include an investment plan similar to the Technology Advancement Program[1] adopted by the Port of LA to accelerate cleaner technologies at the Port.

10. **Demonstrate Commitment to Winning Grants –** As part of the funding and investment plan, we suggest that the Port commit to not leave any grant funding opportunities unapplied for. This would include having dedicated and adequate staff capacity to develop and submit grant applications, as well as building sufficient matching funds for grants into the budget.

11. **Explore Innovative Funding Mechanisms** - We urge the Port to consider designing a loan program for electric drayage trucks, CHE and other off-road equipment to make it easier for operators to transition to zero-emission technologies. A number of electric CHE are now commercially available and zero-emission Class 7-8 trucks are in demonstration or early commercialization phase. We also recommend that the Port explore the establishment of an Air Quality Finance Authority, recommended by the U.S. EPA's National Environmental Justice Advisory Council.[2] This authority could serve as a mechanism to assist small fleet owners and other goods movement related businesses to receive low cost financing.

[1] Port of LA Technology Advancement Program
https://www.portoflosangeles.org/environment/progress/initiatives/technology-advancement-program
[2] Reducing Air Emissions Associated With Goods Movement: Working Towards Environmental Justice
https://www.epa.gov/sites/production/files/2015-02/documents/2009-goods-movement.pdf

We also offer the following comments on specific implementation actions:

12. **Clarifying the Scope of Drayage Truck Charging Infrastructure-** The proposed needs assessment and feasibility study (Table 2) should reflect how drayage trucks are operated beyond the gates of the Port, including an assessment of the daily cycle of the trucks. It should map out optimal charging strategies while minimize the overall emission footprint, for instance, taking into consideration the potential impact on peak load. Importantly, planning and committing real estate for infrastructure requirements for these technologies will also be critical and should be built into the assessment. Additionally, recognizing that most drayage drivers are independent with limited resources, the assessment should also take into account the cost impact on drivers. We request that the Port share the scope of the proposed study as it becomes ready.

13. **Electrification and Resilience Plan for Mobile Elements of Operations** – Beyond the charging infrastructure for drayage trucks, we recommend that the Port develop a clear roadmap for infrastructure that will be needed to electrify other mobile components of its operations - including a resiliency assessment. EV systems have the potential to be more resilient that fossil-fueled systems for several reasons, notably shorter supply lines and potential for in situ generation. On the point of generation, as the Port is itself a municipal utility, it has the opportunity to lead the development of renewable generation in situ and nearby solar (and wind) generation. The Port should look to the electrified fleet as both a new load and a new capability to store energy. This latter capability creates the full set of capabilities needed to implement island microgrids, which is a good resiliency strategy. One of Port's tenants demonstrates an example of this strategy, FedEx, which is showing the way to resiliency, reliability and zero-emission with its fuel cells and solar PV array.

14. **Strategy for harbor crafts –** The Port's 2015 emissions inventory shows that harbor crafts are the second largest contributor of DPM, and the third largest contributor of total NOx emissions associated with port's operations. We urge the Port to continually assess the readiness of different repowering options as part of their annual review of actions and proactively seek cost-effective and technology-ready solutions that go beyond the expected regulatory updates in 2020. In the meantime, the Port should also seek commitments from its tenants to transition to cleaner harbor crafts. For near-term solutions, the Port may also consider tapping into new funding sources such as the Volkswagen fund to upgrade tug and switcher engines to the latest clean diesel technology. A recent study[3] by Diesel Technology Forum and Environmental Defense Fund confirms that these upgrades offer one of the most cost-effective options for reducing diesel emissions, particularly NOx emissions.
15. **Strategy for Ocean Going Vessel (OGV)**

    a. **At-berth emissions:** We appreciate that the Port is considering implementing an environmental performance incentive program for vessels as one of the intermediate

[3] Emission reductions and cost effectiveness for marine and locomotive projects https://www.dieselforum.org/largeengineupgrades

term actions. Given that there are existing models that the Port could replicate (e.g. Environmental Ship Index), it seems this could be implementable in the nearer term. While incentives could serve as a near-to-intermediate term action, we recommend that overtime use of shore power or emission control systems become mandatory, and that the Port should set a timeline for capturing 100% of vessel at-berth emissions similar to the Ports of LA/Long Beach.

b. **In-transit emissions:** As the draft plan acknowledges, this is a key challenge as the majority of diesel particulate matter emissions are due to OGV in transit and there are limited regulations to address these sources. At the same time, the Port's proposed infrastructure improvement plan (Table 2.) offers an opportunity to consider innovative ways to steer ships to cleaner fuels by leveraging its refueling station and other infrastructure components.

c. **Vessel speed reduction:** the draft plan identifies this as a near-term action. Vessel speed reduction is a routine emission reduction strategy and we agree should be explored; however, this practice can also lead to ships speeding up once outside the channel, thereby cancelling out the benefits. We encourage the Port to consider taking into account the impact of any potential unintended consequences in assessing the effectiveness of this strategy. Automatic information systems can also be used to evaluate how frequently this occurs.

Thank you for the opportunity to comment on the draft Blueprint and we look forward to continuing to work with the Port to ensure an effective implementation path towards a zero-emission port that will deliver cleaner, healthier air to the community. Please feel free to contact Fern Uennatornwaranggoon at FernU@edf.org, T 415-293-6162, if you have any questions or would like to discuss any of the above further.

Sincerely,

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BY EMAIL

August 30, 2018

Meg Patulski
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RE: FEEDBACK – UPDATES TO EMISSION INVENTORY BEST PRACTICES GUIDANCE

I. INTRODUCTION

Environmental Defense Fund (EDF) appreciates the opportunity to provide suggestions for the Environmental Protection Agency (EPA) to consider when updating the EPA's *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* from the original document that was released in 2009.

EDF is a non-profit, non-partisan, non-governmental environmental organization that combines law, policy, science, and economics to find solutions to today's most pressing environmental problems. Our interest in emissions inventories, especially for ports and freight facilities, stems from our role as a clean air advocate and environmental justice stakeholder, working to help address impacts on overburdened communities and partnering with environmental justice organizations on overlapping issues.

The following comments provide informal feedback to the EPA on issues that EDF believes are needed to ensure that emissions inventories are prepared in a standardized and scientifically robust manner, using best available technology, and ensuring that inventories can support decision-making that reduces emissions and provides measurable improvements in the health of communities living near ports and other freight facilities.

Our comments are organized into four main themes focused on data standardization, geographic scope, accounting for data accuracy and uncertainty, and data normalization. Ultimately, it is important for port stakeholders to be able to understand and *compare* emission inventories across ports, even if it is just to have confidence that a port is presenting the most accurate information possible. Without common-sense approaches to data collection (type and scope) and standardization, emissions inventories lose significant value for stakeholders and others interested in understanding air quality impacts from port operations.

We also recognize that cost can be an obstacle for the development of detailed emission inventories, especially for smaller and medium sized ports. Where possible, EPA should provide port authorities data from the National Emissions Inventory (NEI) that can be used to support local port inventories. The AIS data EPA uses for the NEI Ocean Going Vessel and Harborcraft emission inventories is one example. EPA's Office of Air Quality Planning and Standards (OAQPS) also has locomotive data that could potentially be useful. Lastly, the updated guidance should recognize that equipment inventories that document the age and engine tier could provide actionable data to target grant funds to the oldest and most polluting equipment. The equipment inventory can be an important first step to future development of an emissions inventory.

II. DATA STANDARDIZATION

A review of emission inventories prepared by ports reveals several different approaches to both *what* data are collected in support of emission inventory development, and *how* those data were collected. For a port emissions inventory to be both a reasonable approximation of actual emissions, as well as relevant to port stakeholders interested in understanding air quality impacts associated with port operations, it is imperative that ports collect the same information, especially since most of the data are typically available and tracked due to fiscal management, security, or other reasons (i.e., there is justification beyond emissions estimation to track these data). Moreover, in recent years, technology has helped to automate data collection, while at the same time, improve data accuracy. EPA can help to guide and educate ports on both what data to collect, as well as how to most effectively collect it. The table shown on the following page provides some suggestions that build upon the initial best practices outlined in EPA (2009).

Mode	Suggestions
Ocean-going vessels (OGVs)	• Use already-aggregated AIS data in a standardized time period from providers that distill OGV activity by mode, by time in mode, and estimate engine emissions by cross-referencing OGV datasets (AIS and IHS) using MMSI/IMO number. • Include all activity of the vessel from its first point of entry into the US (12 nm offshore) if foreign-flagged, or to a standardized distance for US-flagged vessels, to its departure from the area. The activity may later be categorized to port-related calls and non-port related calls. This is important to be able to identify efficiency opportunities that may need to be undertaken in a more collaborative approach (e.g., Kruse 2015[1]). • Load factors should be derived from actual speed calculated from AIS data compared to the maximum design speed provided by the IHS dataset. • Compile updated information on boiler and turbine (e.g., for LNG vessels) emissions, since these data are not generally included in existing datasets. • EPA currently collects some OGV AIS data to support the National Emissions Inventory (NEI), and it would be helpful if the updated guidance provided an approach for how this AIS data could support local port inventories.
Harborcraft	• Commercial harborcraft are also now required to use AIS technology, so already-aggregated data should be used for activity data; MMSI data from harborcraft can be then be cross-referenced to other datasets (e.g., Waterborne Commerce for tug/tow boats, the USCG Vessel Registration database, and vessel broker sites) for engine and other information. • Careful consideration of estimated engine age for these vessels should be made, as new studies suggest that for some applications, engines are older than current EPA estimates or model assumptions[2]. • Load factors should be derived from actual speed calculated from AIS data compared to the maximum design speed provided by the IHS dataset. • Careful consideration of "stopped" vessels should be made, to identify if the engines are actually off, or if the vessel is idling while standing by (a common practice in areas without available shorepower at layberths). • Similar to the OGV AIS data that EPA collects for NEI, any harborcraft AIS data that EPA collects should be shared for port-specific inventories. • As a first step, ports should undertake a survey of the harborcraft (including engine age/tier) operating in their area.
Cargo-handling equipment	• Heavy-duty equipment manufacturers are increasingly including telematics and other technologies that provide use feedback for where units are operating, engine speeds, fuel usage, and other data. Where available, ports can use data provided by equipment owners that are based upon real world usage as inputs (or basis for default factors) for emissions estimates. • Use of the EPA Diesel Emissions Quantifier can help ports (and others) estimate emissions for CHE, if key inputs are collected (horsepower, engine model year, hours/miles/fuel usage). • Equipment inventories that identify the age and emissions Tier of the CHE can be important for identifying the oldest CHE for potential upgrading or replacement. This can be a very useful first step for ports or terminals that do not have the resources to conduct a complete emissions inventory.
Locomotives	• Locomotive data collected by EPA should be shared for port-specific inventories.
Onroad trucks	• Heavy-duty truck manufacturers are increasingly including telematics and other technologies that provide use feedback for where units are operating, engine speeds, fuel usage, and other data. Where available, ports can use data provided by truck owners that are based upon real world usage as inputs (or basis for default factors) for emissions estimates. • Idling can and should be better characterized in emission inventories, as high and low engine load factors can be included in emission models to better characterize extended and short-term idling. • Equipment inventories that identify the model year of the drayage trucks operating at the port can be a low cost first step for identifying candidates for vehicle replacement. • Identify the major origin and destinations for the drayage trucks, and whether the trucks are using routes near or through environmental justice communities.

III. GEOGRAPHIC SCOPE

Ports use vastly different geographical scopes for emissions sources that they are tracking, and in many cases, the justification for using a narrow geographical scope is questionable. For example, a couple of ports only include drayage truck emissions just beyond the actual port's boundary (e.g., Everglades, Oakland). Others include activity that better reflects where drayage trucks are actually emitting by including all miles traveled, up until the first intermodal transfer (e.g., Port Authority of New York and New Jersey). Ideally, the emissions impact related to port operations would include all segments following cargo that moves through a port, but often, it is difficult to track past the first intermodal transfer point for a given source (e.g., drayage truck dropping off container to distribution center), so at least including that initial segment is a reasonable compromise (tracking beyond could entail significant research and tracking). Ports would be expected to be conducting origin-destination analyses anyway, as part of their own business assessments to identify opportunities, vulnerabilities, and as a part of regional transportation planning. Expanding the geographical scope of each emission source mode to the first intermodal transfer point is an important best practice that should be followed in all inventory efforts. For ports located in nonattainment areas, the geographic scope should encompass all port related activities that could impact the nonattainment area. For each transportation mode tracked in port emission inventories, a reasonable geographic scope of emissions might include the following:

- **OGVs**: all activity (maneuvering, hoteling, cruising, reduced-speed cruising) from the international boundary (12 nautical miles from US coastline) to docks operating under ownership, lease, or close cooperation (e.g., benefiting from dredging, etc.) with local port authority.
- **Harborcraft**: all activities (maneuvering, assisting, hoteling) from harborcraft that support OGVs within the OGV geographical boundary, as well as independent harborcraft activity (e.g., tug/barge activity) that occurs within connected waters where harborcraft have called on facilities operating under ownership, lease, or close cooperation with local port authority.
- **CHE**: all activity, including idling, from CHE at facilities operating under ownership, lease, or close cooperation with local port authority.
- **Locomotives**: all activities from on-dock and near-dock rail facilities where port-related operations are the primary activity.
- **Onroad Trucks**: all activities, including extended and short-term engine idling, up to the first intermodal transfer point.

IV. DATA ACCURACY AND ACCOUNTING FOR UNCERTAINTY

Emission inventories are typically based upon modeled data that are (hopefully) representative of real-world conditions. Depending on the source of the data, there may be higher confidence in some inputs, over others. For example, OGV hoteling activity provided in an AIS dataset is likely to be more reliable than handwritten call logs since data automation may reduce the potential for human error. Alternatively, automated data collection is admittedly not perfect, as there is always the

[1] https://static.tti.tamu.edu/tti.tamu.edu/documents/161510-1.pdf
[2] https://www.dieselforum.org/files/dmfile/Cost-Effectiveness_Memo-Task-1-Final-February-2018.pdf

potential for interference or tampering. One major improvement to emissions inventories would be to include sensitivity analysis to provide a range of estimated emissions, based on confidence of how accurate the data that have been collected to develop the inventory are. In scientific literature, reporting of statistics always include a measure of how probable the measured (or estimated) data might be to reality (i.e., whether to reject a hypothesis or not that was posed to explain an observation). At a minimum, port inventories might include a simple sensitivity analysis that brackets a ±10% range for each emissions source, to reinforce to the general public that the emissions inventory is an approximation for real-world emissions. In the near future, however, more sophisticated models should allow for better statistical analysis that are based upon sample size and other measures to help improve estimates.

IV. NORMALIZING DATA TO CARGO THROUGHPUT

A few port authorities (e.g., San Pedro Bay ports) have begun to normalize emissions to cargo throughput measures, reporting emissions on a per twenty-foot equivalent (TEU) or per cargo ton. This trend is helpful for identifying efficiency opportunities that can result in emission reductions on a per unit of cargo basis. However, it is also critically important for port authorities to continue to track total emissions, since efficiency improvements may only be able to achieve a certain level of emissions reductions. Ultimately, port operations may become much more efficient, but if cargo throughputs triple, total emissions could be increasing significantly.

V. CONCLUSION

EDF appreciates the opportunity to provide informal feedback to EPA and welcomes the opportunity to discuss these ideas in greater detail. If you have any questions, please contact Christina Wolfe at 512.691.3416 or cwolfe@edf.org.

Sincerely,

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March 16, 2018

To: Meredith Cowart, Concur, and Richard Sinkoff, Port of Oakland

From: James Fine, Ph.D

Re: Responses to Concur's MAQIP Meeting Follow-Up Questions

Staff at Concur contacted me for clarification on my public comments. I provide that clarification in this memo.

Meredith Cowart, Concur, noted my comment and wrote:
"the group would benefit from seeing explicit descriptions of the relative uncertainty associated with the various potential emissions control measures." She posed this question: "In terms of the relative uncertainty, could you specify what this should look like -- e.g. the range of possible outcomes and likelihood of those outcomes?" As well, she noted that I asked "how emissions associated with electricity use are treated" and that "Till Stoeckenius responded that these are not included in the inventory."

My response:
Thank you for asking for clarification. The answer is not simple, but is worth taking a few sentences to explain. My first response is that the MAQIP working group should dedicate time to discussion of uncertainty, and how it relates to risk assessment in this context.

The most important uncertainty to watch out for pertains to ensuring the health of the community since that is the reason for the MAQIP emissions reduction goals. Emissions "inventories" are input into computer models that simulate atmospheric processes and output estimates of air pollution exposures and consequent health impacts. Therefore, it is critical to both examine and communicate to stakeholders the uncertainty in each step of health risk assessment. An estimate of emissions estimate (aka, "inventory") is a foundational part of any air quality health risk assessment.

Steps of Health Risk Assessment (see https://www.epa.gov/risk/human-health-risk-assessment):

> **Step 1 - Hazard Identification**
> Examines whether a stressor has the potential to cause harm to humans and/or ecological systems, and if so, under what circumstances.

Step 2 - Dose-Response Assessment
Examines the numerical relationship between exposure and effects.

Step 3 - Exposure Assessment
Examines what is known about the frequency, timing, and levels of contact with a stressor.

Step 4 - Risk Characterization
Examines how well the data support conclusions about the nature and extent of the risk from exposure to environmental stressors.

The MAQIP Emissions Inventory is an input into Steps 3 and therefore step 4 (which combines outputs from Steps 2 and 3). Therefore, the emissions inventory uncertainties should be communicated to the working group in a way that is understandable and provided in the context of the risk characterization.

The community deserves an opportunity to understand both what emissions are being estimated, and what might be missed. That is, what are the uncertainties in the emissions inventory and how do those uncertainties lead to uncertainty in the Exposure Assessment and consequent Risk Characterization? The same is true for historic performance of emissions mitigation measures, and expected benefits of future mitigation measures.

In addition to uncertainty about the science of emissions and health impacts, there is uncertainty about implementation. Will the actors (including Port administration and tenants) execute the plan as planned? The MAQIP process should put in place a plan that is expected to be successful. Where there is significant uncertainty about plan success, then the Port needs to develop a plan to mitigate those risks.

Taking this step to consider uncertainty can also point us to new solutions. For example, the emissions inventory currently ignores the emissions associated with generating electricity used in and near the Port. This is a significant uncertainty that merits careful consideration for several reasons. First, there is a fuel-oil power plant in West Oakland that contributes air pollution when used. Second, increased electrification is a stated mitigation strategy for cargo handling and other vehicles in or near the Port. Third, there are opportunities to reduce emissions associated with electricity usage beyond the Port borders, including, for example, the conversion of natural gas stoves and water heaters to electric power, and electrification generation and EV-charging potential in and near the Port.

Emissions Inventory Uncertainty References

For Till and his team, for the estimate of emissions, there is a well-developed literature on emissions inventory uncertainty, such as:

1. https://www3.epa.gov/ttnchie1/conference/ei16/session5/frey.pdf
2. https://www3.epa.gov/ttnchie1/conference/ei11/qa/pulles.pdf
3. https://www3.epa.gov/ttnchie1/conference/ei19/session3/shires.pdf

Also, see Air Emission Inventories in North America: A Critical Assessment, C. Andrew Miller et al., U.S. Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory Research Triangle Park, NC,

With these resources at your fingertips, I request that the Port (and its' consultants) conduct a health risk assessment, including explicitly analysis of how uncertainties in the emissions inventory and proposed mitigation plan translate into uncertainties about the conclusion that the MAQIP will be successful in protecting the health of people at the Port and nearby.

It stands to reason that uncertainties in the emissions inventory translate into uncertainties about health effects from Port-related activities and mitigation measures. I'm asking the Port to be transparent and explicit about these uncertainties so we can use them to make BETTER risk management decisions. Once done correctly, we will be able to make probabilistic statements about the likelihood of meeting the MAQIP goals, which I think is the most useful and honest way to achieve consensus on the next MAQIP. As well, we will be able to get one step further in our community conversation about solutions that we can all rally behind.