U.S. Environmental Protection Agency (EPA) Board of Scientific Counselors (BOSC)

Air and Energy (A-E) Subcommittee

Virtual Meeting Summary

April 1–2, 2020

Dates and Times: April 1, 2020, 1:00 p.m. to 5:00 p.m.; April 2, 2020, 1:00 p.m. to 4:30 p.m. Eastern Time

Location: Virtual

Executive Summary

On April 1–2, 2020, EPA's BOSC Air and Energy (A-E) Subcommittee convened in a virtual meeting. The goals of the two-day meeting were to discuss EPA's response to subcommittee comments on the A-E Strategic Research Action Plan (StRAP), emphasize the program's partner engagement, and review Research Area 4: Public Health and Environmental Exposures and Responses to Emerging Air Pollutants and Sources. The meeting format allowed for presentations, open dialogue, program feedback, subcommittee questions, and EPA responses to questions.

Day 1 consisted of presentations and discussions outlining the A-E program's research portfolio and center capabilities. Day 2 included presentations and discussion regarding partner engagement and Research Area 4.

Dr. Bruce Rodan, EPA's Office of Research and Development (ORD) Associate Director for Science, thanked everyone for their flexibility to meet virtually due to Coronavirus Disease 2019 (COVID-19) gathering restrictions. He hoped the subcommittee would soon visit the laboratories and meet the scientists.

Overview of the A-E Research Program Portfolio

Dr. Bryan Hubbell, National Program Director, A-E Research Program, provided an overview of the new ORD organizational structure. He emphasized that the A-E program is transitioning from the A-E StRAP to research implementation, including A-E program engagement with regions, states, and tribal communities, and has started meetings with research area coordination teams (RACTs) to obtain engagement and assessment needs (e.g., research area summaries, information on partner needs, objectives and goals of outputs, and products).

Dr. Hubbell outlined each of the nine research areas within the A-E program and the program's role and progress within each. Research Area 1 outlines approaches to support air quality management programs; Research Area 2 focuses on approaches to characterize source emissions, air quality, exposure, and mitigation strategies; Research Area 3 emphasizes public health and environmental responses to air pollution; Research Area 4 prioritizes developing methods to measure pollutants of emerging interest; Research Area 5 outlines methods to evaluate environmental benefits and consequences of a changing energy system; Research Area 6 focuses on methods to enable resilience to future environmental stressors; Research Area 7 highlights emerging innovative and advanced approaches to improve air quality and exposure

categorization; Research Area 8 emphasizes novel sources of data to assess human health and ecosystem impacts and risks; and Research Area 9 outlines cross-cutting research in the topic of wildland fires.

As evidenced by the research areas Dr. Hubbell presented, the A-E research portfolio encompasses a broad area of research and is committed to sustained engagement with state, local, and tribal communities through extramural programs, prize-based challenges, and other efforts.

Center Capabilities: Implementing the Portfolio

Mr. Tim Watkins, Director, Center for Environmental Measurement and Modeling (CEMM), explained that CEMM develops, evaluates, and applies measurements and models to characterize the sources, occurrence, transformation, transport, and effects of pollutants and stressors in the natural environment rather than the built environment. The results of this work will provide fundamental methods and models required to implement environmental statutes. CEMM employs approximately 375 people from scientific disciplines ranging from biology to engineering.

Mr. Watkins emphasized that CEMM has several unique research capabilities, including photochemical smog chambers and air dispersion wind tunnels. Mr. Watkins also highlighted how CEMM collaborates and engages with state, local, and tribal communities as well as other federal agencies, academia, and industry to provide the tools EPA needs.

Mr. Watkins emphasized CEMM's work as a foundational role in the A-E program, as CEMM researchers lead projects in all nine A-E program research areas. Examples of this work include developing the Community Multiscale Air Quality (CMAQ) model and building models to measure energy outputs such as power plants and refineries.

A-E subcommittee members and EPA staff engaged in discussion including measuring nanoparticles and a standardized methodology for air toxics. Both topics are areas of research within CEMM and the A-E program.

Dr. Wayne Cascio, Director, Center for Public Health and Environmental Assessment (CPHEA), shared that CPHEA's strengths include its access to human exposure facilities and their broad range of employee expertise. He emphasized that the A-E program vision serves as a focus for CPHEA priorities, and CPHEA scientists are responsible for 45 products in the A-E program. CPHEA scientists engage in various types of research, including wildfire exposure, study risk communication, and limit interventions to wildfire exposure. CHPEA hopes their wildfire research will result in empirical evidence that can inform guidance for effective community-level smoke preparation and response.

Another area of research in CPHEA is the use of clinical electronic health records databases to better understand air pollution. A CPHEA epidemiologist recently published a manuscript using a clinical research database to examine long-term particulate matter exposure to patients with heart failure. Dr. Cascio emphasized that the ability to use clinical databases will be transformative to environmental health epidemiology.

Mr. Watkins raised a third area of CPHEA research addressing important ecological and environmental questions related to sea level rise, resilience, extreme events, and storm water. One project examines the need to understand refugial properties of watersheds and how human activities and natural disturbance events impacted by wildland fire and drought affect salmon refugia. The watershed classification will provide a framework allowing EPA's Office of Water, Region 10, and state-level partners to identify both key refugia and highly vulnerable watersheds to inform multiple activities including water quality standards and prioritization efforts.

After the presentations by both Mr. Watkins and Dr. Cascio, the A-E subcommittee members and EPA staff engaged in discussions regarding the lack of environmental justice (EJ) as a cross-cutting issue. A-E program staff said that ORD does not consider EJ issues as cross-cutting, but the A-E program works with the Sustainable and Healthy Communities program on EJ issues. Other topics included a research focus on hydrogen and other low carbon fuels for energy production and information transparency issues.

A-E Program Partner Engagement

Dr. Sherri Hunt, Principal Associate Director, A-E Research Program, provided examples of recent outreach and engagement activities to elaborate on the A-E program's approach to developing an engagement strategy. The engagement strategy would provide a common vocabulary and understanding of how to communicate and engage with different groups through outreach, communication, and engagement.

The A-E program has a long history of mutual engagement and communication with program and regional offices, states, and tribal communities through RACTs and partner alliance and coordination teams (PACTs). PACTs are more specific and structured to focus on specific A-E program research topics while RACTs engage scientists from across EPA and the states to focus on ORD implementation plan development.

Dr. Hunt explained that internal ORD engagement ("inreach") helps the A-E program learn about other activities and expertise across ORD to identify new opportunities for leveraging across the organization and to enhance collaborations. From this "inreach," the A-E program will develop an engagement strategy to expand engagement to EPA regions, states, local and tribal communities, industry, and non-governmental organizations. Next steps include meeting with individuals and groups to discuss communication and engagement goals and focusing on high-impact activities and what will be the most valuable to the A-E program and their partners.

After the presentation, A-E subcommittee members and EPA program staff engaged in discussion regarding using surveys to collect information from stakeholders. EPA staff said they are working on internal product surveys but noted that external surveys undergo strict federal regulation. Other topics of discussion included community engagement with EJ groups, where policy makers fit into the engagement strategy, and prioritization metrics.

Overview of Research Area 4

Dr. Andy Miller, Associate Director for the Climate, A-E Research Program, explained the emerging issues within the A-E program by outlining the three topic areas: science for air quality

decisions, extreme events and emerging risks, and next-generation methods to improve public health and the environment. He added that another emerging issue is wildfires.

Dr. Miller said there are several mechanisms by which the A-E program responds to emerging issues. He mentioned Pathfinder Innovation Projects, which are annual projects that provide A-E program researchers the opportunity to develop and explore new ideas. The A-E program also has multiple programs to support annual regional, state, and tribal-initiated research in addition to engagement with other agencies, industry, and EPA offices.

Research Area 4 provides a helpful illustration of these responses. The A-E program identified Research Area 4 emerging issues through interactions with other agencies, EPA offices, state and local community stakeholders, and the scientific community. Dr. Miller emphasized that these interactions enabled the A-E program to start addressing ethylene oxide (EtO) and per- and polyfluoroalkyl substances (PFAS).

Dr. Beth Hassett-Sipple, Assistant Center Director for Air and Energy, CEMM, emphasized the importance of RACTS and that each research area convened a RACT to develop a portfolio to address the most pressing needs for scientific and technical information. She explained that the Research Area 4 RACT identified six strategic outputs in the revised draft A-E StRAP, including development of laboratory methods for priority PFAS compounds emitted to the atmosphere; evaluation of organic species impacting criteria pollutant formation; synthesis of research on airborne PFAS emissions, fate, and impacts; and identification of remaining critical knowledge gaps.

PFAS are of concern to the A-E program due to the multitude of diverse industrial and commercial sources that emit PFAS and their presence in ground and water systems. Additionally, multiple states as well as program and regional offices requested PFAS air-related support, so A-E program scientists began acquiring resources to complete PFAS work. Dr. Hassett-Sipple said the highest priority is to fully characterize emissions and understand the fate of the full suite of PFAS compounds emitted from multiple sources. She noted that CMAQ model simulations are vital for connecting multipollutant PFAS air emission rates to ambient and deposition measurements.

Other areas of concern to the A-E program are EtO emissions and volatile chemical product (VCP) emissions. A-E program scientists have identified several deliverables, including emission inventory analysis, laboratory and modeling work, and estimates of VCP emissions.

After the presentations by both Drs. Miller and Hassett-Sipple, A-E subcommittee members and EPA staff engaged in discussion regarding future emerging issues, the difficulty of measuring PFAS compounds, and potential A-E program work related to measuring COVID-19 rates in areas with high rates of chronic respiratory disease.

Meeting Agenda and Other Meeting Materials

The agenda[1] and other meeting materials can be accessed at https://www.epa.gov/bosc/air-and-energy-subcommittee-meeting-materials-april-1-2-2020.

Meeting Participants

BOSC Air and Energy Subcommittee Members:

Charlette Geffen, *Chair*
Sandra Smith, *Vice Chair*
Viney Aneja
Jeffrey Arnold
Bart Croes
Jennifer Hains
Lucinda Johnson*
Cara Keslar
Michael Kleinman
Myron Mitchell
Louie Rivers, III
Annette Rohr
Constance Senior
Art Werner

**EPA BOSC Executive Committee Vice Chair*

EPA Designated Federal Officer (DFO): Tom Tracy, *Office of Science Advisor, Policy, and Engagement*

EPA Presenters:

Wayne Cascio, *Director, Center for Public Health and Environmental Assessment*
Beth Hassett-Sipple, *Assistant Center Director, Air and Energy Research Program*
Bryan Hubbell, *National Program Director, Air and Energy Research Program*
Sherri Hunt, *Principal Associate Director, Air and Energy Research Program*
Andy Miller, *Associate Director for Climate, Air and Energy Research Program*
Tim Watkins, *Director, Center for Environmental Measurement and Modeling*

Other EPA Attendees:

Christine Alvarez	Megan Fleming	Russell Owen	Michael Slimak
Christina Baghdikian	Andrew Geller	Mel Peffers	Kevin Teichman
Tina Bahadori	Andy Gillespie	Zachary Pekar	Salina Tesfay
Doris Betancourt	Ian Gilmour	Carolina Peñalva-Arana	Lynn Tran
Ann Brown	Lindsey Jones	Lara Phelps	Alan Vette
Serena Chung	Samantha Jones	Tom Pierce	Kelly Widener

[1] https://www.epa.gov/sites/production/files/2020-03/documents/april_2020_a-e_bosc_virtual_agenda_-_website_0.pdf

Kacee Deener
Rebecca Dodder
Patrick Dolwick
Robert Elleman
Aimen Farraj
Tad Kleindienst
Todd Krantz
Elisa Lazzarino
William Linak
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Tom Long
Amina Pollard
Anne Rea
Bruce Rodan
Mary Ross
Donna Schwede
John Shoaff
Linda Wilson
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Tiffany Yelverton
William Yelverton

Other Attendees:

Crystal Collins
Sam Grainger
Shan He
Joel Leon
Stuart Parker
Anjuli Ramos
Christine Sookhdeo
Jake Wallace
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