



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

BOARD OF DIRECTORS
ADVISORY COUNCIL
September 19, 2024

COUNCIL MEMBERS

Professor Ann Marie Grover Carlton, Ph.D., University of California Irvine
Dr. Stephanie M. Holm, MD, PhD, MPH, University of California San Francisco
Dr. Michael T. Kleinman, Ph.D., University of California Irvine
Dr. Philip T. Martien, Ph.D.
Professor Michael T. Schmeltz, DrPH, MS
Dr. Gina Solomon, M.D., M.P.H., University of California San Francisco
Garima Raheja, PhD candidate, Columbia University
Davina Hurt, Air District Board of Directors Liaison

**MEETING LOCATION(S) FOR IN-PERSON ATTENDANCE BY
COUNCIL MEMBERS AND MEMBERS OF THE PUBLIC**

**Bay Area Metro Center
1st Floor Board Room
375 Beale Street
San Francisco, CA 94105**

THE FOLLOWING STREAMING OPTIONS WILL ALSO BE PROVIDED

These streaming options are provided for convenience only. In the event that streaming connections malfunction for any reason, the Advisory Council reserves the right to conduct the meeting without remote webcast and/or Zoom access.

The public may observe this meeting through the webcast by clicking the link available on the air district's agenda webpage at www.baaqmd.gov/about-the-air-district/advisory-council/agendasreports.

Members of the public may participate remotely via Zoom at <https://bayareametro.zoom.us/j/86265193349>, or may join Zoom by phone by dialing (669) 900-6833 or (408) 638-0968. The Webinar ID for this meeting is: 862 6519 3349

Public Comment on Agenda Items: The public may comment on each item on the agenda as the item is taken up. Members of the public who wish to speak on a matter on the agenda will have two minutes each to address the Council on that agenda item, unless a different time limit is established by the Co-Chairs. No speaker who has already spoken on an item will be entitled to speak to that item again.

The Council welcomes comments, including criticism, about the policies, procedures, programs, or services of the District, or of the acts or omissions of the Council. Speakers shall not use threatening, profane, or abusive language which disrupts, disturbs, or otherwise impedes the orderly conduct of a Council meeting. The District is committed to maintaining a workplace free of unlawful harassment and is mindful that District staff regularly attend Board meetings. Discriminatory statements or conduct that would potentially violate the Fair Employment and Housing Act – i.e., statements or conduct that is hostile, intimidating, oppressive, or abusive – is *per se* disruptive to a meeting and will not be tolerated.

ADVISORY COUNCIL MEETING AGENDA

THURSDAY, SEPTEMBER 19, 2024

9:30 AM

1. Call to Order - Roll Call

The Council Chair shall call the meeting to order and the Clerk of the Boards shall take roll of the Council members.

CONSENT CALENDAR (Item 2)

The Consent Calendar consists of routine items that may be approved together as a group by one action of the Council. Any Council member or member of the public may request that an item be removed and considered separately.

2. Approval of the Draft Minutes of the Advisory Council Meeting of July 29, 2024

The Council will consider approving the Draft Minutes of the Advisory Council Meeting of July 29, 2024.

INFORMATIONAL ITEM(S)

3. Cumulative Impacts Analysis within Air District Policy Development and Programs

The Council will discuss how cumulative impacts analysis can be integrated into Air District policy development and programs, including permitting, air quality modeling, and rules prioritization. This item will be presented by Greg Nudd, Deputy Executive Officer of Science and Policy.

4. CalEnviroScreen at the Air District

The Council will receive a presentation on the role CalEnviroScreen plays in Air District policy and practice. The nature and purpose of CalEnviroScreen, as well as key decision points in the design and implementation of tools like CalEnviroScreen, will be discussed. Notable indicators that are present in similar tools, but not in the latest version of CalEnviroScreen, will be reviewed. The roles that CalEnviroScreen and similar tools play in the construction of designations that influence Air District regulatory requirements and incentive programs will be explained and contextualized, highlighting key forms of practical adaptation. This item will be presented by Dr. David Holstius, Senior Advanced Projects Advisor in the Assessment, Inventory, and Modeling Division.

5. BenMAP-CE at the Air District

The Council will receive a presentation on the role the BenMAP-CE (US EPA Environmental Benefits Mapping and Analysis Program, Community Edition) platform plays in Air District policy and practice including the nature and purpose of BenMAP-CE, as well as key design decision points. Staff will also illustrate its application as a supplement to the rulemaking process and discuss the assessment of multi-pollutant impacts using BenMAP-CE. This item will be presented by Dr. David Holstius, Senior Advanced Projects Advisor in the Assessment, Inventory and Modeling Division.

OTHER BUSINESS

6. Report of the Executive Officer/APCO

7. Public Comment on Non-Agenda Matters

Pursuant to Government Code Section 54954.3, members of the public who wish to speak on matters not on the agenda will be given an opportunity to address the Council. Members of the public will have two minutes each to address the Council, unless a different time limit is established by the Chair. The Council welcomes comments, including criticism, about the policies, procedures, programs, or services of the District, or of the acts or omissions of the Council. Speakers shall not use threatening, profane, or abusive language which disrupts, disturbs, or otherwise impedes the orderly conduct of a Council meeting. The District is committed to maintaining a workplace free of unlawful harassment and is mindful that District staff regularly attend Board meetings. Discriminatory statements or conduct that would potentially violate the Fair Employment and Housing Act – i.e., statements or conduct that is hostile, intimidating, oppressive, or abusive – is per se disruptive to a meeting and will not be tolerated.

8. Council Member Comments / Other Business

Council members may make a brief announcement, provide a reference to staff about factual information, or ask questions about subsequent meetings.

9. Time and Place of Next Meeting

Wednesday, October 30, 2024, at 9:30 a.m. at 375 Beale Street, San Francisco, CA 94105. The meeting will be in-person for the Advisory Council members and members of the public will be able to either join in-person or via webcast.

10. Adjournment

The Council meeting shall be adjourned by the Chair.

CONTACT:

MANAGER, EXECUTIVE OPERATIONS
375 BEALE STREET, SAN FRANCISCO, CA 94105
vjohnson@baaqmd.gov

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BAAQMD homepage:
www.baaqmd.gov

- Any writing relating to an open session item on this Agenda that is distributed to all, or a majority of all, members of the body to which this Agenda relates shall be made available at the Air District's offices at 375 Beale Street, Suite 600, San Francisco, CA 94105, at the time such writing is made available to all, or a majority of all, members of that body.

Accessibility and Non-Discrimination Policy

The Bay Area Air Quality Management District (Air District) does not discriminate on the basis of race, national origin, ethnic group identification, ancestry, religion, age, sex, sexual orientation, gender identity, gender expression, color, genetic information, medical condition, or mental or physical disability, or any other attribute or belief protected by law.

It is the Air District's policy to provide fair and equal access to the benefits of a program or activity administered by Air District. The Air District will not tolerate discrimination against any person(s) seeking to participate in, or receive the benefits of, any program or activity offered or conducted by the Air District. Members of the public who believe they or others were unlawfully denied full and equal access to an Air District program or activity may file a discrimination complaint under this policy. This non-discrimination policy also applies to other people or entities affiliated with Air District, including contractors or grantees that the Air District utilizes to provide benefits and services to members of the public.

Auxiliary aids and services including, for example, qualified interpreters and/or listening devices, to individuals who are deaf or hard of hearing, and to other individuals as necessary to ensure effective communication or an equal opportunity to participate fully in the benefits, activities, programs and services will be provided by the Air District in a timely manner and in such a way as to protect the privacy and independence of the individual. Please contact the Non-Discrimination Coordinator identified below at least three days in advance of a meeting so that arrangements can be made accordingly.

If you believe discrimination has occurred with respect to an Air District program or activity, you may contact the Non-Discrimination Coordinator identified below or visit our website at www.baaqmd.gov/accessibility to learn how and where to file a complaint of discrimination.

Questions regarding this Policy should be directed to the Air District's Non-Discrimination Coordinator, Suma Peesapati, at (415) 749-4967 or by email at spesapati@baaqmd.gov.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

375 BEALE STREET, SAN FRANCISCO, CA 94105

FOR QUESTIONS PLEASE CALL (415) 749-4941

EXECUTIVE OFFICE:

MONTHLY CALENDAR OF AIR DISTRICT MEETINGS

SEPTEMBER 2024

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Finance and Administration Committee	Wednesday	18	10:00 a.m.	1 st Floor Board Room
Board of Directors Policy, Grants and Technology Committee	Wednesday	18	1:00 p.m.	1 st Floor Board Room
Advisory Council Meeting	Thursday	19	9:30 a.m.	1 st Floor Board Room
Board of Directors Community Advisory Council Meeting	Thursday	19	6:00 p.m.	California State University East Bay Oakland Professional & Conference Center Trans Pacific Center 1000 Broadway, Suite 109 Oakland, CA 94607

OCTOBER 2024

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Meeting	Wednesday	2	10:00 a.m.	1 st Floor Board Room
Board of Directors Stationary Source Committee	Wednesday	9	10:00 a.m.	1 st Floor, Yerba Buena Room
Board of Directors Community Equity, Health and Justice Committee	Wednesday	9	1:00 p.m.	1 st Floor, Yerba Buena Room
Board of Directors Finance and Administration Committee	Wednesday	16	10:00 a.m.	1 st Floor Board Room
Board of Directors Policy, Grants and Technology Committee	Wednesday	16	1:00 p.m.	1 st Floor Board Room
Advisory Council Meeting	Wednesday	30	9:30 a.m.	1 st Floor Board Room

NOVEMBER 2024

<u>TYPE OF MEETING</u>	<u>DAY</u>	<u>DATE</u>	<u>TIME</u>	<u>ROOM</u>
Board of Directors Meeting	Wednesday	6	10:00 a.m.	1 st Floor Board Room
Board of Directors Stationary Source Committee	Wednesday	13	10:00 a.m.	1 st Floor, Yerba Buena Room
Board of Directors Community Equity, Health and Justice Committee	Wednesday	13	1:00 p.m.	1 st Floor, Yerba Buena Room
Board of Directors Finance and Administration Committee	Wednesday	20	10:00 a.m.	1 st Floor Board Room
Board of Directors Policy, Grants and Technology Committee	Wednesday	20	1:00 p.m.	1 st Floor Board Room
Board of Directors Community Advisory Council Meeting	Thursday	21	6:00 p.m.	1st Floor, Yerba Buena Room

JMB 9/16/2024 – 2:08 p.m.

G/Board/Executive Office/Moncal

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Gina Solomon and Members
of the Advisory Council

From: Philip M. Fine
Executive Officer/APCO

Date: September 19, 2024

Re: Approval of the Draft Minutes of the Advisory Council Meeting of July 29, 2024

RECOMMENDED ACTION

Approve the attached draft minutes of the Advisory Council Meeting of July 29, 2024.

BACKGROUND

None.

DISCUSSION

Attached for your review and approval are the draft minutes of the Advisory Council Meeting of July 29, 2024.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: Marcy Hiratzka
Reviewed by: Vanessa Johnson

ATTACHMENTS:

1. Draft Minutes of the Advisory Council Meeting of July 29, 2024

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
(415) 749-5073

Advisory Council Meeting
Friday, July 29, 2024

DRAFT MINUTES

Note: Audio recordings of the meeting are available on the website of the Bay Area Air Quality Management District at www.baaqmd.gov/bodagendas

CALL TO ORDER

1. **Opening Comments:** Advisory Council (Council) Chairperson Solomon called the meeting to order at 9:02 a.m.

Roll Call:

Present: Chairperson Dr. Gina Solomon; Vice Chairperson Dr. Phil Martien; and Members Dr. Stephanie Holm, Professor Michael Kleinman, Garima Raheja, Dr. Michael Schmeltz, and Board Liaison Davina Hurt.

Absent: Member Professor Ann Marie Grover Carlton.

CONSENT CALENDAR

2. **APPROVAL OF THE DRAFT MINUTES OF THE ADVISORY COUNCIL MEETING MINUTES OF MARCH 1, 2024**

Public Comments

No requests received.

Council Comments

Vice Chair Martien requested that the language in Item 3 (Advisory Council Introductions) be changed from “Dr. David Holstius, Senior Advanced Projects Advisor in Planning and Climate Protection” to “Dr. David Holstius, Senior Advanced Projects Advisor in Assessment, Inventory, and Modeling.”

Council Action

Professor Kleinman made a motion, seconded by Vice Chair Martien, to **approve** the Draft Minutes of the Advisory Council Meeting Minutes of March 1, 2024 as amended; and the motion **carried** by the following vote of the Council:

AYES: Holm, Hurt, Kleinman, Martien, Raheja, Schmeltz, Solomon.
NOES: None.
ABSTAIN: None.
ABSENT: Carlton.

INFORMATIONAL ITEMS

3. REVIEW AND DISCUSSION OF CUMULATIVE IMPACTS SELECTED REFERENCES

A breadth of research on cumulative impacts of air pollution was made available to Advisory Council members and Air District staff to guide its work. At the March 1, 2024 meeting of the Advisory Council, Council members reviewed a list of selected references on cumulative impacts developed by Air District staff. At the July 29, 2024 meeting the Council discussed the selected references they each reviewed since the March 1, 2024 meeting, and shared their analyses.

Public Comments

No requests received.

Council Comments

Council Chair Dr. Gina Solomon invited members to discuss the Selected References. Councilmember Garima Raheja noted that “cumulative impacts” includes things that are not air pollution, suggesting a need to consider jurisdiction. Councilmember Prof. Michael Kleinman pointed out a key challenge of holistic environmental regulation: separating the influence of various factors in assessments of effectiveness can be very difficult. Councilmember Dr. Stephanie Holm emphasized the importance of cumulative impacts to her patients and their families. Councilmember Dr. Michael Schmeltz highlighted the need to define “cumulative impacts”, and to clarify what the Council’s work would accomplish for the agency and the public. Vice-Chair Dr. Phil Martien observed that many of the readings are overlapping, and suggested that clarifying the decisions or frameworks that are at stake could facilitate simplification. He also stressed the importance of meaningfully involving affected stakeholders at all stages, including development: “nothing that affects us without us.”

Regarding the issue of quantification, Chair Solomon drew a distinction between cumulative impacts and risks, in that “impacts” can be quantitative or qualitative, and asked where on that spectrum the Council should aim. Chair Solomon also highlighted Sprinkle et al.'s (2021) question on why cumulative impacts remain under-addressed despite longstanding awareness, suggesting that the breadth of the topic could impede efforts, and that focus would be helpful.

To account for both qualitative and quantitative data, Dr. Schmeltz suggested considering a mixed methods approach, inclusive of community input.

Councilmember Raheja proposed using CalEnviroScreen (CES) as a starting point, given that the tool is familiar and benefits from strong existing support.

Vice-Chair Martien remarked that the effects-based/stressor-based framework(s) described in Sexton et al (2012) was noteworthy, and pointed out the value of combining effects-based and stressor-based frameworks, emphasizing the validation of community perspectives.

Dr. Holm agreed on the utility of CalEnviroScreen but suggested the Air District should also explore explicitly addressing air pollutant mixtures, which CalEnviroScreen does not do.

The Chair of the Air District’s Board of Directors, Davina Hurt, asked how one might settle a tension between “value-neutral” scientific evidence versus “inclusivity, history, and values,” knowing that models are incomplete, yet that some may argue that environmental justice (EJ) may be displacing a scientific perspective.

Chair Solomon expressed a desire to hear more about the many ways in which the Air District is applying CalEnviroScreen, and suggested that additional applications of this existing tool could be one chunk of work taken up by the Advisory Council.

Chair Solomon also expressed interest in multi-pollutant exposures as a second chunk of potential work, and mentioned that this is being addressed at the Federal level with the BenMAP-CE tool, including a case study in Atlanta, which might be adaptable to the Bay Area, and perhaps extended to include pollutants beyond criteria air pollutants.

A third direction, Chair Solomon suggested, was to find and evaluate cumulative risk in some large epidemiological studies, where the stressors have included some kind of interaction term; and then prioritize them for application to the Bay Area, including community perspectives on prioritization. The HeartSCORE cohort was offered as a promising example, as it simultaneously examines the joint effects of exposure to particulate matter, social risk, and socioeconomic status on cardiovascular outcomes and mortality in a cohort with a sizeable African-American contingent. Applications of studies looking at the joint effect of heat and air pollution, Chair Solomon suggested, may also be worth exploring.

Dr. Schmeltz, reflecting on the question from Board Chair Hurt, indicated that CBPR (community-based participatory research) and convergence research are examples of methodologies that are known to work by integrating different disciplines into a cumulative impacts analysis, including not just physical scientists, but social scientists as well.

Dr. Schmeltz and Dr. Holm raised the topic of indoor exposures, with Dr. Holm pointing out that schools are a shared indoor space with a unique vulnerable population, in that every member of society is at some point a child, and that schools may be easier to get information about than homes. Prof. Kleinman noted the complexity of indoor air pollution, and that it often correlates with outdoor pollution. Dr. Holm clarified that indoor exposures are influenced by outdoor sources, modulated by ventilation and filtration, and emphasized the episodic nature of indoor pollution profiles. Prof. Kleinman agreed and added that nearby outdoor sources can have an especially large impact.

Councilmember Raheja noted that, while “a lot of scientific data is stored in computer files, a lot of the historical data we’re hoping to consider is stored in stories” and the knowledges of members of the

community; therefore it would be important to use methods such as interviews, and finding ways to incorporate those perspectives in decision-making. Councilmember Raheja questioned whether indoor exposures would meaningfully influence the output or influence of tools like CalEnviroScreen. Chair Solomon agreed on the importance of indoor exposures but cautioned against premature integration in such tools without addressing important gaps.

Vice-Chair Martien again emphasized the need to focus on specific policy actions that could be influenced by Council deliberations. Vice-Chair Martien also mentioned that the Air District is familiar with using BenMAP, as well as more localized dispersion-modeling tools, in novel ways, to model a host of pollutants within a community.

Executive Officer Dr. Phil Fine stressed the desire of the Air District to be able to assess the health benefits of the regulatory actions that it takes to reduce emissions and exposure; that these cannot be fully accounted for without assessing cumulative impacts; and that it is important to come up with a list of possible decision points for the Council, in order to focus. Dr. Fine also called attention to non-regulatory actions and the importance of assessing disparities in exposures and impacts. He described CalEnviroScreen as a tool with limitations and suggested exploring its database for information that might be used in specific contexts. Regarding mixed methods, Dr. Fine remarked that it is relatively easy for a policy-making body to make decisions based on community feedback and knowledge, but that more of a scientific basis would be helpful to better defend some of those decisions. Knowing that high uncertainty and difficulty in quantifying something does not mean it's not scientific, the history of environmental regulation shows that quantifiability is important.

Dr. Fine proposed a joint meeting with the Community Advisory Council, and stated that staff would bring back a clearer picture of decision points and what staff are already doing along these lines; and from that some frameworks could be developed, perhaps different frameworks for different decision points.

Council Action

No action taken.

4. COMPARISON OF STATE CUMULATIVE IMPACTS ASSESSMENT PROGRAMS

The Council received a staff presentation on a comparison of cumulative impacts assessment programs established in four states and one city. The presentation included a comparison of program elements for legislative action, applicability, indicators for overburdened communities, and public notice and participation requirements. Dr. Judith Cutino, Health Officer, gave the staff presentation *Comparison of State Cumulative Impacts Assessment Programs*, including: outcome; requested action; outline; program elements for comparison; California Environmental Protection Agency (CalEPA); CalEnviroScreen 4.0 – 21 indicators; New Jersey Department of Environmental Protection (NJDEP); NJDEP applicability, EJ MAP tool, and steps of EJ rule; New York State Department of Environmental Conservation (NYSDEC); NYSDEC policy, indicators 1 and 1, and disproportionate burden analysis and mitigation; Massachusetts Department of Environmental Protection (Mass. DEP); Mass. DEP defines EJ population, indicators, and permitting steps; City of Chicago – cumulative impact assessment; Chicago EJ Index (28 indicators); City of Chicago health impact assessment (HIA) basis to deny permit; Minnesota Pollution Control Agency (MPCA); MPCA EJ maps and Community Benefit Agreement (CBA).

Public Comments

No requests received.

Council Comments

Following the presentation by staff (Dr. Judy Cutino), Chair Solomon expressed a desire to see more of a comparison of CalEnviroScreen’s indicators with those used by other tools.

Chair Solomon also noted the potential of Health Impact Assessments (HIAs), which had not yet been discussed, remarking that it was very interesting to see that Chicago was triggering an HIA for certain types of projects; HIAs do consider cumulative impacts, and include both quantitative and qualitative information.

Dr. Holm highlighted Chicago’s inclusion of compliance history, which is often a point of frustration with communities. Chair Solomon agreed and wondered to what extent the Air District has the obligation or ability to consider compliance history. Dr. Meredith Bauer, the Deputy Executive Officer of Engineering and Compliance, responded that staff are thinking more about establishing compliance history broadly throughout Air District operations. Greg Nudd, the Deputy Executive Officer of Science and Policy, offered that from a rule perspective, there is some flexibility, although it is necessary to define what a “good” or “bad” compliance history is. Chair Solomon remarked that compliance history has been raised as a concern by communities for a long time, but also, scientifically speaking, a small number of sources tend to account for a disproportionate amount of exposure, and compliance history might be a good way to get at those. Dr. Bauer emphasized that there is also a psychological toll of living near historically non-compliant sources, and asked whether that stress might be a relevant factor. Chair Solomon agreed, and indicated that one could also expect attributable exposures to be systematically under-estimated for such a source, given an expectation of under-reporting and/or exceedances. Dr. Fine mentioned that compliance history is indirectly considered in current practice, during the issuing of permits, insofar as conditions in permits for expanded operations or significant operational changes are crafted with an intent to ensure compliance going forward; and that there may be opportunities to make that case-by-case practice more systematic.

Dr. Martien inquired whether Dr. Cutino had encountered any quantification of impacts or risks from non-chemical stressors in her review; she had not, other than in the mechanisms used to produce scores for scoring tools. Dr. Martien asked whether risk assessments conducted in Massachusetts had influenced such scoring in any way; they had not, each being factored only into the analysis of the relevant project application. Councilmember Raheja inquired whether monitoring was ever incorporated into such a score; Dr. Cutino had not seen evidence of that either.

Dr. Schmeltz inquired about community participation in community CBAs, impact assessments, and permitting decisions at the Air District. Dr. Fine acknowledged this as a potential area for consideration. Currently, there are no CBA provisions in permitting rules, but the Air District works to ensure relevant public participation and awareness (e.g. through public noticing). Dr. Fine noted that the Air District’s Board of Directors recently passed a policy to return some penalties to communities without requiring facility involvement. Federally, agencies like the Department of Energy now mandate CBAs for some programs under initiatives like the Inflation Reduction Act. Dr. Holm suggested considering the

burdens on overburdened communities when increasing the scope of opportunities for community involvement.

Councilmember Raheja expressed appreciation for Dr. Cutino’s presentation, and inquired about other states’ incorporation of cumulative impacts in non-regulatory work. Dr. Fine responded that the primary example of this at the Federal level is the Justice40 initiative.

Council Action

No action taken.

ACTION ITEM

5. DELIBERATION ON THE KEY FINDINGS IN EXISTING RESEARCH ON CUMULATIVE IMPACTS

Greg Nudd, Deputy Executive Officer of Science and Policy, gave the staff presentation *Deliberation on the Key Findings in Existing Research on Cumulative Impacts*, including: action requested by the Council; proposed key findings; and establishing key findings.

The original proposed key findings were:

1. *Communities experiencing racism and poverty are more sensitive to the health impacts of air pollution.*
2. *There are likely synergistic impacts from multiple pollutant exposures.*
3. *The science is still in development and these impacts may not be fully quantifiable at this time, but some additional quantitative or semi-quantitative estimates would be helpful in policy development.*
4. *Even without full quantification, the science on these issues is strong enough to justify policy changes.*

Public Comments

No requests received.

Council Comments

Vice-Chair Martien noted the importance of synergism, suggested “vulnerable” as a term of art, drew attention to the inclusion of community members as key stakeholders, and emphasized that the end goal should be kept in mind, specific methods being more suitable for specific policy problems. Dr. Holm reflected that the first and second items in the proposed statement had some overlap. Dr. Schmeltz advocated for including community experience in assessments. Board Chair Hurt linked climate vulnerability with health impacts, and suggested clearer language to promote community understanding. Councilmember Raheja proposed inclusion of historic as well as current impacts, and the inclusion specifically of the phrase “environmental justice”. Chair Solomon proposed revising findings to highlight community vulnerability and list relevant factors, acknowledging the limitations in quantifying interrelationships.

Chair Solomon supported the goal of plain language communication for target audiences. Dr. Holm asked whether the goal was to produce a “plain language” version instead of, or in addition to, the current statement. Chair Solomon inquired whether the statement was to be an interim version. Mr. Nudd clarified that the staff’s intent was for it to represent interim findings, to set the stage for further work; and that staff preferred to focus on plain language, so that the statement could be relayed to target audiences such as the Board of Directors and the Community Advisory Council.

Vice-Chair Martien offered an additional statement to reflect an intention to include community stakeholders. Dr. Holm offered a simplification of the language regarding synergism, which Prof. Kleinman later amended. Dr. Fine suggested including non-chemical stressors, which Chair Solomon and Dr. Holm incorporated.

Councilmember Raheja recommended emphasizing “marginalized communities” specifically. Chair Solomon, Dr. Schmeltz, Dr. Fine, and Dr. Holm suggested revisions to language regarding quantifiability, the sufficiency of existing science, and the inclusion of community perspectives and qualitative as well as quantitative data and methods. Prof. Kleinman offered that cumulative impacts and policy changes should take into account the effects of multiple pollutants in all communities. Councilmember Raheja responded that it was important to specifically consider marginalized communities, considering that they have historically been left out of these discussions. Vice-Chair Martien proposed an item on simplifying methods for specific policies.

Dr. Holm referenced the Healthy Places Index (HPI) as a tool that includes resilience factors, not just vulnerabilities. Chair Solomon acknowledged its utility, but expressed reservations; would the Council say that a park near a facility should discount emissions from the facility? Dr. Holm responded that the District might improve resilience factors through non-permitting actions, such as funding. Dr. Schmeltz offered that the current language around “qualitative and quantitative” might be inclusive enough. Dr. Martien suggested amending the second items to include both positive and negative factors. Chair Hurt supported emphasizing positive factors, noting community sensitivity to the term "vulnerable." The Council amended its statement to express that some communities remained more vulnerable despite the influence of positive factors.

Council Action

The Council deliberated, amended, and found agreement upon proposed key findings found in the literature related to Cumulative Impacts.

Dr. Holm made a motion, seconded by Professor Kleinman, to **adopt** the following amended proposed key findings found in the literature related to Cumulative Impacts:

Proposed Key Interim Findings:

1. *Despite resilience and adaptation, some communities are more vulnerable to the health impacts of air pollution than others.*
2. *Community health vulnerability is related to multiple stressors, including racism, poverty, historic environmental injustice, environmental exposures, housing insecurity, effects of climate change, and other factors.*
3. *Effects of exposure to multiple stressors can be greater than the sum of the individual effects.*
4. *The science on these issues is strong enough to justify science-based policy changes.*

5. *Additional quantitative, and qualitative data and methods, as well as community perspectives, are needed, even as we move forward with policy development, based on the current science.*
6. *Methods for considering cumulative impacts and related policy changes should be developed in partnership with community members, notably those from marginalized populations.*
7. *Methods for accounting for cumulative impacts can be simplified when targeted to specific policy actions.*

The motion **carried** by the following vote of the Council:

AYES: Holm, Hurt, Kleinman, Martien, Raheja, Schmeltz, Solomon.
NOES: None.
ABSTAIN: None.
ABSENT: Carlton.

OTHER BUSINESS

6. REPORT OF THE EXECUTIVE OFFICER/AIR POLLUTION CONTROL OFFICER (APCO)

Dr. Philip M. Fine, Executive Officer/APCO thanked the Council for its deliberation during Item 5. He then asked the Council items that it would like to see agendized at future meetings.

Public Comments

No requests received.

Council Comments

The Council expressed interest in the following topics (for potential future Council presentations):

- comparison of indicators among different state assessment programs that identify California communities that are disproportionately burdened by multiple sources of pollution
- comparison of CalEnviroScreen’s indicators and Bay Area socio-economic indicators
- how CalEnviroScreen is currently being used to measure cumulative impacts
- Benefits Mapping and Analysis Program Community Edition (BenMAP CE) by US EPA
- additional publications or videos of scientific meetings on cumulative impacts
- the utilization of HIAs and CBAs
- the Air District’s working definition of ‘cumulative impact assessment’ and approaches to developing one
- how compliance history is accumulated and used in policy and rulemaking

Council Action

No action taken.

7. PUBLIC COMMENT ON NON-AGENDA MATTERS

No requests received.

8. COUNCIL MEMBER COMMENTS

None.

9. TIME AND PLACE OF NEXT MEETING

Thursday, September 19, 2024, at 9:30 a.m. at 375 Beale Street, San Francisco, CA 94105. The meeting will be in-person for the Advisory Council members and members of the public will be able to either join in-person or via webcast.

10. ADJOURNMENT

The meeting adjourned at 11:20 a.m.

Marcy Hiratzka
Clerk of the Boards
Executive Office

&

Dr. David Holstius
Sr. Advanced Projects Advisor
Assessment, Inventory, and Modeling

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Gina Solomon and Members
of the Advisory Council

From: Philip M. Fine
Executive Officer/APCO

Date: September 19, 2024

Re: Cumulative Impacts Analysis within Air District Policy Development and Programs

RECOMMENDED ACTION

Informational only; no action requested at this time.

BACKGROUND

After reviewing the recommended readings on cumulative impacts analyses and how it has been used in other jurisdictions, the Advisory Council made a number of key interim findings. One of these was as follows:

“Methods for accounting for cumulative impacts can be simplified when targeted to specific policy actions.”

In this item staff will be presenting some potential policy actions that would benefit from additional consideration of cumulative impacts.

DISCUSSION

Air District staff are currently focusing on four different policy actions: community-focused air quality planning, California Environmental Quality Act (CEQA) significance thresholds, permitting for new and modified sources, and setting pollution limits in regulations for existing sources.

Community-focused Air Quality Planning:

Air quality planning under the Clean Air Act has been very successful in improving air quality for everyone, but it is largely structured to address pollutants such as ozone and fine particulate matter (PM_{2.5}). Ozone is inherently a regional pollutant because it forms over time and space as volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) chemically interact in the atmosphere in the presence of sunlight. Similarly, PM_{2.5} has a significant component of secondarily formed pollution as VOCs, NO_x, oxides of sulfur, and ammonia interact in the

atmosphere to create inhalable particulates. Given the regional nature of these pollutants, the approach to statutory and regulatory approach to addressing them has been regional in nature. As a result, sources that are significant to communities may not be large enough across the whole region to be considered significant to air quality planning and are therefore inadequately controlled (e.g. dust sources).

Another aspect of current air quality planning is that it is designed to achieve specified air pollution reduction goals. Given that some populations are more sensitive to air pollution, reducing pollution equally across a region may not provide equitable results. As a result, impacted communities may have both more inadequately controlled sources and more vulnerability to the pollution from those sources.

Community-focused air quality planning would consider the sensitivity of different populations to air pollution. It would also address those sources that may not have been considered “significant” in the past. Application of a cumulative impacts analysis to the design of an air quality plan could potentially enable the Air District to design control strategies that not only meet state and federal standards for ambient air quality, but also potentially provide greater health benefits by focusing on the pollutants or combination of pollutants that are driving health impacts in vulnerable communities. These control strategies are a combination of more stringent regulations, incentive programs, and other policy interventions such as limitations on the growth of transportation emissions.

CEQA Significance Thresholds:

The Air District provides guidance on air quality and greenhouse gas analyses for local land use authorities who must address CEQA requirements in their planning and permitting actions. As part of that guidance, we provide thresholds above which a project is considered to have a “significant” impact from an air quality or GHG emissions perspective. The Air District guidance includes substantial evidence for these thresholds.

Local governments must make their significance determinations based on substantial evidence, and they typically rely on the Air District’s analysis. Projects which are deemed to have significant impacts under CEQA often require more extensive public processes for approval, this can extend project timelines and put the projects at risk. Given the potential policy implications of these significance thresholds, the Air District Board of Directors typically makes the final decision on the thresholds.

Current significance thresholds for PM_{2.5} and toxic air contaminants could be improved by a more thorough consideration of cumulative impacts. The Air District could recommend more protective significance thresholds in certain communities. The Air District could also consider pollutant interactions in setting significance thresholds for risk from toxic air contaminants.

Permits for New and Modified Facilities:

New and modified stationary sources of air pollution are largely required to get permits from the Air District. There are exceptions for sources based on their size and emission rate. The

permitting program is designed to support regional air quality planning, while protecting the health of neighboring communities. Permits require the application of Best Available Control Technology, offsets for significant increases of PM_{2.5}, NO_x and VOCs, and in many cases a Health Risk Assessment (HRA) to address emissions of compounds that have been listed as Toxic Air Contaminants by the State of California. The HRAs are conducted based on guidance, including risk values developed and maintained by the Office of Environmental Health Hazard Assessment (OEHHA). The HRAs consider pollutants on an individual basis and do not account for chemical interactions. The risk values are set by OEHHA at a level intended to be protective of vulnerable individuals.

Air District regulations set maximum impact limits for new and modified sources. No permit will be issued for a project that exceeds a cancer risk of 10 in a million. In overburdened communities, defined based on CalEnviroScreen percentile scores, the toxic risk limit is 6 in a million. The Air District also requires enhanced public notice for new and modified facilities in overburdened communities. The Air District does not have land use authority, and so siting decisions are made before we receive the permit application.

The Air District could improve the protectiveness of our permitting program by setting maximum limits for localized health risks of exposure to PM_{2.5}. Since PM_{2.5} is not considered a toxic air contaminant, it's not addressed in our HRA process. A methodology for calculating these risks was developed by the Air District with the assistance of the Advisory Council and OEHHA. We are currently finalizing this methodology with OEHHA.

Another path for improvement would be a more sophisticated consideration of cumulative impacts in the evaluation of toxic air contaminants in the health risk assessment. This revised methodology would need to be developed in cooperation with OEHHA, but could potentially include consideration of chemical interactions and a more fine tuned approach to addressing population vulnerability.

New Regulatory Requirements for Existing Stationary Sources:

The Air District has the authority to develop and enforce regulations to reduce air pollution from existing stationary sources. The emission standards in the regulations must be technically feasible and practical to implement and enforce. Currently, our regulations (aside from permitting) set emissions limits that are the same across the region. Historically, the priority for new and more stringent regulations has been from control strategies developed to meet regional air quality planning goals, that is they focused on regionally important source categories.

The Air District could consider cumulative impacts when prioritizing the development of new and modified regulations. This change is likely to be one of the outcomes from community-focused air quality planning. Another possible change would be to set stricter emissions limits in certain communities and/or for certain pollutants, based on an analysis of cumulative impacts.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: Greg Nudd
Reviewed by: Dr. Philip M. Fine

ATTACHMENTS:

1. Cumulative Impacts in Air District Policies and Programs Presentation



BAY AREA
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AGENDA: 3

Cumulative Impacts in Air District Policies and Programs

**Advisory Council
September 19, 2024**

**Greg Nudd
Deputy Executive Officer of Science and Policy
gnudd@baaqmd.gov**

Presentation Outline

- **Cumulative Impacts in Key Policies and Programs**

- Air Quality Planning
 - Current regional approach
 - Opportunities for a community-focused approach
- California Environmental Quality Act Guidance
 - Current guidance on thresholds of significance
 - Opportunities for more thorough consideration of cumulative
- Permits (New and Modified Facilities)
 - Current approach with stricter risk limits in overburdened communities
 - Opportunities for a more refined and protective health risk assessments
- Stationary Source Regulations (Existing Facilities)
 - Current approach derived from regional planning
 - Opportunities to consider cumulative impacts when setting emission standards

Air Quality Planning: Current Regional Approach

- **Ozone and fine particulate matter (PM_{2.5}) regional approach**
 - Ozone forms in the atmosphere from emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO_x) – regional approach is required
 - PM_{2.5} has a significant secondary component that forms due to atmospheric chemistry (contributing pollutants: VOC, NO_x, oxides of sulfur, ammonia) but it is also directly emitted
 - The California Air Resources Board (CARB) and the United States Environmental Protection Agency (US EPA) set ambient air quality standards designed to protect most vulnerable individuals
 - Attainment is typically based on the monitor within the region with the highest (most impaired) measurements
 - Worst ozone pollution in the Bay Area typically in the Tri-Valley Area of the East Bay
 - Worst PM_{2.5} pollution measured near major roadways in East and South Bay

Air Quality Planning: Current Regional Approach

- **Ozone and (PM_{2.5}) regional approach continued**
 - Permitting new and modified facilities
 - No net increase in pollutants contributing to ozone or PM_{2.5} concentrations
 - Offsets only required for significant increases
 - Offsets can come from anywhere in the region
 - Best Available Control Technology (BACT) is required
 - Control strategies
 - Air District develops a plan to reduce pollutants and precursors
 - Includes more stringent regulations, incentive programs, and limits on the growth of transportation emissions
 - Regulations set limits on the amount of pollution equipment can emit (e.g. NO_x emissions per unit of heat input for boilers of a certain size)
 - Regulatory limits must be feasible
 - The combined control strategies are applied to a computer model of the regional atmosphere to provide evidence that, if enacted, the area would achieve the ambient air quality standards

Air Quality Planning: Current Regional Approach

• Air Toxics

- California and US EPA identify toxic compounds and set risk values
 - Neither have identified PM_{2.5} as a “toxic” contaminant, leaving its control to the regional approach
- US EPA and CARB develop source-specific regulations intended to provide maximum levels of control of toxic contaminants
- California Office of Environmental Health Hazard Assessment (OEHHA) develops Health Risk Assessment (HRA) methodology
 - HRA uses health risk factors designed to protect most vulnerable
 - HRA considers multiple pollutants, but on an additive basis, not considering synergistic effects
- Air District:
 - Permitting: Sets maximum acceptable risk limits for new/modified facilities with stricter limits in overburdened communities
 - Rule 11-18: This rule sets a risk threshold for existing facilities. Facilities must develop emission reduction plans if an HRA shows an exceedance of the threshold

Air Quality Planning: Community-Focused Approach

- Opportunities for a community-focused approach
 - Address sources that are significantly impacting vulnerable communities but may not be significant on a regional basis (e.g. dust sources, odor sources)
 - Design control strategies to achieve multiple goals:
 - Attain regional state and federal ambient air quality standards
 - Address sources identified by community members as impactful
 - Reduce inequity in pollution exposure
 - Prioritize reductions most beneficial to vulnerable communities
 - Address specific health endpoints (e.g. cancer risk, asthma onset, all cause mortality)

California Environmental Quality Act Guidance

• Current Practice

- Local governments must analyze the environmental impacts of their decisions under the California Environmental Quality Act (CEQA)
- The Air District provides guidance, based on substantial evidence, to local governments on conducting air quality and greenhouse gas impact reviews under CEQA
- The guidance document also addresses how to incorporate environmental justice considerations into decision making
- This guidance includes recommendations for significance thresholds for air pollutants. Projects with impacts below the significance thresholds are often easier and faster to approve
- The Air District Board gives final approval of these significance thresholds
- Local governments are not required to adhere to our thresholds, if their determinations are also supported by substantial evidence

California Environmental Quality Act Guidance

- **Opportunities for improvement**
 - Incorporate Air District-developed local risk methodology for PM_{2.5}
 - Set more protective significance thresholds in overburdened and vulnerable communities
 - Incorporate consideration of synergistic effects into significance determinations for air toxics

Permits for New and Modified Facilities

- **Current approach**

- Requires Best Available Control Technology
- Use current OEHHA guidance for HRAs
 - Does not address synergistic effects of pollutants
 - Does not include localized impacts of PM_{2.5} emissions
- Significant increases in PM_{2.5} and/or precursor emissions must be offset with reductions elsewhere in the region
- Stricter requirements for new toxic emissions in overburdened communities
 - Overburdened communities defined as those in the 70th+ percentile in CalEnviroScreen plus 1,000 ft buffer
 - Enhanced public notice process
 - Stricter toxic risk limits (6/1M vs 10/1M elsewhere)

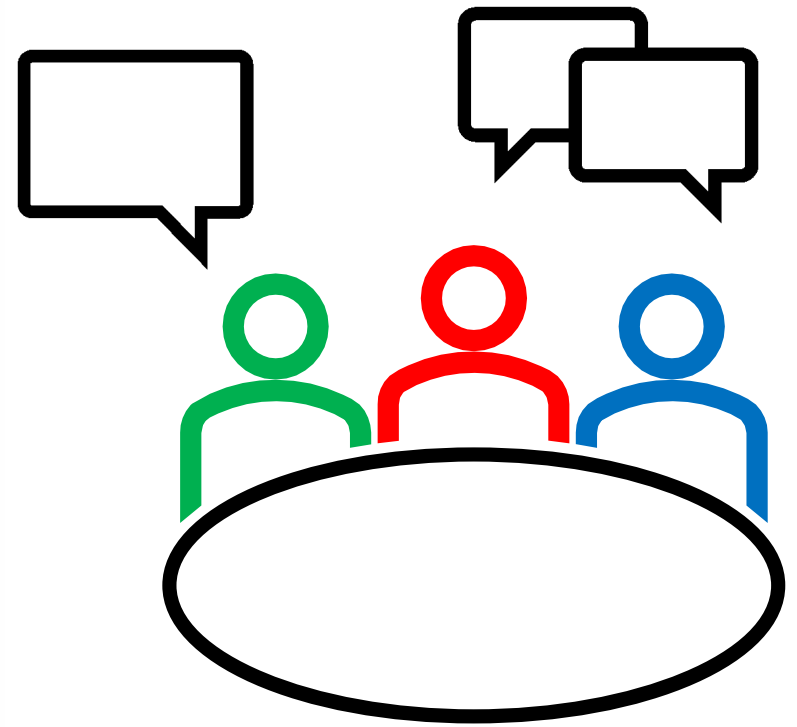
Permits for New and Modified Facilities

- **Opportunities for more protective and refined health risk assessments**
 - Set a local risk maximums for PM_{2.5} exposure, with consideration of cumulative impacts
 - Update HRA methodology to consider interactions between pollutants
 - Update HRA methodology to include consideration of community vulnerability

Stationary Source Regulations (Existing Facilities)

- **Current approach derived from regional planning**
 - Focused on sources of regional significance
 - Emissions standards must be feasible (technical and economic component)
 - Same emissions standard applies across the region
- **Opportunities to consider cumulative impacts**
 - Use community-focused planning to prioritize sources for more stringent rules
 - Set different performance standards for different locations, considering cumulative impacts

Discussion



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Gina Solomon and Members
of the Advisory Council

From: Philip M. Fine
Executive Officer/APCO

Date: September 19, 2024

Re: CalEnviroScreen at the Air District

RECOMMENDED ACTION

Informational only; no action requested at this time.

BACKGROUND

Cumulative impacts are widely understood to vary from place to place. Tools intended to characterize, summarize, and classify this variation have played a role in supporting programs at the Air District for more than a decade. This agenda item specifically responds to the Council's interest in learning about how CalEnviroScreen, among other tools, is now used in this way. The presentation will discuss the approach embodied by CalEnviroScreen, important decision points inherent in the design of similar tools, and the relevant programs that such tools currently support.

DISCUSSION

In recent years, a number of place-based tools, procedures, and criteria have been developed by Federal, state, regional, and local agencies to assist in characterizing the geographic distribution of cumulative impacts. Among such tools, CalEnviroScreen has played a notable role in directly and indirectly shaping place-based designations ("in or out"), which in turn have shaped consequential resource allocations and regulatory requirements through various programs.

At the Air District, CalEnviroScreen contributes to efforts to classify and designate certain areas for: enhanced regulatory requirements; prioritized and/or enhanced resource allocations; and development of localized emission reduction plans. It is also used to help characterize local conditions, and to estimate the degree to which programmatic investments are flowing to certain areas.

The success of CalEnviroScreen has inspired the creation of similar tools by other entities. As the universe of such tools has grown, the pool of data ("indicators") — used by these tools to represent social, environmental, and other conditions — has expanded. In response to a question from the Council, this presentation will briefly review indicators used by other state-level tools that are not used by the current version of CalEnviroScreen (version 4.0).

A diverse mixture of such tools currently supports workflows at the Air District, evolving in tandem with funding streams and programmatic aims. The presentation will map out an illustrative selection of such programs, which depend on various designation protocols and tools upstream. To offer perspective on how the outputs from such tools are translated into designations, two general approaches to adaptation and modification will be discussed.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: David Holstius and Judy Cutino
Reviewed by: Song Bai

ATTACHMENTS:

1. CalEnviroScreen at the Air District Presentation



BAY AREA
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CalEnviroScreen in Air District Policy and Practice

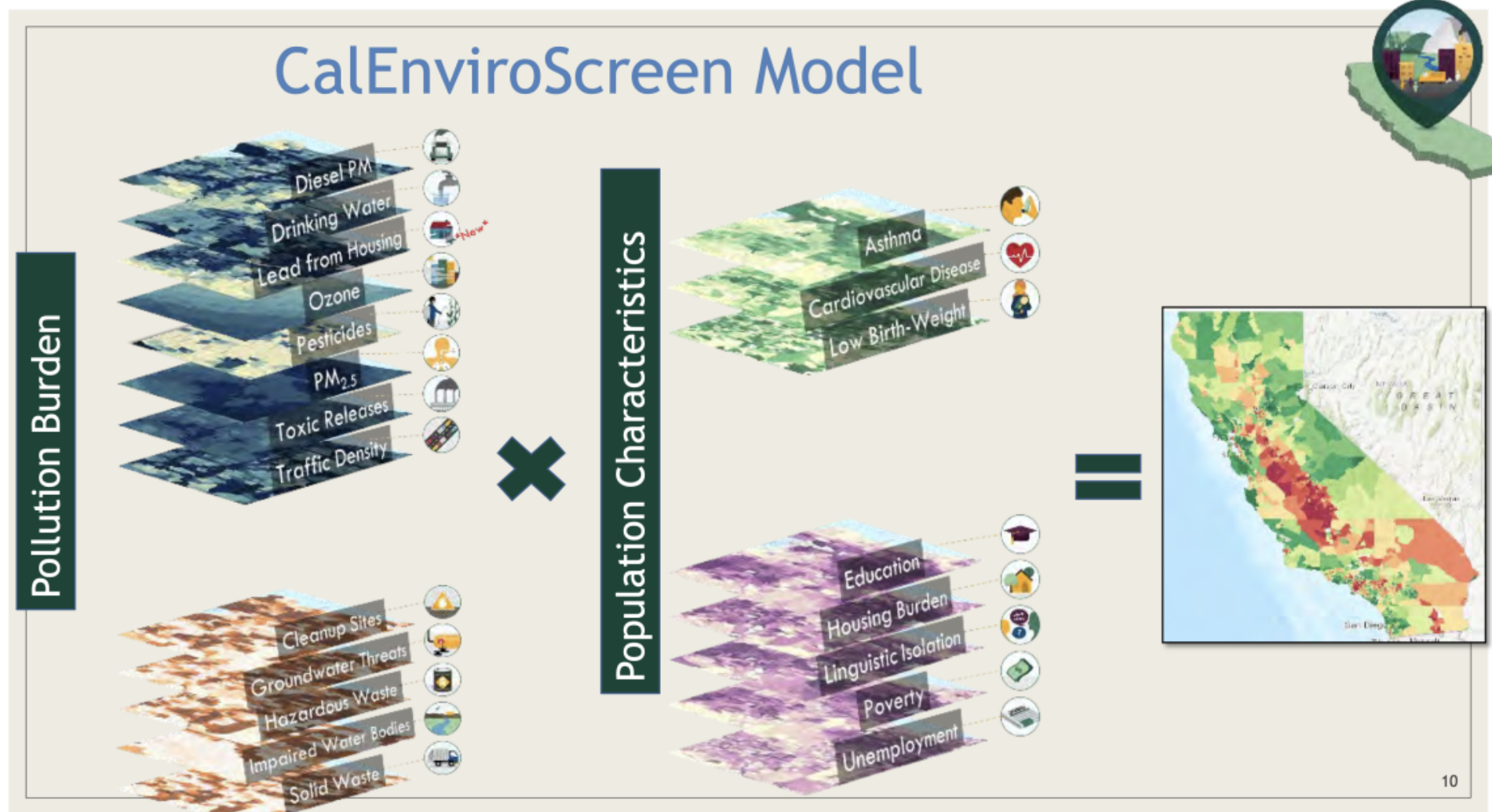
**Advisory Council Meeting
September 19, 2024**

**David Holstius, PhD
Senior Advanced Projects Advisor
dholstius@baaqmd.gov**

Presentation Outline

- CalEnviroScreen (CES) at the Air District
 - Approach and key implementation decisions
 - Notable indicators in other tools
 - Applications at the Air District
 1. Regulatory requirements; incentive programs
 2. Broader context: tools, designations, and programs

GIS-Based Approach



<https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf>

Design Decisions

For the implementation of any such tool:

1. Spatial scale
2. Set of indicators (emphasized in this presentation)
3. How indicators are operationalized*
4. Numeric transformations*
5. Post-transform weighting
6. Reduction method (incl. handling missing data)

** Can affect whether tracking is possible, or only relative prioritization*

Notable Indicators in Other Tools

Sensitive populations*

- % young, old, people of color, minority, w/disabilities, uninsured
- Schools, long-term care, public housing, childcare, prisons

Health endpoints*

- Prevalence: elevated blood lead, chronic obstructive pulmonary disease (COPD), coronary heart disease, asthma in schools
- Incidence: premature mortality

** CES labels its group of health endpoints “Sensitive Populations”*

Notable Indicators in Other Tools (cont.)

Air toxics risk metrics

- Non-cancer risk
- Cancer risk from diesel particulate matter (DPM), and not from DPM

Major sources of emissions

- Facilities listed in multiple major registries
 - CES uses EPA Toxics Release Inventory
- More layers for specific facility types (e.g. incinerators; scrap metal)
 - CES has several, but some tools have more
 - More layers \approx upweighting this class of sources
- Airports, ports, rail yards, rail lines, heavy-duty trucks

Notable Indicators in Other Tools (cont.)

Climate

- Projected flooding
- Extreme heat
- **Other notable indicators**
 - Driving time to hospital
 - Redlining (HOLOC grade)
 - Agricultural land
 - Vegetative cover
 - Impervious surface
 - Open recreational space
 - Energy poverty
 - Homes without internet
 - Homes built before 1960
 - Renter-occupied housing

CalEnviroScreen (CES) at the Air District

Currently, CalEnviroScreen (CES) contributes to Air District efforts to:

Designate areas

- For enhanced regulatory requirements
- For prioritized and/or enhanced resource allocations
- For development of localized emission reduction plans (AB 617)

Characterize local conditions

- In Community Description chapters in AB 617 plans
- In CEQA comments supporting EJ concerns

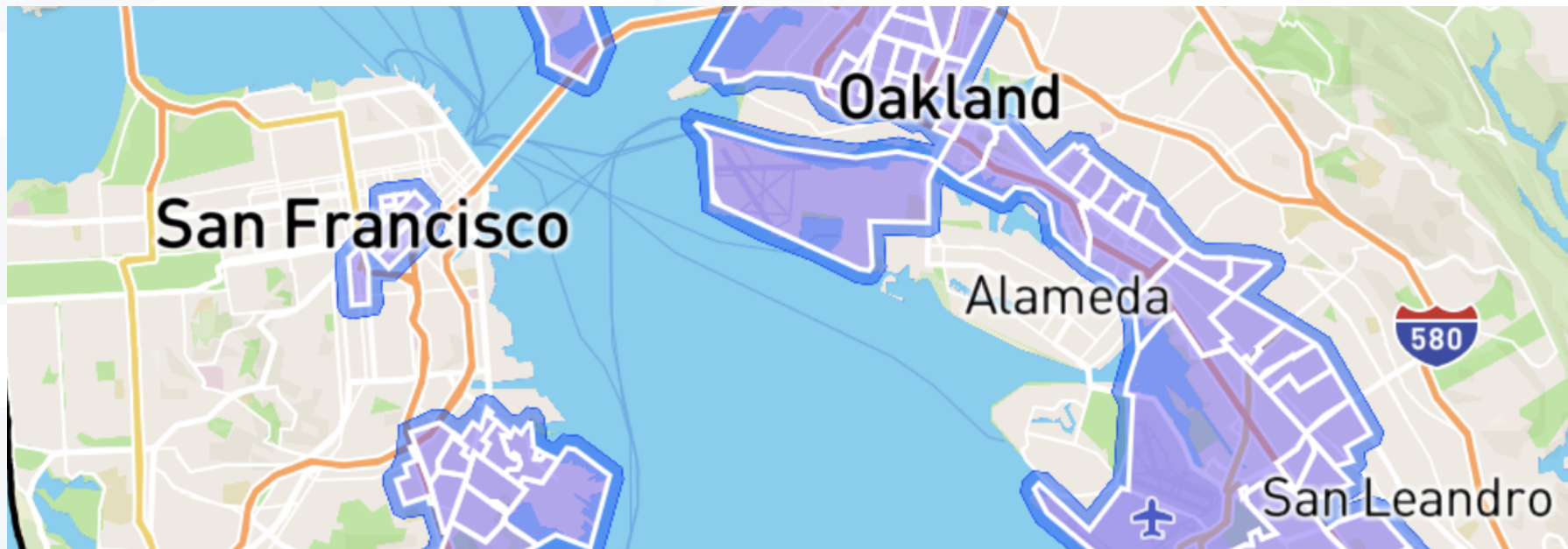
Assess project/program investments

- Which communities are likely benefiting and how much?

“Overburdened Community” Designation

2-1-243

Overburdened Community: An area located (i) within a census tract identified by the California Communities Environmental Health Screening Tool (CalEnviroScreen), Version 4.0, as having an overall CalEnviroScreen score at or above the 70th percentile, or (ii) within 1,000 feet of any such census tract.



“Overburdened Community” Designation (cont.)

Overburdened Community designations trigger **enhanced permit requirements and fees**

2-5-302 Project Risk Requirement: The APCO shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project risk exceeds any of the following project risk limits:

302.1 A cancer risk of 10.0 in one million (10×10^{-6} or 10E-6); or for a project located within an Overburdened Community as defined in Regulation 2-1-243 (other than a project at an Essential Public Service), a cancer risk of 6.0 in one million (6.0×10^{-6} or 6.0E-6);

302.2 A chronic hazard index of 1.0;

302.3 An acute hazard index of 1.0.

302.7 Fee for applications in an Overburdened Community: An applicant with a project that requires a Health Risk Assessment in an Overburdened Community shall pay a fee of \$1,000 in addition to any other permit application fees.

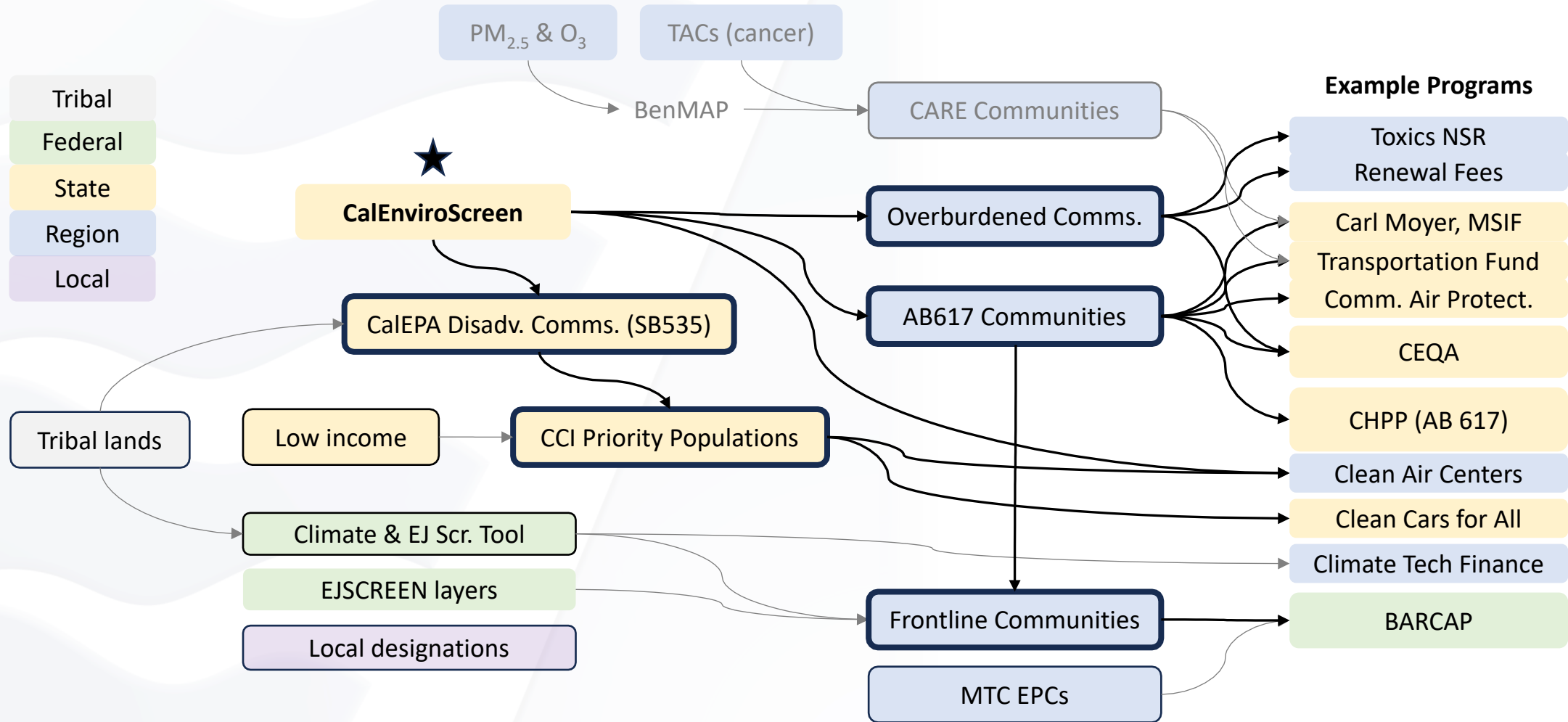
Incentive Projects

CES-influenced designations

- Have largely superseded CARE Program maps
- Shape certain funding eligibility, prioritization, and award amounts
- Used to focus marketing and outreach
- Used to structure evaluation (required by some state programs)
- Programs may aim to allocate significant % to projects in designated areas

Place-Based Tools, Designations, & Programs

(Illustrative, not exhaustive; centering CalEnviroScreen & Air District)



Assessment vs. Designation

Customizing a *tool* is one way to change relative scores

- Six key parameters listed on slide 5

For constructing *designations*, these also matter:

- Choice of threshold
- Topping off with additional inclusion *criteria* (very common in practice)
 - Unioning with other maps; buffering; grandfathering; etc.
 - Example: Overburdened Communities (slides 10–11)
 - Example: CA Climate Investment Priority Populations
- Larger *process* in which the tool may play a supporting role
 - Example: AB 617 community boundaries
 - Designations refined via participatory process with community co-leads

Discussion

- Thank you
- Questions

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Gina Solomon and Members
of the Advisory Council

From: Philip M. Fine
Executive Officer/APCO

Date: September 19, 2024

Re: BenMAP-CE at the Air District

RECOMMENDED ACTION

Informational only; no action requested at this time.

BACKGROUND

The Air District aims to be able to assess the health benefits of actions to reduce emissions and exposures, which requires the consideration of cumulative impacts. At a previous meeting of the Advisory Council, the Council expressed interest in learning more about how BenMAP-CE (Environmental Benefits Mapping and Analysis Platform, Community Edition) is used at the Air District to estimate the effects changes in air pollution would have on selected health outcomes, as well as in discussing potential enhancements to that process.

DISCUSSION

BenMAP-CE is an open-source computer program developed by the US EPA that calculates the number and economic value of air pollution-related deaths and illnesses. The software incorporates a database that includes many of the concentration-response relationships, population files, and health and economic data needed to quantify these impacts. It has been used to answer a variety of policy-related questions both inside and outside the United States, from national to urban scales.

At the Air District, BenMAP-CE is used to attribute impacts due to anthropogenic emissions from large or ubiquitous sources, for multiple health endpoints. As a supplement to the rulemaking process, it is used to predict benefits from proposed interventions, both in terms of (a) geographic and demographic variation in exposure reductions, as well as (b) net impacts, and economic valuations thereof. These predictions begin with modeled air pollution surfaces representing changes in air pollution concentrations: a base case and a counterfactual, typically at a spatial scale of 1x1 km. Then, to estimate corresponding changes in annual prevalence or incidence rates, effect estimates from fitted epidemiological models are applied to relevant subsets of the modeled population, which is stratified by age, sex, and race/ethnicity. Finally, these changes in rates are scaled by the size of the modeled population (also at 1x1 km scale).

For the sake of commensurability, the results are also typically re-expressed in economic terms, using conventional valuation functions supplied by US EPA.

BenMAP-CE can use externally provided health impact functions (HIFs) without modification to its source code. A modified version of BenMAP-CE was created by researchers to experiment with HIFs that explicitly account for interactions between more than one air pollutant. This presentation will briefly review that work and discuss potential implications.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Philip M. Fine
Executive Officer/APCO

Prepared by: David Holstius
Reviewed by: Song Bai

ATTACHMENTS:

1. BenMAP-CE at the Air District Presentation



BAY AREA
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AGENDA: 5

BenMAP-CE in Air District Policy and Practice

**Advisory Council Meeting
September 19, 2024**

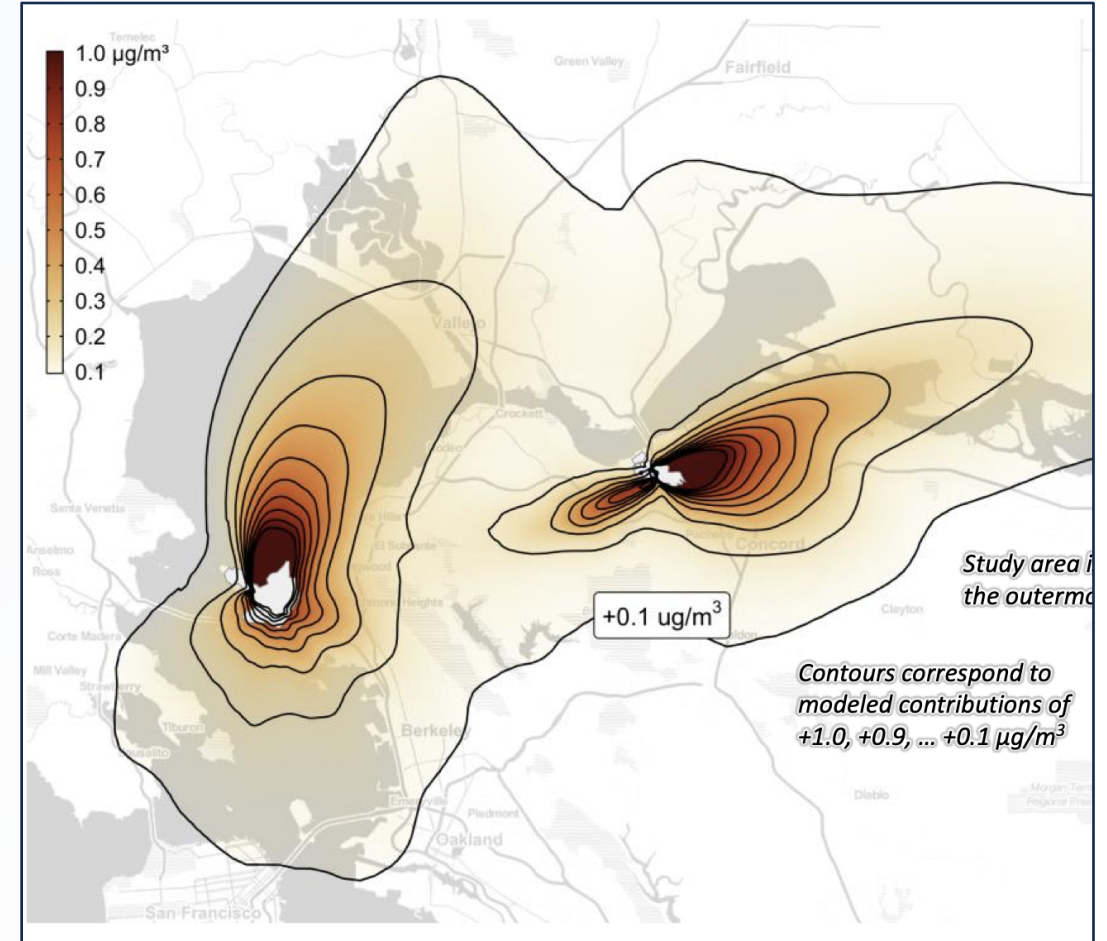
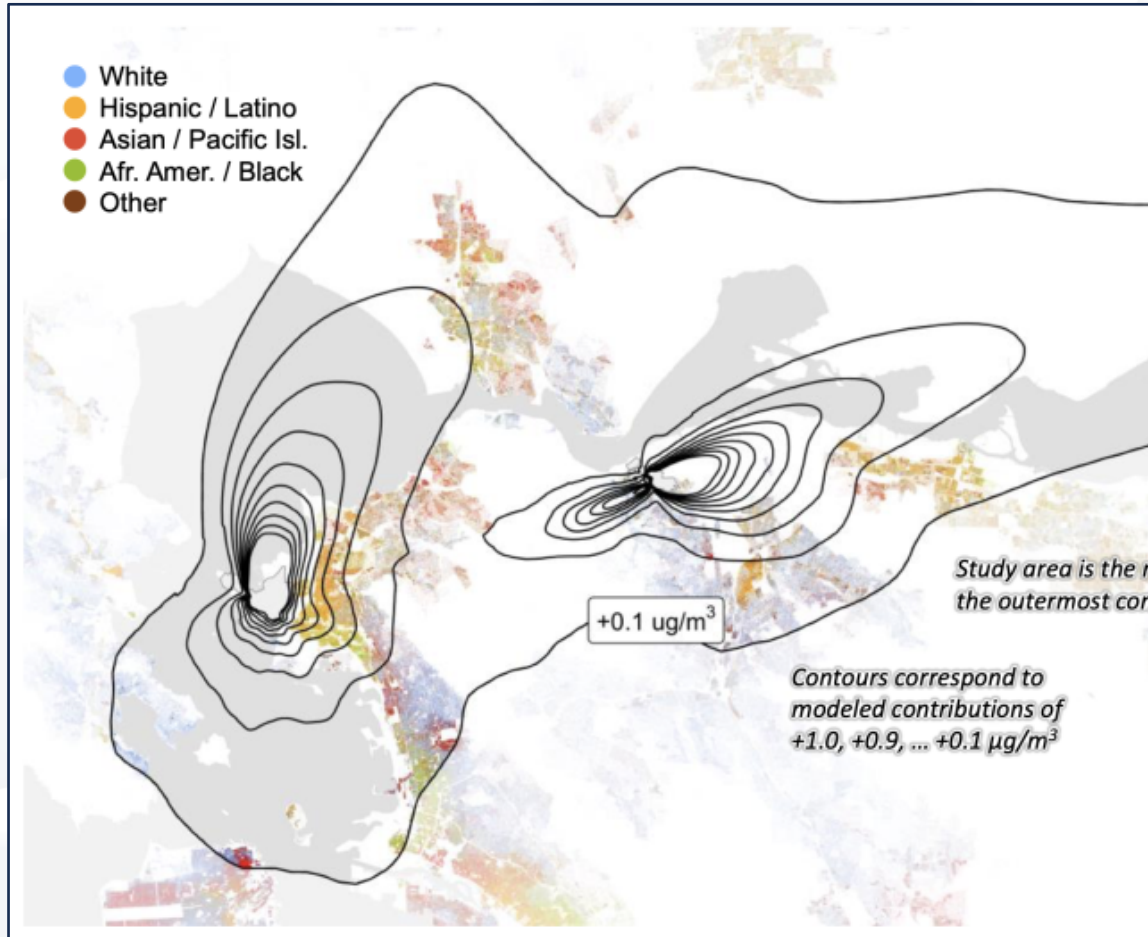
**David Holstius, PhD
Senior Advanced Projects Advisor
dholstius@baaqmd.gov**



Presentation Outline

- BenMAP-CE at the Air District
 - Example application
 - Approach and key decisions
 - Extensibility to combinations of stressors

Example Application



Simulation-Based Approach

Key design decisions in any application

1. Spatial scale
2. Extent of study area / population coverage
3. Set of health impact functions (HIFs)*
4. Economic valuation approaches*
5. Levels and dimensions of analyses of variation

* See also: Martenies et al (2015) *Health impact metrics for air pollution management strategies*

BenMAP-CE at the Air District

Currently, BenMAP-CE contributes to Air District efforts to:

Attribute impacts due to anthropogenic emissions

- From large or ubiquitous sources
- For selected health endpoints (generally “causal” or “likely”)

Predict benefits from proposed interventions

- As a supplement to policy development
- In terms of geographic and/or demographic variation
- In terms of net impacts, and economic valuations thereof

Multi-Pollutant BenMAP-CE

Coffman et al (2024)

Conducted 12 km photochemical modeling (WRF; CMAQ) of changes in criteria pollutants across Atlanta, 2011–2025, attributed to sector-level growth & controls

Modified BenMAP-CE code to handle multipollutant HIFs

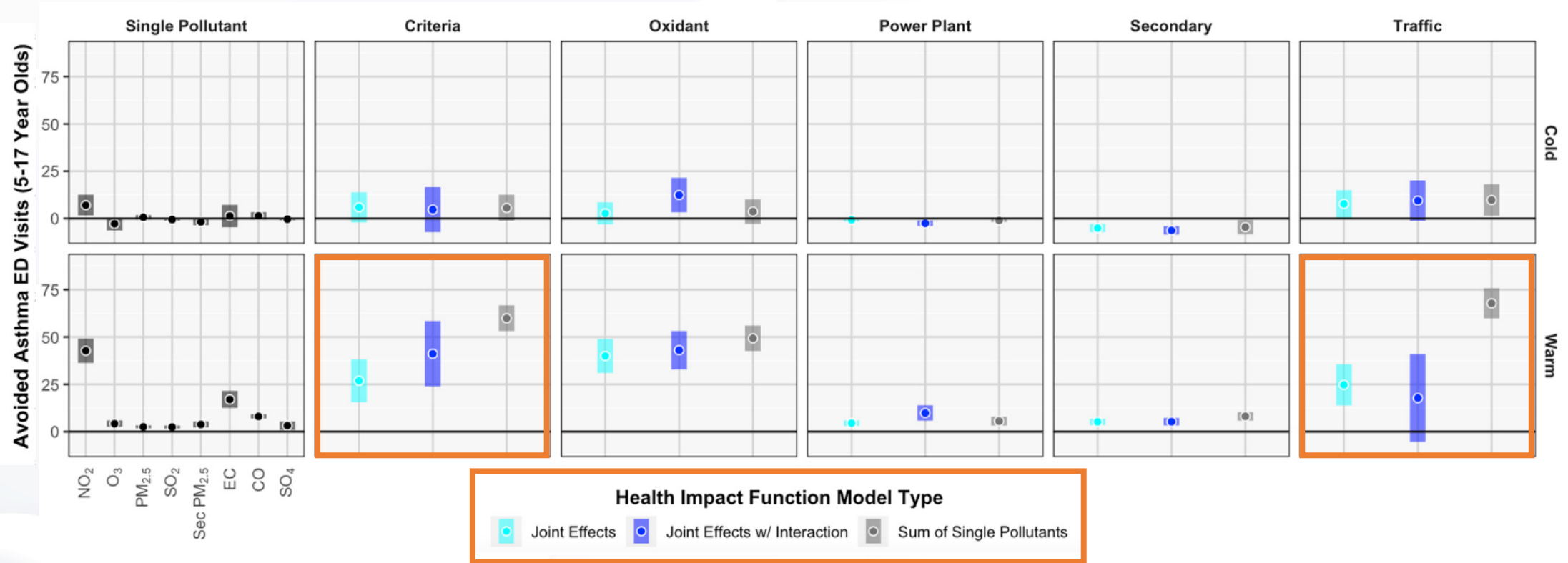
Used pollutant-specific HIF coefficients for asthma emergency department (ED) visit rates, derived from study of same region (Winquist et al 2014)

Holding population constant, predicted change in # events, 2025 vs 2011, via:

- a) “Joint” (multi-pollutant) HIF, no interaction terms
- b) “Joint” (multi-pollutant) HIF, including first-order interaction terms
- c) Sum of single-pollutant HIFs

Multi-Pollutant vs Single-Pollutant

“The multipollutant results were generally of the same magnitude as the summed single-pollutant results, the exceptions being the results for the traffic and criteria pollutants in the warm season.”



Coffman et al 2024. Quantifying Multipollutant Health Impacts Using BenMAP-CE: A Case Study in Atlanta, Georgia. *Environmental Health Perspectives*, 132(3), 037003.

Multi-Pollutant Caveats

1. Additional uncertainty
 - Statistical: interaction terms result in wider confidence intervals
 - Results tend to be more likely to include null
 - Scientific: no ISA-level* causal determinations for these combinations
2. Value of information
 - Additional cost in terms of time and effort
 - Not all differences (in findings) make a difference (to policy)
3. Availability of required inputs

* ISA = Integrated Science Assessment, e.g. <https://www.epa.gov/isa/integrated-science-assessment-isa-particulate-matter>

Non-Chemical Stressors

In principle, the same crank can be turned

- Chiger and Nachman (2024) encourage this line of research
- For health impact functions (HIFs), a variable is just a variable

A suitable study or meta-review would be required

- Both Chiger & Coffman note that not all studies fit the requisite *type* of model, or publish enough details when they do
- The study by Winquist et al (2014) is an outlier in this regard

Discussion

- Thank you
- Questions