Federal Interagency Committee on Indoor Air Quality (CIAQ) Meeting Minutes

June 14, 2023

Moderator: Laureen Burton, U.S. Environmental Protection Agency

Meeting Overview

- Welcome, Announcements and Introductions
- Federal CIAQ Member Agency Updates (Pages 2–22)

- Indoor Air Quality (IAQ) Area of Interest Presentation

  Ozone Emissions From 222 Nanometer (nm) GUV Lamps and Potential Impacts on IAQ

  Dustin Poppendieck, Ph.D., Mechanical Engineer, NIST, Indoor Air Quality and Ventilation Group Engineering Lab

- Post-Meeting Updates and Announcements
  - The next CIAQ meeting is scheduled for October 2023.

U.S. Department of Energy (DOE)

Agency Point of Contact: Chris Early, 202-586-0514, chris.early@ee.doe.gov

Presentation Titled "Every Breath You Take: Indoor Air Quality and Energy Efficiency"

The DOE held the Better Buildings, Better Plants Summit April 11–13. The DOE Better Plants program is a voluntary partnership that aims to drive significant energy efficiency improvements across energy-intensive industrial companies. Better Plants works with leading U.S. manufacturers and wastewater treatment agencies to set energy, water and waste reduction goals and commit to reducing energy intensity by 25% over a 10-year period across all U.S. operations. In return, partners receive support in the form of technical assistance, tools, resources and national recognition.

On April 13, 1:30–2:30 p.m. EDT, Lawrence Berkeley National Laboratory gave a presentation titled "Every Breath You Take: Indoor Air Quality and Energy Efficiency" that went into details about—

- 3 Steps to Better Air Quality, Lower Risk and More Efficient Buildings
- Finding the Balance: Indoor Air Quality & Energy Efficiency
- Energy and Health in Post-Pandemic Buildings

The slides are available here:
https://betterbuildingssolutioncenter.energy.gov/sites/default/files/2023Summit-Indoor_Air_Quality_and_Energy_Efficiency-Slides.pdf

The Buildings Upgrade Prize Is Happening in 2023: https://www.herox.com/BuildingsUP

Developed by the U.S. Department of Energy Building Technologies Office, Buildings UP aims to build capacity to rapidly and equitably transform U.S. buildings. Teams submitted innovative concepts to leverage the billions of dollars available through the Bipartisan Infrastructure Law, the Inflation Reduction Act, utility rebate programs, and many other funding sources, capitalizing on this once-in-a-generation opportunity to equitably transform a wide variety of buildings across diverse geographies. As teams progress through the prize, they will receive cash prizes and technical assistance to help bring their ideas to life. Indoor air quality is part of the solution.

Equity-Centered Innovation Pathway

Teams proposed a concept to deliver scalable and replicable upgrades to buildings in disadvantaged communities; low- and moderate-income households; and underserved commercial, nonprofit and public buildings. Phase 1 Equity-Centered Innovation winners will each receive a $400,000 cash prize.

Open Innovation Pathway

Teams proposed a concept for replicable and scalable solutions that addresses a geographic area or building type. Phase 1 Open Innovation winners will each receive a $200,000 cash prize.

Winners of both pathways will be eligible to advance to Phase 2 and access technical assistance. Phase 1 winners will be announced in September.

Research Papers, Presentations and Other Work by the Lawrence Berkeley National Laboratory (LBNL)

Working From Home

With ASHRAE, LBNL co-authored a Residential Buildings Committee Residential Issue Brief: "Working From Home." This 10-page paper discusses health and IAQ issues of working from home in a post-pandemic world.

https://www.ashrae.org/file%20library/communities/committees/standing%20committees/residential%20building%20committee%20(rbc)/rib_01-31-2023_working-from-home_final.pdf

Development of Advanced Smart Ventilation Controls for Residential Applications

At the ASHRAE winter conference in February, LBNL presented a seminar: "Development of Advanced Smart Ventilation Controls for Residential Applications."

Forum on Dry Climate Home Performance

At the Jan/Feb 2023 Forum, LBNL gave several seminars:

- "Mechanical Ventilation and IAQ in Recent-Year Homes in Oregon and Colorado"
- "In-Home Exposures to Wildfire Smoke and Options to Mitigate"
- "Emissions of Ultrafine Particles from Gas and Electric Cooking Burners"

New Information Added to the DOE Building America Solution Center at https://basc.pnnl.gov

The Building America Solution Center provides access to expert information on hundreds of high-performance construction topics. Recently, these links and fact sheets were added, provided by EPA and ASHRAE:

- What Kind of Filter Should I Use in My Home HVAC System to Help Protect My Family From COVID-19?
- Flood Cleanup: Protecting Indoor Air Quality
- Filtration and Disinfection FAQ

Centers for Disease Control and Prevention (CDC)

National Center for Environmental Health (NCEH)

Division of Environmental Health Science and Practice (DEHSP)

The Division organized a session at the 2023 American Thoracic Society (ATS) conference on May 23 in Washington, D.C.; many of the presentations contained information about indoor air. The title of the session was Environmental Health Equity Under the Rubric of Vital Conditions. Speakers and their titles are listed below.

- Introduction of the Division of Environmental Health Science and Practice's Vital Conditions Health Equity Plan
  - Ayana Perkins, Ph.D., CDC, Atlanta, Georgia
- Adverse Health Impacts Associated With Wildland Fire Smoke Exposure
  - Ambarish Vaidyanathan, Ph.D., CDC, Atlanta, Georgia
- Trends in Risk for Legionnaires' Disease Based on Access to Economic Resources
  - Nakia Clemmons, M.P.H., CDC, Atlanta, Georgia
- Radon: Reducing a Lung Cancer Risk Factor by Protecting Communities and Buildings
  - Adela Salame-Alfie, Ph.D., CDC, Atlanta, Georgia
- Exploring Asthma Health Care Utilization Data to Reduce the Elevated Risk During the Pandemic
  - Osatohamwen Idubor, M.D., M.H.S., CDC, Atlanta, Georgia
- Volatile Organic Compounds (VOCs) in Low-Income Housing in a Multi-Site Study
  - Ginger Chew, Sc.D., M.S.P.H., CDC, Atlanta, Georgia

Asthma and Community Health Branch

- Evaluation of Home Assessment Training for Asthma Triggers:

  In the past, we presented the CDC, EPA and HUD co-branded evidence-based home assessment training that focuses on asthma triggers. CDC received Office of Management and Budget (OMB) approval (March 28, 2023, OMB Control # 0923-0047) to conduct an evaluation of the training. Specifically, CDC will collect the following information from participants of the evidence-based home assessment training on their experience taking the training:

  - Demographics (background on years of experience in Healthy Home Visits)
  - Perceptions of level of difficulty of training content
  - Pre-/post-test of concepts in the training slides
  - Recommendations for improvement of the training slides

The information collected will be used to help CDC, EPA and HUD assess whether the training content and structure are appropriate for the intended audience (e.g., the material and which areas of the training could be modified if comprehension is a problem).

- Several of the CDC-funded programs at Asthma—Partner Contacts and Programs | CDC contain accomplishments related to indoor air.

- Recent publication: Kelly, G., Idubor, O.I., Binney, S. et al. The Impact of Climate Change on Asthma and Allergic-Immunologic Disease | SpringerLink. *Curr Allergy Asthma Rep* (2023).

Agency for Toxic Substances and Disease Registry (ATSDR)

Office of Community Health and Hazard Assessment

- Two abstracts related to indoor air have been accepted for upcoming presentations:

    - National Environmental Health Association (NEHA) 2023 presentation: Updates to ATSDR's Vapor Intrusion Assessment Approach. Tonia Burk and Sandra Miller.

    - International Society of Exposure Science (ISES) 2023 poster: A Comprehensive Approach to Health Assessment of Exposures from Petroleum Vapor Intrusion. Tonia Burk, Bradley Patrick Goodwin, Sandra Miller.

U.S. Department of Housing and Urban Development (HUD)

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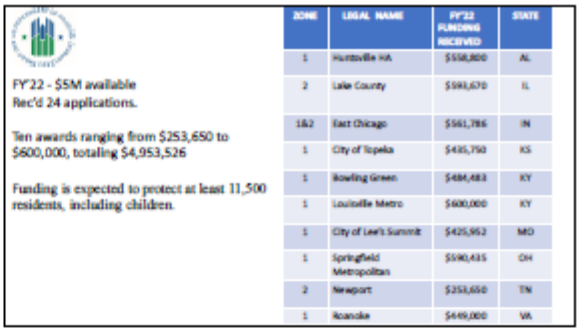

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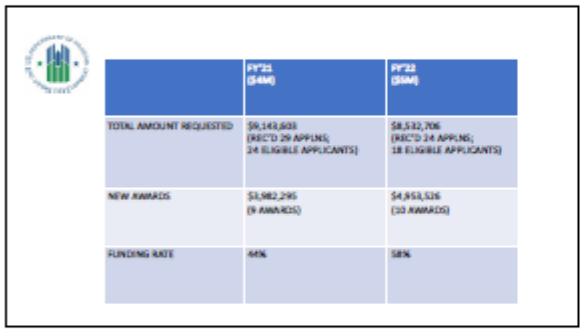

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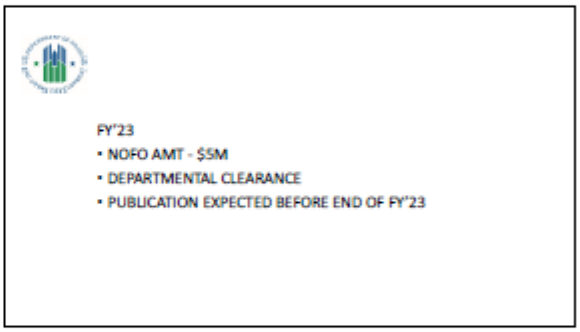

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National Institute of Science and Technology (NIST)

NIST Net-Zero House

Project Contact: Lisa Ng, 301-975-4853, lisa.ng@nist.gov

The NIST Net Zero Energy Research Test Facility (NZERTF) is a two-story, four-bedroom house incorporating energy-efficient construction, space conditioning systems and appliances, as well as solar water heating and solar photovoltaics to meet the house's energy needs. For general information on the house, view the following video: http://www.youtube.com/watch?v=xSzu83fyQaQ. All publications can be found at the NIST NZERTF webpage, http://www.nist.gov/el/nzertf. A tracer gas system that measures both SF_6 and CO_2 has been installed in the home to obtain continuous air change rate measurements and to investigate the performance of CO_2 demand control and other ventilation control approaches. An ozone monitor has been installed to record ozone in each level of the home. A CO_2 heat pump water heater has been installed, and a CO_2 geothermal heat pump will be installed this year.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

In spring 2022, NIST hosted the Chemical Assessment of Surface and Air (CASA) research campaign. A team of 12 external research groups used environmental and chemical perturbations in the NZERTF to investigate the chemistry of indoor environments. Chemical transformation induced by ozone, smoke, ammonia, carbon dioxide, insecticide and VOC additions were investigated. Real-time instruments used in this campaign included a chemical ionization mass spectrometer (CIMS), two proton transfer reaction–mass spectrometers (PTR-MS), an aerosol mass spectrometer (AMS), a water-soluble gas analyzer, and thermal desorption aerosol gas chromatography (SV-TAG) instruments. Formaldehyde, NO_x, ozone and ultrafine particles were measured with other lab-grade instruments. A range of consumer-grade sensors were also deployed throughout the NZERTF during the study. In addition, a variety of surfaces were placed in NZERTF for varying lengths of time to examine the impact of indoor air chemistry changes on surfaces and role surfaces play in impacting indoor air chemistry. These surfaces will be analyzed offsite at collaborators laboratories. Initial data analysis has been presented in 13 presentations at academic conferences. Two journal articles have been submitted for publication. A number of other journal articles are also being prepared.

ASHRAE Standard 62.1

The 2022 version of Standard 62.1, Ventilation and Acceptable Indoor Air Quality, was published last year by ASHRAE. Among many other changes, the new version of the standard contains the following: a reorganization of Section 5, "Systems and Equipment," to better reflect the path of airflow and the relationship of buildings, systems and equipment; improvements to the performance-based IAQ Procedure; requirements for a maximum dew-point temperatures in mechanically cooled buildings; clarified air density adjustments; and removal of items related to transient occupancies that now fall under Standard 62.2. The committee will be meeting during the ASHRAE Annual Conference in Tampa on June 23–25. More information is available at the following webpages:

- https://www.ashrae.org/conferences/2023-annual-conference-tampa
- https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2

ASHRAE Standard 62.2

The 2022 version of Standard 62.2, Ventilation and Acceptable Indoor Air Quality in Residential Buildings, was also published last year by ASHRAE. Among many other changes, the new version of the standard contains more stringent compartmentalization requirements for attached dwelling units and a new requirement for supply or balanced dwelling-unit mechanical ventilation systems for attached dwelling units on enclosed corridors. The committee will be meeting during the ASHRAE Annual Conference in Tampa on June 23–25. Items to be considered in Tampa include a scope modification to address smoking, other scope issues, filtration requirements, an IAQ procedure proposal and IMC/UMC code change proposals. More information is available at the following webpages:

- https://www.ashrae.org/conferences/2023-annual-conference-tampa
- https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2

ASHRAE Standard 189.1

Project Contact: Andrew Persily, andyp@nist.gov

The committee responsible for the ASHRAE/ICC/IESUSGBC SSPC 189.1, *Standard for High-Performance Green Buildings Except Low-Rise Residential Buildings*, is approaching the final stages of the update to the 2020 version of the standard, which will be published in 2023. This standard constitutes the technical content of the *2021 International Green Construction Code*. The committee holds monthly web meetings, which are open to all interested parties. The committee will be meeting during the ASHRAE Annual Conference in Tampa on June 26 and 27. More information on the 189.1 committee activities can be found on the ASHRAE website, where you can sign up for notifications of public reviews and other information at https://www.ashrae.org/resources--publications/free-resources/listserves.

ASHRAE Guideline 44P

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

The ASHRAE committee developing a guideline titled *Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events* continues to meet by webinar monthly with a goal of publishing the guideline in the fall of 2023. The interim planning framework document, titled *Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events* (available online from ASHRAE at https://tinyurl.com/yxyuqh72) and published last year, has been downloaded over 1,000 times.

ASHRAE Guideline 45P

Project Contact: Lisa Ng, 301-975-4853, lisa.ng@nist.gov

The ASHRAE committee developing a guideline titled *Measurement of Whole-Building Performance for Occupied Buildings Except Low-Rise Residential Buildings* has been meeting by webinar every 3 weeks. The committee is rewriting the *ASHRAE 2010 Performance Measurement Protocols for Commercial Buildings* into a guideline.

ASHRAE Guideline 241P

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

A new ASHRAE committee is developing a standard titled *Control of Infectious Aerosols*. The standard will establish minimum requirements for ventilation, filtration and air-cleaning system design, installation, commissioning, operation and maintenance to reduce exposure to infectious aerosols. The first version of this standard is not being developed as an American National Standards Institute (ANSI) standard. The draft standard has completed an Advisory Public Review and is expected to be published this summer.

ASHRAE Green Guide Version VI

Project Contacts: Lisa Ng, lisa.ng@nist.gov, and Tania Ullah, tania.ullah@nist.gov

The sixth revision of the *ASHRAE Green Guide* is scheduled to be published later this year. Version VI is intended for more experienced building professionals, whereas the previous versions contained more introductory content. NIST took the lead editorial roles on the IEQ and Water Efficiency chapters.

ASHRAE Ventilation Podcast

Project Contact: Andrew Persily, andyp@nist.gov

Andrew Persily and Meghan McNulty (of Servidyne in Atlanta) spoke on the topic of "Ventilation in Theory and Ventilation in Practice" during an ASHRAE Journal podcast. That discussion focused on the disconnects between design intent and performance when ventilating buildings and how ventilation theory and research play out in real-world applications. The podcast is available at https://www.ashrae.org/news/ashraejournal/ashrae-journal-podcast-episode-23.

CO_2 Monitoring Outreach

Project Contact: Andrew Persily, andyp@nist.gov

The use of CO_2 monitoring in schools and other buildings has increased in efforts to identify poorly ventilated spaces. In support of these and other activities, Andrew Persily published a paper titled "Development and Application of an Indoor Carbon Dioxide Metric" in the *Indoor Air* journal, available as open access (DOI: 10.1111/INA.13059). The paper refers to an online tool QICO2 that can be used to estimate a space-specific CO_2 concentration based on the target ventilation rate of the space and its occupancy, which can serve as a ventilation rate metric. That tool is available at https://pages.nist.gov/CONTAM-apps/webapps/CO2Tool/#/ and is described in NIST Technical note 2213 Indoor Carbon Dioxide Metric Analysis Tool, which is available at https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2213.pdf.

ASTM: D22.05 Subcommittee on Indoor Air

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

The subcommittee is starting a new effort to produce a guide (ASTM WK81752 Guide for Determination of Airborne PFAS in the Indoor Environment) on analytical methods for the analysis of per- and polyfluoroalkyl substances (PFAS) in indoor air. The intent of the guide is to help the user understand

the range of chemical properties of PFAS found in air, the applicability of various sampling media and extraction methods, and the applicability of various analytical equipment used for detection. This Guide had two negatives on the initial ballot that have since been resolved. The guide will be re-balloted this summer.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

The subcommittee has also started a workgroup to produce a standard test method for the testing of air cleaning technologies (ASTM WK81750 Standard Test Method for Chemical Assessment of Air Cleaning Technologies). This method is designed to be agnostic to the air cleaning technology, quantify the removal performance of multiple target chemicals, and investigate a range of potential byproducts. NIST has conducted experiments to support method development and provide precision and bias data for the method. This method will be balloted for the first time in summer 2023.

Project Contact: Andrew Persily, andyp@nist.gov

The Subcommittee on Indoor Air is also in the process of revising D6245 Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation. A revision of this standard was balloted at the subcommittee level in January 2023. Based on comments received during that ballot, the standard is being revised for another ballot to be issued this summer.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

Other existing standards are continually undergoing review and revision on a 5-year rotation.

ISIAQ STC34:

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

ISIAQ Scientific and Technical Committee (STC34) aims to continuously monitor, collect, and organize information about IEQ guidelines worldwide. In 2021, STC34 created an open integrated IEQ database that is freely accessible at www.ieqguidelines.org. Currently, the database is focused on indoor air quality parameters. The committee continues to meet to extend the database to include standards, regulations and guidelines related to ventilation, thermal comfort, acoustics and lighting.

Germicidal UV (222 nm) Ozone Formation:

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

In-room germicidal UV (GUV) using 222 nm wavelengths has recently gained traction as a method to inactivate airborne pathogens. The technology directs 222 nm light onto occupied spaces to minimize the near-field bioaerosol transmission. Given that this wavelength creates ozone in the stratosphere, there were questions if significant ozone was formed in using this technology indoors. NIST tested a GUV 222 nm lamp in a stainless steel chamber and demonstrated that the lamp did produce ozone. This research can be viewed in the following preprint: https://www.medrxiv.org/content/10.1101/2023.05.17.23290115v1. The impact of the ozone produced on IAQ remains a subject of future NIST studies.

U.S. Environmental Protection Agency (EPA), Indoor Environments Division (IED)

Clean Air in Buildings Challenge

The Clean Air in Buildings Challenge is a call to action by the Biden administration to encourage and assist building owners and operators with reducing risks from airborne viruses and other contaminants indoors. The Clean Air in Buildings Challenge includes a set of guiding principles and best practices that highlight a range of recommendations and available resources for improving ventilation and indoor air quality in buildings, which can help better protect the health of building occupants and reduce the risk of COVID-19 spread.

Key actions outlined in the Clean Air in Buildings Challenge include:

- Creating a clean indoor air action plan
- Optimizing fresh air ventilation
- Enhancing air filtration and cleaning
- Conducting community engagement, communication and education

White House Clean Air in Buildings Pledge Campaign

The White House has invited building owners and operators across the country to join the administration's efforts to help fight against the spread of infectious diseases (such as COVID-19) by publicly pledging to meet the Clean Air in Buildings Challenge. Visit https://www.whitehouse.gov/cleanindoorair/sign-the-pledge to take and sign the pledge!

Request for Information (RFI) for the Clean Air in Buildings Challenge

Building on the Biden administration's Clean Air in Buildings Challenge, a key component of the President's National COVID-19 Preparedness Plan, EPA's Indoor Environments Division (IED) issued an RFI) in late 2022 that sought public comment to inform efforts by EPA and others to support the widespread adoption of actions that lead to improvements in indoor air quality in the nation's building stock, with a particular emphasis on commercial buildings and schools, to help reduce disease transmission indoors and improve public health. More than 400 commentors provided input. IED is reviewing and considering information received during this public comment period to support the potential development, improvement and implementation of technical assistance efforts, including tools, training, guidance and other strategies to support sustained ventilation, filtration, air cleaning and other indoor air quality improvements in buildings. For more information, see FR Docket ID No. EPA-HQ-OAR-2022-0794.

Science

New Materials Available for IED-Sponsored* Why Indoor Chemistry Matters *Report

Four new documents accompanying the IED-sponsored report *Why Indoor Chemistry Matters* are now available on the National Academies of Sciences, Engineering and Medicine (NASEM) website. These include:

- A summary discussing the potential human health impacts associated with exposure to indoor chemicals
- An infographic highlighting key points from the report for the general public
- An action guide for researchers and research funders
- An action guide for building professionals and other stakeholders

The action guides extract important takeaways from the report for each stakeholder group and list the research needs and recommendations that are most relevant to their work. Learn more about the Emerging Science on Indoor Chemistry study, download the report and dissemination materials, and access recordings from the study committee's information-gathering workshop on the NASEM website: https://www.nationalacademies.org/our-work/emerging-science-on-indoor-chemistry.

NASEM Indoor Particulate Matter Report Anticipated Soon

The National Academies are continuing work on an IED-sponsored consensus study report on Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions.

The NASEM Committee on Health Risks of Indoor Exposures to Fine Particulate Matter and Practical Mitigation Solutions is conducting a consensus study that will review the recent scientific literature on the health risks of exposure to fine particulate matter indoors and will offer recommendations for engineering solutions and interventions to reduce risks of exposure to it, including practical mitigation solutions to reduce exposure in residential settings. This study report is coming soon. More information can be found on the study webpage.

IAQ Emergency Preparedness, Response and Recovery

New Wildfire Smoke Fact Sheets Coming Soon on AirNow Website

Three new fact sheets developed to accompany Wildfire Smoke: A Guide for Public Health Officials are coming soon on the AirNow website:

- Coping With the Stress of Wildfire Smoke
- At-Risk Groups of People—*coming soon!*
- Using Air Quality Sensors for Smoke: What to Consider and Understanding Sensor Data (a two-part fact sheet)—*coming soon!*

New fact sheets will be posted on the Wildfire Guide Factsheets page when available. For more information about the Wildfire Guide, including fact sheets and updates, visit https://www.airnow.gov/wildfire-guide-information.

EPA Grants for Wildfire Smoke Preparedness in Community Buildings

EPA published a Notice of Funding Opportunity (NOFO) for the Wildfire Smoke Preparedness in Community Buildings program on March 22, 2023, and applications were accepted through May 9, 2023. This is a new federal grant program to support activities that will enhance community wildfire smoke preparedness and reduce indoor exposure to pollutants in wildfire smoke. States, federally recognized Tribes, public preschools, local educational agencies and nonprofit organizations are eligible for this funding for the assessment, prevention, control or abatement of wildfire smoke hazards in community buildings and related activities. The total estimated funding available for awards is

$10,670,000. EPA anticipates awarding approximately 13–18 grants, ranging from $100,000 to $2,000,000.

Applications are currently under review. Grants are expected to be awarded by fall 2023. For more information, visit our webpage for the Wildfire Smoke Preparedness in Community Buildings Grant Program.

IAQ and Tribal Communities

Tribal Indoor Air Quality Training & Resource Directory

EPA's Tribal Indoor Air Quality Training and Resource Directory is a comprehensive compilation of resources and information to help tribes identify and access various indoor air quality (IAQ) resources and funding to support the creation or expansion of Tribal IAQ programs. This resource directory was developed in collaboration with the National Tribal Air Association (NTAA) and the Institute for Tribal Environmental Professionals (ITEP). The directory is divided into the following sections: Healthy Homes, Schools and Buildings; Asthma; Mold and Moisture; Radon; Commercial Tobacco and Secondhand Smoke; Home Heating, Cooking and Energy; Disaster Preparedness & Mitigation; Disaster Response & Recovery; COVID-19 and Other Pathogens; Funding; Alaska Resource Addendum; and Helpful IAQ Contacts.

In 2023, EPA, in collaboration with other stakeholders, is conducting outreach and continues to promote the Tribal Indoor Resource Directory to other groups, including the Indoor Air Quality Alaska Tribal Air workgroup and the Tribal Air Monitoring Support Center workgroup.

Please visit the Indoor Air Quality in Tribal Communities website to learn more and to download the Resource Directory.

Household Energy (Cooking, Heating and Lighting in Low- to Middle-Income Countries)

Leadership on Cookstoves/Household Energy

Over the past 2 years, EPA has continued leading an effort to broaden and strengthen a whole-of-government approach to addressing the global issue of 4 million deaths annually from exposure to emissions from rudimentary cooking practices in developing areas of the world. At the 27th meeting of the Council of Parties (COP27) in Sharm El-Sheikh, Egypt, in November 2022, EPA organized a key event with the Clean Cooking and Climate Consortium (4C) at the U.S. Pavilion titled "Reducing Emissions from Cooking to Achieve Nationally Determined Contribution (NDC) Goals." To watch this event, please visit https://www.epa.gov/indoor-air-quality-iaq/household-energy-and-clean-air. During this event, EPA Administrator Michael Regan discussed the U.S. whole-of-government approach, in which EPA, CDC, DOE, the National Institutes of Health, U.S. Department of State, and U.S. Agency for International Development are collaborating to implement this worldwide climate, health, gender and livelihood initiative. If you or your organization are interested in joining the USG Household Energy Interagency Working Group, please reach out to EPA's John Mitchell at mitchell.john@epa.gov.

Advancing Sustainable Household Energy Solutions (ASHES) Initiative at Colorado State University

EPA cooperative partner Colorado State University is collaborating with the Berkeley Air Monitoring Group to implement a household energy solutions and air quality initiative called Advancing Sustainable Household Energy Solutions (ASHES). This work includes a webinar series that shares the latest

household energy findings from numerous researchers and their organizations. ASHES webinars have highlighted the work of the World Health Organization's household energy initiatives, EPA Science to Achieve Results (STAR) grantees, the World Bank and other research programs. The latest ASHES webinar was held on June 14, 2023, and focused on Creating a Gender-Just Cooking Sector: Challenges, Lessons and Opportunities. For more information on ASHES, or to watch recordings of previous ASHES webinars, please go to www.ashes-csu.org.

Working With Countries to Implement Their Nationally Determined Contributions (NDCs)

Every country in the world is required under the Paris Climate Agreement to submit a plan to reduce climate emissions, called their Nationally Determined Contributions (NDCs). Sixty-seven countries have now included references to reducing emissions from household energy in their NDCs.

EPA is working with our consortium of partners (Clean Cooking Alliance, Climate and Clean Air Coalition (CCAC), Berkeley Air Monitoring Group, Stockholm Environmental Institute, and the United Nations Framework Convention on Climate Change (UNFCCC)—called the Clean Cooking & Climate Consortium (4C)—to support countries in meeting their climate goals by reducing CO_2, methane, black carbon, and other short-lived climate pollutants (SLCP). The Consortium has been hosting a series of expert consultations to facilitate more direct interaction and support to countries in developing household energy components in their NDCs; organizing their measurement, reporting and verification (MRV) activities; identifying financing opportunities; and implementing best practices for scaling clean cooking programs to meet their national climate goal.

State of the Evidence Base Paper

EPA and its partners are developing a State of the Evidence Base paper for the clean cooking sector, covering research on health, climate, gender, economics and more. This paper, which is targeted to be completed for the end of 2023, will collect existing knowledge about household energy, identify gaps in research, and help actors set priorities for future efforts in this sector.

Notice of Funding Opportunity (NOFO): Cleaner Cooking and Reducing Household Energy Emissions

EPA announced a NOFO in February 2023 to provide approximately $1 million annually in support to eligible entities to improve climate, environment, health, gender equity and livelihoods by reducing emissions in low- to middle-income countries from household energy. The goal of this work is to facilitate the identification, promotion and implementation of effective approaches and government policy actions that result in the rapid uptake and sustained use of clean and cleaner household energy technologies and fuels in low- to middle-income countries. Results of this competition are anticipated to be announced in late June or July, and funds will be awarded soon thereafter.

Radon

National Radon Action Plan (NRAP)

IED continues to support the growing national network of federal agencies, private sector agencies, nongovernmental organizations (NGOs) and states to prevent lung cancer deaths through the NRAP. The NRAP presents a long-range strategy for eliminating avoidable radon-induced lung cancer in the U.S. The NRAP Leadership Council invites leaders who are serious about saving lives; building in health protection

where we live, work and learn; eliminating preventable disease; and realizing a high return on investment in a healthier future to join the NRAP Leadership Council.

Leadership Council members meet monthly to share updates and progress toward the goals outlined in the NRAP. Twice a year, a longer and more in-depth meeting with all members is held to evaluate the collective impact of our work and identify continued actions needed to reinforce priority strategies and activities. The next in-person meeting of the NRAP Leadership Council will take place June 22, 2023, in Washington, D.C.

State and Tribal Indoor Radon Grants (SIRG)

EPA continues to support programs aimed at risk reduction through the State and Tribal Indoor Radon Grant (SIRG) Program. The SIRG Program was appropriated $10.9 million in fiscal year 2023 for state and tribal indoor radon grants, an increase of $2.7 million from last year. This is the first significant increase in annual SIRG appropriations since the program's inception in the late 1980s. In alignment with EPA's current strategic plan, EPA plans to increase funding not only to states, but also to existing and new tribal grantees and is also encouraging state grantees to assist underserved and low-income communities. EPA Regions are in the process of awarding SIRG funds, and we anticipate multiple new state and tribal grantees this year.

In February 2023, EPA finalized the 2022 Annual SIRG Activities Report. This report highlights the important work states, territories and tribes are undertaking across the country to advance risk reduction. The Report highlights many new success stories and a strong commitment to IAQ and radon risk reduction. A link to the report is available on EPA's SIRG Resources webpage.

Building Codes and Standards

EPA continues to collaborate with industry and states to actively engage in efforts to promote adoption of radon-resistant new construction (RRNC) practices through international, national, state and local building codes. These efforts are mandated by the Indoor Radon Abatement Act and are also a key component of the NRAP. Model codes and standards for RRNC exist in single-family, multifamily and large buildings through ANSI/American Association of Radon Scientists and Technologists (AARST) Voluntary Consensus Standards, IED programs and green standards for single family buildings. This includes such programs as EPA's Indoor airPLUS, NAHB 700 and ASHRAE 189.

The International Residential Code (IRC) is the most widely used national building code for residential new construction in the United States that comes from the International Code Council (ICC) family of national building codes. Appendix F in the IRC was adopted in 1995 to provide RRNC optional requirements if someone were to build a home radon resistant. In 2019, an additional testing requirement was added to the Appendix F, along with a rejection of a code change proposal for side-wall venting. In 2022, along with some other minor technical fixes to Appendix F, there was a failed attempt to remove the reference of the EPA Radon potential map as a reference. This was to remove the confusion that the map be used to determine actual radon levels, which is not the map's intended use. Updates will occur for Appendix F and the rest of the IRC in 2025 where EPA will attempt to bring RRNC and testing requirements for radon into the main body of the code.

Radon Credentialing

As part of EPA's responsibility to promote and support the availability of quality radon services to the public, EPA has been working over the past several years, through consultation with states, the public and industry—and in response to congressional direction—to develop a contemporary framework to guide the credentialing of radon service providers going forward. EPA's proposed radon credentialing criteria, published for comment in the *Federal Register* on March 20, 2023, provides a national quality standard for state-run and independent programs that credential radon service providers. The proposed criteria, which are nonregulatory, will encourage consistency across radon credentialing programs. In doing so, these criteria will protect consumers and public health. EPA is accepting comments until June 21, 2023. For more information about the proposed criteria and how to comment, please visit EPA's radon website at www.epa.gov/radon. This URL also provides access to a recording of an April 12, 2023, information session, along with a questions-and-answers document that addresses questions from participants.

EPA's Radon Reference and Intercomparison Program (ERRIP)

As part of annual requirements for secondary radon chambers to be certified to perform radon measurements and calibrations services for the radon industry participating in the National Radon Safety Board (NRSB), AARST's National Radon Proficiency Program (AARST-NRPP), and state radon programs, secondary radon chambers participate in EPA's Radon Reference and Intercomparison Program (ERRIP), managed and operated by EPA's Office of Radiation and Indoor Air, National Analytical Radiation Environmental Laboratory (NAREL), located in Montgomery, Alabama. NAREL provides the only U.S. radon reference that is NIST-traceable. There are currently four industry-certified secondary radon chambers for use by the U.S. radon community. These radon chambers are as follows: Bowser-Morner, Inc., Dayton, Ohio; TCS Industries, Inc., Harrisburg, Pennsylvania; KSU Radon Chamber, Manhattan, Kansas; and Spruce Environmental Technologies, Ward Hill, Massachusetts.

Asthma

Asthma Awareness Month 2023

May was Asthma Awareness Month. The month of May provided EPA with increased opportunities to educate stakeholders on the seriousness of asthma and the effective strategies that can be implemented to improve the lives of people with asthma. Throughout the month, helpful tips for managing asthma were highlighted through EPA social media accounts.

EPA's 2023 winner of the National Environmental Leadership Award in Asthma Management is the Wisconsin Asthma Program, which was introduced during an Asthma Awareness Day event hosted by the Allergy and Asthma Network and received the award for delivering excellent environmental asthma management as part of their comprehensive asthma care services to improve the lives of children and families with asthma. EPA also hosted a webinar on May 23 to recognize the Wisconsin Asthma Program and to showcase and spread best practices. The webinar is archived and available on demand.

EPA participated in Asthma Awareness Day on Capitol Hill, hosted by the Allergy and Asthma Network to engage with members of Congress and their staff. This year's theme was "Moving Toward Patient-Centered Health Care." EPA provided remarks on the Asthma Program approach to combat asthma disparities by promoting comprehensive asthma management to address the indoor environmental determinants of health for people with asthma.

Asthma materials and events hosted by asthma stakeholders across the country are highlighted and promoted through AsthmaCommunityNetwork.org and EPA's asthma webpage.

Asthma Community of Practice

On March 9, 2023, EPA convened the Asthma Community of Practice (CoP) to discuss population health data and analytics to support indoor environmental interventions for asthma. The CoP comprises leaders from across the country representing federal agencies and regional, state and community-based asthma programs, and includes health care payers, state Medicaid programs, health care providers and community-level practitioners who are leading innovative work to expand delivery and reimbursement for in-home asthma interventions. At this convening, Dr. Andrew Beck of Cincinnati Children's Hospital Medical Center and University of Cincinnati Department of Pediatrics shared features and learning from his work on population health situational awareness efforts in Cincinnati to equip cross-sector leaders to design interventions that improve asthma for children and communities across the city. EPA shared ongoing work to help build community capacity to use data and analytics to target indoor environmental interventions and services to have the greatest impact on asthma health outcomes.

On March 29, 2023, EPA hosted the third of a series of three webinars on Asthma Disparities and Community Health, titled "Reimagining Asthma Care, Climate Resilience and Equity in Contra Costa, California: Partnering Health Care with Weatherization to Address the Indoor Environmental Determinants of Health." The featured expert speaker, Michael Kent, Hazardous Materials Ombudsman for Contra Costa Health Services, California, shared his experience building a county-level model with cross-sector health care and weatherization partners to address the indoor environmental determinants of health to improve community asthma outcomes. The presentation slides are currently available, and the webinar video can be accessed on the AsthmaCommunityNetwork website at https://www.asthmacommunitynetwork.org/node/18575.

Federal Collaboration on Asthma Disparities

An important component of EPA's asthma program is equipping stakeholders with ongoing technical knowledge and capacity building. This is accomplished through AsthmaCommunityNetwork.org, an online resource that facilitates peer-to-peer engagement and action learning events. Currently, there are more than 5,000 members registered. EPA hosts technical webinars throughout the year, and they are archived on this website. In addition, AsthmaCommunityNetwork.org features more than 600 asthma educational materials in the Resource Bank and offers mentoring opportunities for registered members. You can also find more information on our asthma award winners, and sustainable financing. If you are not a member, join today!

The Asthma Publications Resource One-Pager has QR codes to several asthma resources—including guides for asthma triggers, tips for controlling asthma, and a home visit checklist for health care professionals. Learn how good indoor air quality contributes to a favorable environment for individuals with asthma. Simply scan the QR codes to access the resources (see the Asthma Resources One-Pager PDF).

Comprehensive IAQ Interventions in Homes

Indoor airPLUS: New Homes

IED's Indoor airPLUS Program (IAP) is a voluntary partnership and labeling program that helps new-home builders address customer health concerns through construction practices and product specifications that minimize exposure to airborne pollutants and contaminants. IAP continues to see sustained growth, welcoming more than 140 new builder and rater partners in the first quarter of 2023. By the end of June 2023, EPA expects to see more than 60,000 total IAP labeled homes reported, with many more expected in the year ahead, due to new partnerships with various production builders.

Indoor airPLUS: Program Updates

In February 2023, EPA proposed updates to the Indoor airPLUS program, including a two-tiered certification program and other changes to strengthen and update program specifications and requirements. The comment period on the proposed updates closed on April 24, 2023. The proposed updates to the program take into consideration the broad range of feedback EPA received in response to a December 2020 opportunity for public comment on revised Indoor airPLUS Construction Specifications proposed at that time. This 2023 proposal is designed to address feedback received on the 2020 proposal and to encourage broad industry participation to advance indoor air quality protections, while strengthening program integrity with an improved verification and quality assurance framework.

Under this proposed program update (Version 2), builders will have an opportunity to choose between two Indoor airPLUS labels: Indoor airPLUS Certification and Indoor airPLUS Gold. The proposed Indoor airPLUS Certification specifications focus on strategies to improve indoor air quality without a prerequisite of ENERGY STAR certification. The proposed Indoor airPLUS Gold specifications include more advanced protections for improved indoor air quality in conjunction with ENERGY STAR certification.

Following the comment period that closed on April 24, 2023, EPA is processing feedback received to inform the path forward. EPA expects to release the final Version 2 Indoor airPLUS Certification and Gold specifications in January 2024. During the first 12 months of implementation beginning January 2024, partners may continue to use Indoor airPLUS Construction Specifications Version 1, Rev.4, or begin to use one of the new two-tier specifications, if finalized. EPA anticipates that the Indoor airPLUS Construction Specifications Version 1, Rev. 4, will be sunset by January 2025. These dates are subject to change.

Comprehensive IAQ Interventions in Schools

Inflation Reduction Act—Schools Air Quality Grants

Provision 60106 of the Inflation Reduction Act includes a new $50 million program to improve school air quality and reduce greenhouse gas emissions, with a particular focus on schools serving low-income and disadvantaged communities. This program will include funding for grants and other activities to monitor and reduce air pollution and greenhouse gas emissions at schools, as well as technical assistance to schools in low-income and disadvantaged communities to address environmental issues; develop school environmental quality plans that include standards for school building, design, construction and renovation; and identify and mitigate ongoing air pollution hazards.

EPA has just completed the process of hosting listening sessions to receive feedback from various internal EPA and external to EPA stakeholders on these School Air Quality grant and technical assistance provisions. The feedback will be analyzed and used appropriately in the development of an upcoming NOFO, expected to be available in late 2023 and posted on https://www.grants.gov.

EPA Engagements and Webinars on Schools

EPA continues to support healthy indoor environments in schools during the COVID-19 pandemic. View IED-hosted webinars in the series, Healthy Indoor Environments in Schools: Plans, Practices and Principles for Maintaining Healthy Learning Environments.

On March 30, 2023, EPA hosted a webinar showcasing successful school IAQ assessments. The webinar, titled "Power in Your Pocket: Conducting Walkthrough Assessments Using EPA's School IAQ Assessment Mobile App," demonstrated EPA's mobile app. The webinar featured Jennifer Fowler, Director of Environmental Compliance & Sustainability at Florida's Orange County Public Schools, who shared how they implemented a summer program to conduct walkthrough assessments to find and repair issues in their school facilities before they affected student and staff health during the school year. The webinar is available for viewing on demand.

On May 15, 2023, EPA hosted a webinar on healthy indoor environments in schools titled "What Schools Need to Know: Transitioning From Pandemic to Endemic Indoor Air Quality (IAQ) Management." The webinar featured experts Dr. Richard Shaughnessy, Director of the University of Tulsa's IAQ Research Program, and Dr. Richard Corsi, Dean of the University of California, Davis, College of Engineering, who discussed and reflected on lessons learned over the course of the pandemic. These experts provided guidance on how schools can continue to make IAQ a top priority by incorporating best practices into everyday operations and maintenance. The experts also discussed the importance of transitioning from reactive IAQ management to proactive IAQ strategies that anticipate endemic disease spread. In the coming weeks, the webinar will be available for viewing on demand.

EPA continues to actively deliver technical assistance to the schools community through two professional training webinar series: IAQ Master Class Professional Training Webinar Series and IAQ Knowledge-to-Action Professional Training Webinar Series. Since 2015, both series have had more than 22,000 views from live webinars and on-demand recordings online. EPA is eager to drive even more action in school districts through spreading the IAQ Master Class Professional Training Webinar Series across more networks and platforms. Please contact us at iaqschools@epa.gov if your organization would like to use your existing training platforms and vehicles to host or link to the webinar series.

Collaboration With Federal Partners to Promote School Environmental Health

EPA and the U.S. Department of Education are working to sustain and expand a collaborative partnership on healthy infrastructure, indoor air quality investments, and health and learning in schools. This collaboration prioritizes good indoor air quality in schools as essential for achieving learning outcomes, health and well-being and has a special focus on schools serving low-income communities.

EPA continues to collaborate with the DOE's Efficient and Healthy Schools campaign. The campaign aims to help K–12 schools—especially those serving low-income student populations—identify practical HVAC solutions and upgrades to improve energy efficiency while promoting healthier spaces for teaching and learning. This campaign will promote peer-to-peer learning among school participants and recognize schools for their best practices and exemplary solutions. The campaign will also engage supporters—

such as designers, engineers, consultants and program implementers—to better support schools that are investing in efficient and healthy school buildings.

Expanding the Reach for School IAQ Training

Resources for Healthy IAQ in Schools One-Pager: This one-pager has QR codes to several IAQ in schools resources—including guides for parents, teachers, school administrators and school maintenance professionals. Learn how good IAQ contributes to a favorable environment for students; improved teacher and staff performance; and a sense of comfort, health and well-being. In combination, these elements empower schools in meeting their core mission—educating children. Simply scan the QR codes to access the resources. (See the Resources for Healthy Indoor Air Quality in Schools PDF.)

EPA also continues to promote the *IAQ Tools for Schools:* Preventive Maintenance Guidance Documents to help school personnel take a holistic, proactive approach to IAQ issues. The guidance leads school personnel through the steps to develop and implement an IAQ preventive maintenance plan and offers a framework to make the case using a value proposition for an IAQ preventive maintenance plan and gain buy-in from the school community.

Secondhand Smoke and Smoke Free Homes—New Webpages Available

New web-based consumer guidance on secondhand smoke and smoke-free homes is now available on the EPA Indoor Air Quality website. The new guidance expands the conversation of secondhand exposure to tobacco smoke to include secondhand exposure to e-cigarette aerosols and cannabis smoke. The purpose of this guidance is to help inform and increase consumer understanding of the potential impacts of secondhand exposure to all types of smoking indoors. View the new web content at https://www.epa.gov/indoor-air-quality-iaq/secondhand-smoke-and-smoke-free-homes.

COVID-19

Important information on COVID-19 and indoor air is posted on EPA's COVID-19 website at https://www.epa.gov/coronavirus. Specific indoor air COVID-19 content can be found within this site by going directly to https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19.

For multilingual web content on COVID-19 and IAQ, as well as other indoor air environmental health issues, visit https://www.epa.gov/lep.

Consider Subscribing to Email Alerts on IAQ Topics

EPA offers a free subscription service for information on more than 20 indoor air topics—opt in at https://public.govdelivery.com/accounts/usepaiaq/subscriber/new to receive email updates on IAQ. More than 200,000 subscribers regularly receive announcements of upcoming trainings, webinars and events, as well as practical tips and information resources to improve IAQ. Subscribers can choose from among 20 topics, such as mold, air cleaners, radon, environmental asthma, air quality in schools, and IAQ emergency preparedness and response. Many topics are also presented in Spanish. Subscriptions can be cancelled easily at any time.