

Development of a Framework for Evaluating Global Greenhouse Gas Emissions Information for Decision Making

Committee

Donald J. Wuebbles

Chair

Donald J. Wuebbles (Chair) is Emeritus Professor of Atmospheric Science at the University of Illinois. He is also Director of Climate Science for Earth Knowledge. From 2015 to 2017, Dr. Wuebbles was Assistant Director with the Office of Science and Technology Policy at the Executive Office of the President. After many years at Lawrence Livermore National Laboratory, Dr. Wuebbles came to the University of Illinois as Professor and Head of the Department of Atmospheric Sciences in 1994. He also led the development of the School of Earth, Society, and Environment at the University, and was its first director. Dr. Wuebbles is an expert in atmospheric physics and chemistry, with over 500 scientific publications related to the Earth's climate and atmospheric composition. He also provides analyses and development of metrics for translating science to policy and societal responses. He has been a leader in many international and national scientific assessments, including as a coordinating lead author on international climate assessments led by the Intergovernmental Panel on Climate Change (IPCC), thus contributing to IPCC being awarded the Nobel Peace Prize in 2007. He co-led Volume 1 of the 2017 4th U.S. National Climate Assessment. Amongst his major awards, Dr. Wuebbles has received the Cleveland Abbe Award from the American Meteorological Society, the Stratospheric Ozone Protection Award from the U.S. Environmental Protection Agency, and the Bert Bolin Global Environmental Change Award from the American Geophysical Union. He is a Fellow of three major professional science societies, the American Association for the Advancement of Science, the American Geophysical Union, and the American Meteorological Society. Dr. Wuebbles holds a B.S. and M.S. in electrical engineering from the University of Illinois and a Ph.D. in atmospheric sciences from University of California, Davis. He was a member of the joint U.S. National Academy of Science and UK Royal Society Committee on Climate Change that wrote Climate Change: Evidence and Causes in 2014 and updated in 2020.

Kamaljit S. Bawa

Member

Kamal Bawa (NAS) is Distinguished Professor Emeritus at the University of Massachusetts Boston, and Founder-President of the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru, India. His main area of expertise is sustainability science. Among the many awards he has received are the Pew Award in Conservation and the Environment, Giorgio Ruffolo Fellowship at Harvard University, the Gunnerus Prize in Sustainability Science from the Royal Norwegian Society of Letters and Sciences, the international MIDORI Prize in Biodiversity from the Aeon Foundation in Japan, the Linnean Medal from the Linnean Society, and honorary doctorates from the University of Alberta and Concordia University in Montreal. He is an elected Fellow of the US National Academy of Sciences, the Royal Society, the American Philosophical Society, and the American Academy of Arts and Sciences. Dr. Bawa is the founding Editor-in-Chief of *Conservation and Society* and Editor of *Ecology, Economy and Society*. Dr. Bawa received his Ph.D. in botany from Punjab University, India. He recently served on the National Academies' Committee on Developing a Booklet on Biodiversity for the Public and Policy Makers.

Gabrielle B. Dreyfus

Member

Gabrielle Dreyfus is chief scientist at the Institute for Governance & Sustainable Development (IGSD), Washington, DC and Paris, and an adjunct faculty at Georgetown University. She joined IGSD in 2017 after nearly a decade of working at the science and policy interface with the US Department of Energy, rising to deputy director for the Office of International Climate and Clean Energy, and previously with the National Oceanic and Atmospheric Administration, and US Senate. In addition to dozens of scientific and technical publications, Dr. Dreyfus worked as the lead coordinating author on a synthesis report by the International Energy Agency and United Nations Environment Programme on the intersection of energy efficiency and the phasedown of hydrofluorocarbons in the cooling sector. Dr. Dreyfus is a member of the Montreal Protocol's Technology and Economic Assessment Panel Foams Technical Options Committee and Energy Efficiency Task Force, and was a member of the technical review committee of the Global Cooling Prize. She also contributed to the design and implementation of the \$50 million Kigali Cooling Efficiency Program (now Clean Cooling Collaborative), a philanthropic collaboration housed at the ClimateWorks Foundation. She was a 2021 Honoree of Environment+Energy Leader 100. Dr. Dreyfus holds a B.A. in Earth and Planetary Sciences from Harvard University, and a masters and Ph.D. from Princeton University and Sorbonne Université in Geosciences.

Annmarie Eldering

Member

Annmarie Eldering has over 30 years of experience in the fields of air pollution, greenhouse gases, and remote sensing. She retired from NASA's Jet Propulsion Laboratory (JPL) in 2022. Her early work at Caltech focused on measuring and modeling the aerosols that form in the Los Angeles Basin and drastically reduce visibility. Dr. Eldering developed advanced computer models to simulate these processes and evaluate possible strategies for emissions reductions and improvement in air quality. At the JPL, she was the Project Scientist on satellite projects to measure tropospheric air pollution (TES) and later carbon dioxide (the Orbiting Carbon Observatories (-2 and -3)). Through these satellite projects, she has worked closely with the modeling community that is combining ground-based measurements, emissions inventories, and satellite measurements in atmospheric models to create the most complete understanding of the carbon cycle and the state of Earth's atmospheric composition including greenhouse gases. She was also a deputy section manager and section manager in Earth Atmospheric Science at JPL for 5 years, guiding and organizing a cohort of near 100 scientists, technical staff, and postdocs. Dr. Eldering received her B.E. in chemical engineering from Cooper Union and her Ph.D. in Environmental Engineering Science from Caltech.

Fiji C. George

Member

Fiji George has more than 27 years of experience covering corporate climate and sustainability strategy, fundamental science, regulatory and policy experience along natural gas value chain- exploration/production, gas processing, transmission & storage, and liquefied natural gas (LNG). His expertise focuses on researching and implementing sustainable solutions for prudent development and use of natural gas and LNG in a low-carbon economy, and integrating corporate environmental, social & governance (ESG) programs to support the energy transition. Mr. George was a member of the National Academies of Sciences, Engineering and Medicine Committee on Anthropogenic Methane Emissions in the United States: Improving Measurement, Monitoring, Reporting, and Development of Inventories. He is a co-author on multiple peer-reviewed scientific papers, and the architect of the ONE Future Coalition voluntary methane inventory and mitigation program design. He has participated at Intergovernmental Panel on Climate Change (IPCC) Expert Meetings for Technical Assessment of IPCC Inventory Guidelines and provided feedback to the US Environmental Protection Agency on annual US national greenhouse gas inventories. At Cheniere, he leads the development of corporate policies and positions on climate and sustainability issues, including integration of climate considerations into corporate strategies and novel energy transition business plans such as the Cargo Emissions (CE) Tag, Quantification Monitoring Reporting & Verification (QMRV), and Lifecycle Analysis (LCA).

Heather Dawn Graven

Member

Heather Graven is a Reader in the Department of Physics and the Grantham Institute at Imperial College London, UK. She earned her Ph.D. in earth sciences from Scripps Institution of Oceanography at the University of California, San Diego and she worked previously at ETH Zurich, Switzerland. Her research focuses on the use of atmospheric measurements to understand the global carbon cycle and its response to human activities and climate change. She uses radiocarbon and stable carbon isotopes to distinguish fossil fuel and biogenic influences on carbon dioxide and methane, and to investigate carbon cycling in the ocean and land biosphere.

Kevin Gurney

Member

Kevin Gurney is an Atmospheric Scientist, Ecologist and Policy scientist currently working in the areas of carbon cycle science, climate science, and climate science policy at Northern Arizona University where he is a Professor in the School of Informatics, Computing, and Cyber Systems. Dr. Gurney is a co-founder of a for-profit business, Crosswalk Labs, which licenses a product that generates estimates of CO₂ emissions at fine scales across the United States to provide high-resolution CO₂ emissions to businesses, media, states, and local jurisdictions. Gurney's current University research involves understanding elements of the global carbon cycle using a variety of data/model fusion approaches. Over the last two decades Dr. Gurney has focused on quantification of fossil fuel CO₂ emissions at the global ("FFDAS"), national ("Vulcan") and urban ("Hestia") scales. Using data mining and assimilation algorithms, these very high-resolution greenhouse gas quantification products are being used by analysts, scientists, and governments for emissions mitigation planning, tracking and assessment. The US work, in particular, is anchoring efforts at National Oceanic and Atmospheric Administration and the National Institute of Standards and Technology to develop prototypes of a multiscale greenhouse gas information system. He has degrees from UC Berkeley, MIT, and Colorado State University. He previously held faculty positions at Purdue University and Arizona State University. Gurney is an IPCC lead author, an NSF CAREER award recipient, Sigma Xi Young Scientist recipient, a Fulbright scholar, NAU Research and Creativity awardee, and has published over 150 peer-reviewed scientific articles with multiple papers in journals such as Nature and Science and a book from MIT Press, Mending the Ozone Hole.

Angel Hsu

Member

Angel Hsu is an Assistant Professor of Public Policy and the Environment at UNC Chapel Hill and Founder/Director of the Data-Driven EnviroPolicy Lab, an interdisciplinary research group that innovates and applies quantitative approaches to pressing environmental issues. Her research explores the intersection of science and policy and the use of data-driven approaches to understand environmental sustainability, particularly in the areas of climate change and energy, urbanization and air quality. Dr. Hsu has provided expert testimony to the U.S. Senate Committee on Energy and Natural Resources, US-China Economic Security and Review Commission and is a member of the National Committee on US-China Relations and a Public Intellectual Program Fellow. She is a lead and contributing author to global climate science assessments, including the IPCC Sixth Assessment Report and the United Nations Environment Programme (UNEP) Emissions Gap Report. She previously held a joint appointment as Assistant Professor of Environmental Studies at Yale-NUS College in Singapore and the Yale School of Forestry and Environmental Studies as an adjunct. She holds a Ph.D. in environmental policy from Yale University, an M.Phil. in environmental policy from the University of Cambridge, and a B.S. in biology and B.A. in political science from Wake Forest University in Winston-Salem, NC.

Tomohiro Oda

Member

Tomohiro Oda is a senior scientist at the Universities Space Research Association and an adjunct professor at the Department of Atmospheric and Oceanic Science, University of Maryland, College Park. Prior to the current positions, Dr. Oda held positions at NASA Goddard Space Flight Center, Colorado State University, NOAA Earth System Research Laboratory, and Japan's National Institute for Environmental Studies. Dr. Oda is a pioneer of the use of Earth Observations in development of high-resolution carbon spatial emission estimates. During his career, he has advanced spatial carbon emission modeling and the associated error and uncertainty quantification. Dr. Oda has also advanced and matured the carbon emission quantification using new space-based carbon observation. Dr. Oda is the Principal Investigator and developer of the Open-source Data Inventory for Anthropogenic CO₂ (ODIAC) emission inventory data product. He is a science team member of NASA's Orbiting Carbon Observatory mission as well as a key contributor to Japan's Greenhouse gas Observing Satellite (GOSAT) mission. Dr. Oda holds a Ph.D and a master's degree in engineering from Osaka University, Japan and an undergraduate degree in physics from Kwansei Gakuin University, Japan.

Irène Xueref-Remy

Member

Irène Xueref-Remy is Physicist of the National Council of Astronomers and Physicists (CNAP), France, and Principal Investigator of the atmospheric activities at the Center for Scientific Research (CNRS) Observatoire de Haute Provence. She is a Professor at the University of Aix-Marseille (AMU) and she directs research programs at the Mediterranean Institute of Biodiversity and marine and continental Ecology (IMBE) at Aix-en-Provence. Her research focuses on assessing the variability of atmospheric greenhouse gases at different spatiotemporal scales; improving knowledge of emission inventories and natural greenhouse gas fluxes through atmospheric measurements and modeling techniques; and, bridging the gap between science and society by communicating her knowledge through conferences and collaborating with local air quality agencies and stakeholders within her research projects. Her current research focuses on the construction of scenarios for reaching carbon neutrality by 2050 in the Aix-Marseille metropolis in collaboration with local stakeholders. Among others, she is a member of the Scientific Council of the Regional Air Quality Agency and a member of the WMO IG3IS international program (Integrated Global Greenhouse Gas Information System) dedicated to help guiding stakeholders for taking valuable GHG emission-reduction actions in response to climate change. Dr. Xueref-Remy has a diploma of Engineer from the Ecole Centrale de Lyon, obtained her Ph.D. at the University of Grenoble and performed three postdoctoral positions at the Juelich Research Center in Germany, at Harvard University, and at Laboratoire des Sciences du Climat et de l'Environnement in France.

Rachel Silvern

Staff Officer